FAIR RETURN FOR MARITIME ELECTRIC COMPANY (MEC)

EVIDENCE OF

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BEFORE THE

Island Regulatory and Appeals Commission

March 2019

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I INTRODUCTION AND OVERVIEW

Q. PLEASE DESCRIBE YOUR NAME, QUALIFICATIONS AND EXPERIENCE.

A. I am a professor of finance in the Rotman School of Management at the University of Toronto, where I hold the CIT Chair in Structured Finance. I have appeared before most of the major regulatory boards in Canada. These include the CRTC; the National Energy Board; the Ontario Energy Board (OEB); the BCUC; the Alberta Utility Commission (AUC); the Nova Scotia Utilities and Review Board; the New Brunswick Public Utilities Board; the Manitoba Public Utilities Board; the Regie de l'Energie du Quebec; as well as the Island Regulatory and Appeals Commission. I have also filed testimony before the Ontario Securities Commission as well as before civil courts dealing with a range of financial issues. A detailed resume is at Appendix A. Further information and copies of working papers and published articles are on my web page at http://www.rotman.utoronto.ca/~booth.

Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY

A. I have been asked by counsel acting on behalf of the Commission to offer an opinion on the fair rate of return on common equity (ROE) to include in Maritime Electric Company's (MEC) electricity rates for the three year period starting in March 2019.

Q. DO YOU HAVE SOME OVERALL REMARKS?

A. Yes. MEC is a local distribution company with minimal generation, what we commonly refer to as a pipes and wires company. Over the last 20 years, most of these companies have disappeared from the public markets since they generate very stable predictable earnings. This is true of MEC the way it is true of almost every regulated utility in Canada. MEC, for example, is now part of Fortis,[1] the same as Newfoundland Power and the BC gas and private electric companies. Similarly, Enbridge Inc has swallowed up Enbridge Pipelines, Westcoast Pipelines, Consumers Gas, Union Gas and Centra Gas Ontario. The last two almost "pure" regulated

[1] MEC was Fortis' first purchase as it grew out of Newfoundland Power in 1990.

utilities trading on a stock exchange as limited companies were Pacific Northern Gas, which was acquired by AltaGas and Veresen, which was acquired by Pembina Pipelines.

When I first testified with my late colleague Professor Michael Berkowitz, we often used two samples of Canadian firms traded on the Toronto Stock Exchange: 6 local telephone companies (including Island Tel) and 5-6 local gas and electric companies. Now almost all of these companies have either been taken over or morphed into diversified holding companies. Even Hydro One which was partially privatised by the Ontario Government was about to diversify when the provincial government intervened and changed the board of directors. This activity is not limited to Canada. Even in the U.S., we are losing firms. Recently, WGL holdings was acquired by Altagas and Great Plains and Westar merged to form Evergy.

This leads to two problems. First, there are very few pure play Canadian regulated utilities left. Consequently, it is becoming ever more difficult to estimate the fair rate of return for the operating pipes and wires subsidiary. This has always involved what I refer to as the "dirty window" problem: that we are trying to look through the holding company "window" to get information on the regulated operating company. However, that window is getting murkier all the time, which is why I was forced to start looking at U.S. companies for additional supporting evidence.[2] Second, the number of Canadian firms has dramatically shrunk and even the ones that remain, like TransCanada, Enbridge, Fortis and Emera now have increasing US operations that expose them to greater risks. Enbridge and TransCanada, in particular, are now much riskier and no longer comparable to pure transmission and distribution (T&D) utilities.[3]

As a result, my evidence increasingly looks at broader measures of the fair rate of return and the hierarchy principal that fair rates of return increase with risk. For this reason, I start with general macro-economic conditions and the state of the financial markets. I then deal with the two primary models used to estimate the fair rate of return: the capital asset pricing model (CAPM)

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[2] Note Canadian Boards have accepted looking at US companies but recognised the need to make adjustments where appropriate.

[3] Pipelines with expansion plans like Northern Gateway, Canada East and the TransMountain pipeline have suffered huge delays where even approved expansions have been vetoed for short-term political reasons making even pipelines with existing assets risky.

or risk premium model and the discounted cash flow (DCF) model. However, these estimates are from samples of utility holding companies (UHCs) and of necessity involve the dirty window problem. Inevitably, they over estimate the fair rate of return to a pure regulated utility like MEC. I then discuss the reasonableness of the estimates using objective market data from a wide variety of sources where increasingly investment banks freely provide their capital market assumptions and forecasts.

However, to return to a basic assumption, which is that the fair rate of return to MEC has to fit into a hierarchy of required rates of return. At the bottom is the yield, or rate of return, on default free government securities, then the yield on default risky corporate debt, then the yield on preferred shares and finally the overall required return or yield on the equity market. The fair return for MEC should be below that on the overall equity market, since it is a low risk regulated utility, but above that on preferred shares. How it compares to the yield on long-term Canada (LTC) bonds reflects both risk and the tax treatment of interest versus dividend income, where due to the dividend tax credit the yield on preferred shares has often been below that on equivalent maturity Government of Canada bonds. Currently my judgment is that the lower bound to MEC's return is the yield on preferred shares, since for tax reasons, they are a made in Canada yield, whereas the yield on long term Canada (LTC) bonds reflects the massive bond buying programs that have swamped the markets with liquidity over the last 7 years.

What needs to be remembered is that MEC is now owned by Fortis and Fortis finances that investment partly through common and partly through preferred shares, so one important "comparable" security to MEC's common equity is the objective market yield on Fortis' preferred shares. Currently this yield is just over 5.0% versus my estimate of the fair return on the overall equity market of 8.50-9.50%. It is within these limits that I judge my direct estimate of the fair return for a low risk Canadian utility to be 7.5%. This is 0.50% lower than my recommendation in 2010. Further with the changes to the EPA effective January 2017 I am no longer constrained by a minimum common equity ratio of 40%. Instead, the EPA fixes the common equity ratio between 35% and 40%. Traditionally, I have recommended 35% for local distribution companies and 30% for transmission companies. Recently, the Alberta Utilities Commission (AUC, August 2018) has judged transmission and distribution to have the same risk

and allowed them both 37% common equity and an 8.50% allowed ROE. In the AUC's judgment this allows them to raise debt with an A rating.

My personal recommendation is that a 7.5% allowed ROE for the test years based on 35% common equity is fair and reasonable. However, the Commission may want to move to a "half way house" of 8.50% on 37% common equity as a first step in bringing MEC into line with other Canadian utilities.

II FINANCIAL AND ECONOMIC OULOOK

Q. WHY DO YOU START BY CONSIDERING CAPITAL MARKET CONDITIONS?

A. Because the legal standard for a fair rate of return in Canada stemmed from "altered conditions in the money market" where we would now understand the money market to mean the capital market. The Supreme Court of Canada determined a fair rate of return in *BC Electric Railway Co Ltd., vs. the Public Utilities Commission of BC et al* ([1960] S.C.R. 837), where the Supreme Court of Canada had to interpret a statute that provided,

> (a) The Commission shall consider all matters which it deems proper as affecting the rate:
>
> (b) The Commission shall have due regard, among other things, to the protection of the public interest from rates that are excessive as being more than a fair and reasonable charge for services of the nature and quality furnished by the public utility; and to giving to the public utility a fair and reasonable return upon the appraised value of the property of the public utility used, or prudently and reasonably acquired, to enable the public utility to furnish the service:

These statutory provisions articulated the "fair and reasonable" standard in terms of rates, and that the regulatory body should consider all matters that determine whether or not the resulting charges are "fair and reasonable." To an economist, "fair and reasonable" means minimum long run average cost, since these are the only costs, which satisfy the economic imperative for regulation, and by definition do not include unreasonable and unfair cost allocations. The statute also articulated the "prudently and reasonably acquired" test in terms of the assets included in the rate base.

Most statutes also allow the regulatory authority to examine all factors that enter into the rates to ensure that the rates are "fair and reasonable." This includes the firm's capital structure decision, since this has a very direct and obvious impact on the overall revenue requirement. To allow the regulated utility to freely determine its capital structure will inevitably lead to rates that are

unfair and unreasonable, otherwise the management of the regulated firm is not fulfilling its fiduciary duties to act in the best interests of its stockholders.[4]

In terms of financial charges, in Northwestern Utilities vs. City of Edmonton (1929), it was stated that a utility's rates should be set to take into account 'altered conditions in the money market.' A fair rate of return was further confirmed in the BC Electric decision when Mr. Justice Lamont's definition of a fair rate of return, put forward in Northwestern utilities, was adopted:

> *"that the company will be allowed as large a return on the capital invested in the enterprise as it would receive if it were investing the same amount in other securities possessing an attractiveness, stability and certainty equal to that of the company's enterprise."*

This definition is referred to as a market opportunity cost, in that the fair return is what could be earned by investing in similar *securities* elsewhere. Only if the owners of a utility are given an opportunity to earn their opportunity cost will the returns accruing to them be fair, i.e., they will neither reward the owners with excessive profits, nor ratepayers by charging prices below cost.

To any modern financial economist Mr. Justice Lamont's definition of a fair rate of return as an opportunity cost means a market *required* or *expected* rate of return.[5] This is the rate set in the capital or money market as conditions change.

Q. HOW HAVE MONEY MARKET CONDITIONS RECENTLY CHANGED?

A. The Bank of Canada's (the Bank) responsibilities are to "promote the economic and financial welfare of Canada." To do this it conducts monetary policy to "foster confidence in the value of money" and promote the safety and efficiency of Canada's financial system. To do this it manipulates short-term interest rates and conditions in the financial market. In practise, the Bank of Canada mainly operates consistent with what is termed the Taylor rule, after Professor John B. Taylor of Stanford University.

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[4] Note in the US utilities are generally allowed to determine their own capital structure within certain limits for reasons specific to the US and practices that lead to the Public Utility Holding Company Act in 1935 and oversight by the Securities and Exchange Commission.

[5] In equilibrium, the required is the expected rate of return.

The Taylor rule is as follows:

$$r = r^* + i^* + 0.5 * (i - i^*) + 0.5 * (GDP - GDP^*)$$

where *r* is the Bank's actual policy rate, which in Canada is the *overnight rate* and in the US the federal funds rate. The inflation rate is then *i* and *GDP* is the gross domestic product (GDP) growth rate. The superscript stars indicate the Bank's target rates and *a* and *b* are coefficients, which Taylor originally set at 0.50. The Bank of Canada's target rate of inflation has been 2% in a band of 1.0-3.0% for almost two decades and was renewed with the Government of Canada in the Fall of 2016 as part of a new five year pact.

For illustrative purposes assume that the target GDP growth rate is set at 2% and that for the overnight rate at 1%, both of these are real values so do not reflect inflation. Consequently, the "normal" overnight rate would be 3%, which is the sum of the real target overnight rate of 1% and target inflation of 2%. Now suppose both inflation and GDP growth are 0%. This would be a weak economy with below target economic growth and inflation. Substituting these values into the Taylor rule we get

$$r = 1\% + 2\% + 0.5 * (0 - 2\%) + 0.5 * (0 - 2\%) = 1\%$$

So the policy prescription would be to lower the overnight rate from the "normal" "neutral" or target rate of 3% to 1% to stimulate demand. This reduction is based on 1% for the low rate of inflation and another 1% for the sub-par economic growth. The lowered short-term interest rate then stimulates interest sensitive demand such as housing, cars etc., and through them the economy.

In contrast, suppose the economy was growing at above trend at 4% and inflation was at the top of the Bank's range at 3%. In this case substituting into the Taylor rule we get

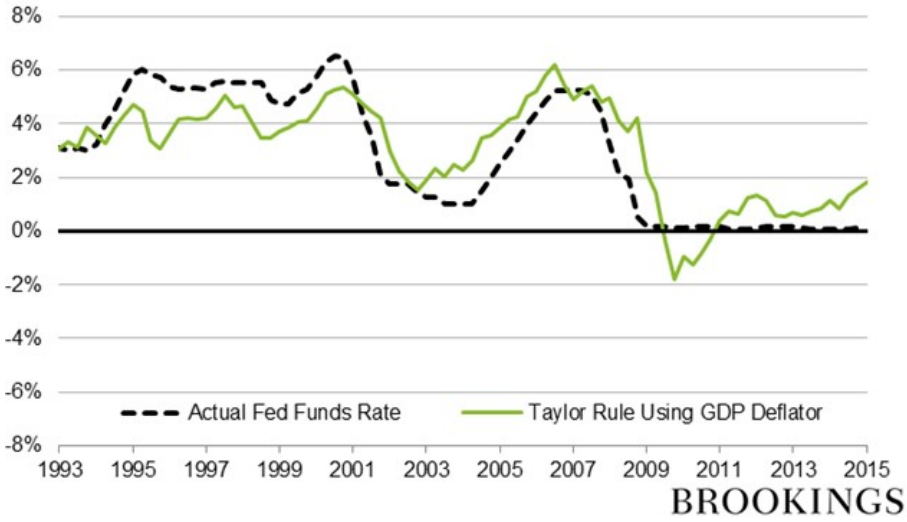
$$r = 1\% + 2\% + 0.5 * (4 - 2\%) + 0.5 * (3 - 2\%) = 4.5\%$$

In this case, with a strong economy and rising inflation, the Bank would set the overnight rate at 4.5%, where the higher interest rate slows down interest sensitive demand and through them the

overall economy and with it inflation. As I will discuss later these values while illustrative are related to where the Bank of Canada has been and where it seems to be going.

These two examples show how the Taylor rule works in "mimicking" the decision process of a central bank trying to maintain an inflation target. In a presentation at the Brookings Institute in April 2015 Ben Bernanke, the former chair of the US Federal Reserve, produced the following graph that clearly shows how the actual US target rate (Federal Funds rate) matched the rate produced by the Tayler rule.

Figure 1: The Original Taylor Rule, 1993-Present

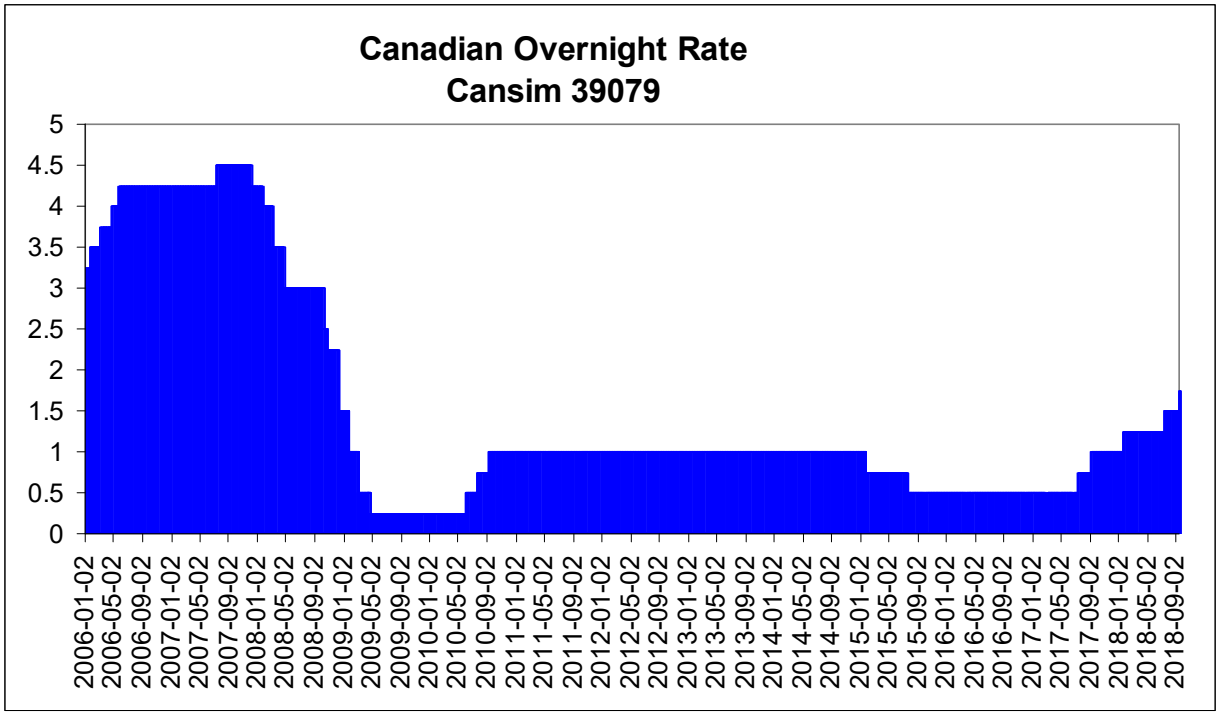


Although simplistic the Taylor rule points to the two key values that are critical for setting the Banks policy rate: the difference between the current and target inflation rate and the output gap, that is, how much spare capacity there is in the economy. It is also why financial markets obsess over these two values as predictors of future financial market conditions and financial costs.

In Schedule 1 is basic macroeconomic data since 1987, where we can clearly see the effect of the Bank of Canada's agreement with the Government of Canada to bring down the rate of inflation, since it has not exceeded 3% since 1991. However, this came with very significant unemployment into the mid-1990s. Then prior to the financial crisis, we had good economic growth and for a time the unemployment rate was actually below what used to be regarded as the non-accelerating inflation rate of unemployment (NAIRU) of about 6.0%. Consumer spending was strong as low interest rates supported the purchase of consumer durables and new housing,

while the strong investment position in Canada was partly due to a dramatic improvement in Canada's terms of trade as commodity prices increased. This created incipient inflationary pressures so that starting in September 2005 the Bank of Canada increased its policy rate, the overnight rate, from 2.5% to reduce the stimulus injected into the economy.

The following graph shows the impact of this tighter monetary policy as the Bank of Canada set the target rate to slow down the economy and reduce inflationary pressures. Of importance is that consistent with the Bank of Canada's 2% inflation target the overnight rate should be *at least* 3.0%. Consequently, at 4.5% up until December 2007 the Bank's monetary policy was restrictive in increasing borrowing costs and slowing interest sensitive demand. This policy stance was reversed due to the impact of the sub-prime mortgage crisis emanating in the United States. The Bank conservatively lowered the overnight rate to 3.0% in May 2008 and it kept it there throughout the summer before being forced to dramatically and rapidly cut the rate to 0.25% in response to the financial crisis triggered by the failure of Lehman Brothers.[6]



[6] 0.25% was thought to be the lowest the rate could be, since otherwise it means negative deposit rates for the settlement balances chartered banks keep at the Bank. However, in practise, the European Central Bank (ECB) had negative rates for sometime so banks paid to keep money on deposit at the ECB.

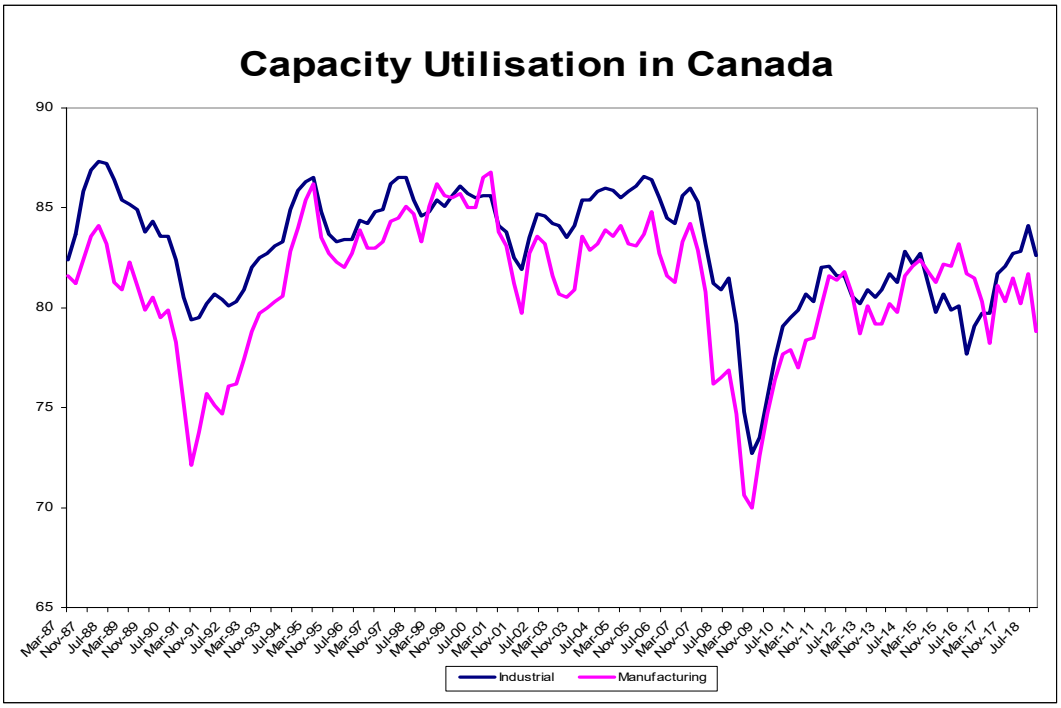
Unlike the US, Canada recovered quickly and the Bank of Canada started "normalising" by increasing the overnight rate in June 2010 since there were obvious signs of recovery. The Bank increased the overnight rate on three separate occasions, each time by 0.25%, to bring it to 1.0%. The Prime rate chartered banks charge their "best" customers increased to 3.0% in tandem with the overnight rate. Expectations in 2011 were that the Bank would resume increasing the overnight rate as the economy continued to strengthen, since 1% is well below the "normal" or "neutral" rate. Further, the Bank of Canada and the Federal Government started to worry that at 1.0% the overnight rate would encourage too much personal borrowing and lead to levels of indebtedness that would have negative implications as interest rates returned to normal levels.[7],[8]

The conundrum faced by the Bank was that while it wanted to stimulate the economy by maintaining low interest rates, it did not want a US style debt-fuelled housing bubble. Additionally, the Canadian economy is not an island and increasingly the Bank was concerned about the transfer of events from the Eurozone, the UK, Japan, the US and China into Canada as they all followed expansionary monetary policies. We can see the impact of events outside Canada in the following graph of the capacity utilisation levels in both the Canadian manufacturing and non-farm sectors.

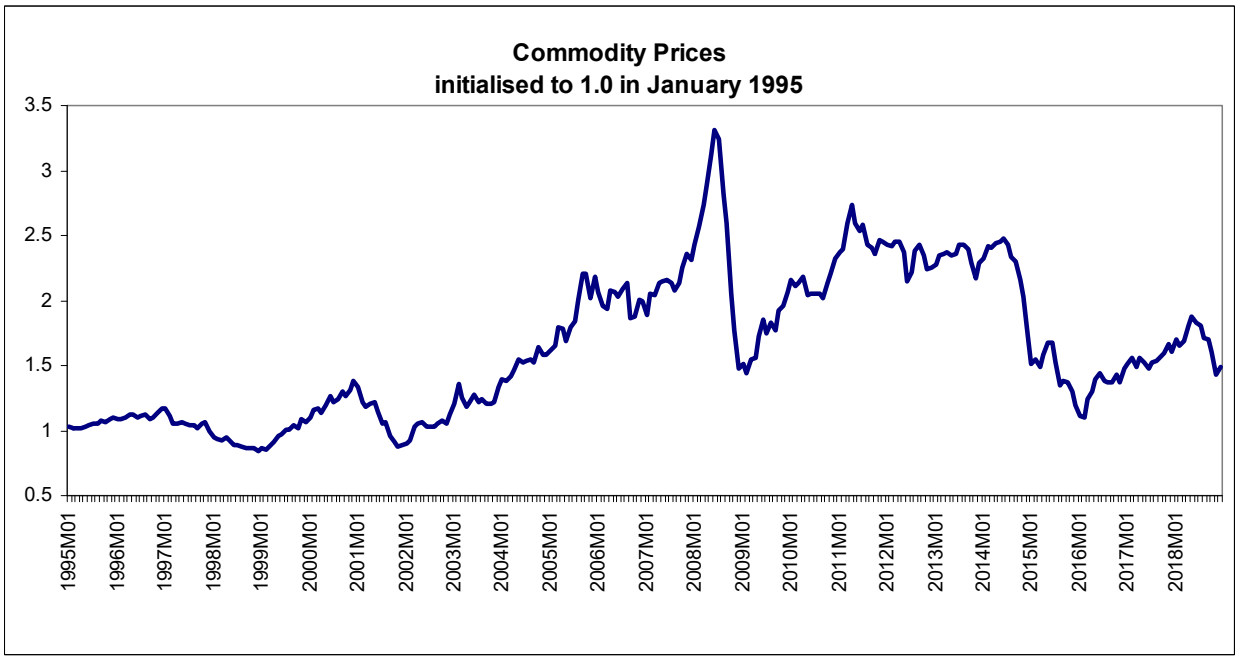
The sharp drop in capacity utilisation during the recession in the early 1990's is evident as well as the slowdown after the financial crisis in 2009-2010. In both cases there followed a normal rapid recovery out of recession and a movement towards stabilisation. However, unlike earlier periods Canada stagnated in 2012-2014 at a "low" level as the recovery did not continue apace. Instead, Canada was hit with the after effects of the Euro crisis and particularly the slow recovery of our major trading partner, the United States. Then just as the US recovery started to gather speed, Canada was hit by the slowdown in China during 2015 and the dramatic drop in commodity prices.

[7] The Bank and Federal Government were both particularly concerned about potential housing bubbles in Vancouver and Toronto.

[8] See the Canadian Bankers Association web site http://www.cba.ca/en/media-room/50-backgrounders-on-banking-issues/657-changes-to-canadas-mortgage-market



The following graph shows the Bank of Canada's commodity price index. We can see the strong increase in commodity prices that started in 2002 as China started to industrialise. The Great Recession in the United States in 2009 caused these commodity prices to collapse, but they quickly recovered until the sharp sell-off in 2015 on growing fears of a China slowdown.



It was this drop in commodity prices that severely affected Canada's resource sector and triggered a "technical" recession in 2015Q2, which in turn weakened capacity utilization. In reaction, the Bank surprised markets by cutting the overnight rate twice in early 2015 from 1.0% to 0.50%. However, since 2016, the economy has strengthened and the Bank has now increased the overnight rate 5 times to its current level of 1.75%.

Q. WHAT HAS HAPPENED SINCE 2016?

A. Mainly two events have occurred, the first is the recovery has continued and the second is the election of President Trump in the United States. In terms of the continued recovery, the fears of a slowdown in China proved overblown and commodity prices have partly recovered. The Table below is from the Bank's Monetary Policy Report (MPR, January 2019) and shows that even Europe grew at 2.5% in 2017, with China still at 6.8%. The United States would undoubtedly have continued to grow in 2017, but President Trump increased business confidence with a promise of reduced regulation and tax reform that stimulated growth to an above trend 2.9% in 2018.

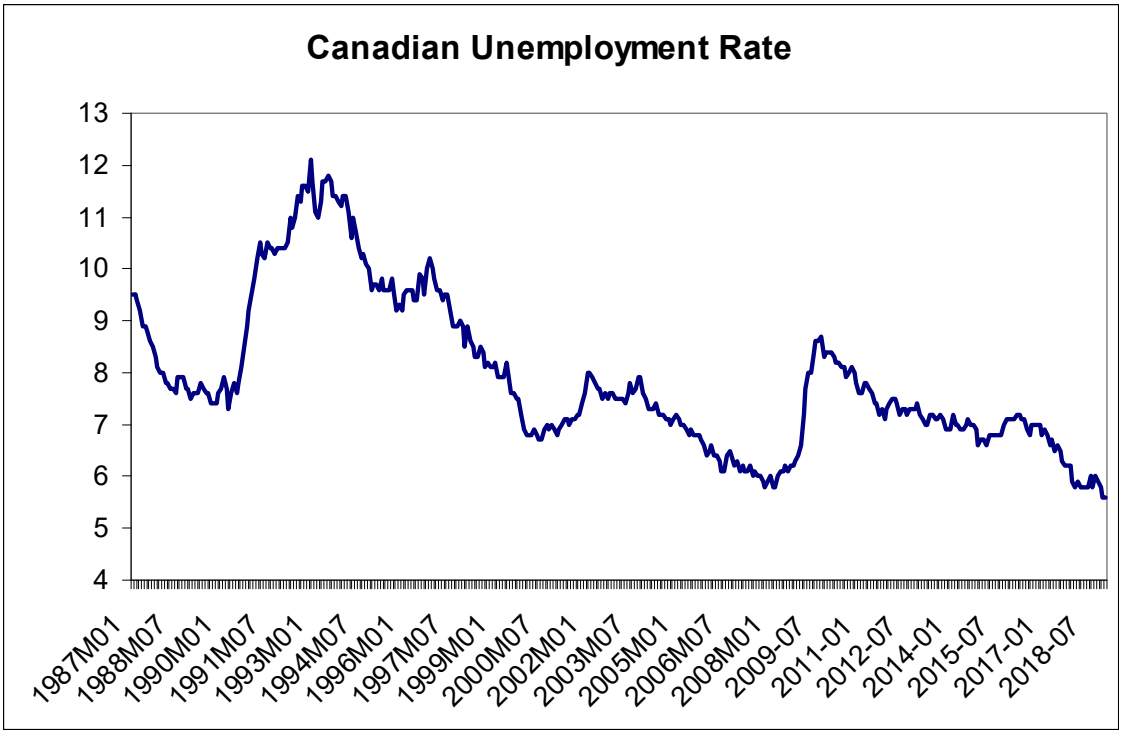
Table 1: Projection for global economic growth

	Share of real global GDP* (per cent)	Projected growth† (per cent)			
		2017	2018	2019	2020
United States	15	2.2 (2.2)	2.9 (2.9)	2.4 (2.4)	1.6 (1.6)
Euro area	12	2.5 (2.5)	1.9 (2.1)	1.5 (1.5)	1.7 (1.5)
Japan	4	1.9 (1.7)	0.8 (0.9)	1.0 (0.8)	0.4 (0.2)
China	18	6.8 (6.8)	6.6 (6.6)	6.2 (6.1)	5.8 (5.8)
Oil-importing EMEs‡	33	4.4 (4.4)	4.4 (4.4)	3.9 (3.9)	4.5 (4.4)
Rest of the world§	18	1.3 (1.3)	2.0 (2.2)	2.0 (2.3)	2.5 (2.6)
World	100	3.6 (3.6)	3.7 (3.8)	3.4 (3.4)	3.4 (3.4)

As the US is our main trading partner this increased growth has spilled over into Canada. As the capacity utilization graph shows, Corporate Canada was getting close to maximum capacity.

Further evidence is in the following graph of the unemployment rate, which shows the persistent decline since its recent peak in 2009. However, this decline was interrupted in 2015 after which it continued its steady decline and is currently (December 2018) at 5.6%. In response to stronger

economic performance, the Bank has started to increase its target rate with five consecutive 0.25% increases, the last one in October, 2018, to bring it to its current level of 1.75%. This is the highest it has been since the financial crisis. On January 9, 2019, the Bank kept its policy rate at 1.75%, but most economists believe that 4-5 more rate hikes are needed to get it to the 3.0% level that was regarded as neutral before the US Great Recession.[9] However, the level of household indebtedness is far higher now than in 2005 and there is concern that the economy's tolerance for higher borrowing costs will not tolerate an overnight rate at 3.0% without tipping the economy into recession. Similar concerns have been voiced in the US.



Q. HOW DOES THIS RELATE TO GDP?

A. In 2016 the Bank was very concerned about housing prices and household indebtedness, which to some extent it still. However, household indebtedness has stabalised as interest rates have increased and economic growth has broadened with increased exports and business investment picking up as firms bump up against capacity constraints. The following table from

[9] The Bank also seems to think an overnight rate in the range 2.5%-3.5% is neutral.

the MPR shows the Bank's approximate 2% economic growth forecast has only 1.0% coming from consumer spending, while housing has a negative impact. Both of these are the result of higher interest rates. From the Bank's point of view, this is a better scenario than recently as the "heavy lifting" is no longer coming solely from the consumer and the housing market. Instead export demand and business investment are picking up the slack. The removal of the threat of the cancellation of NAFTA and its replacement with the Canada-US-Mexico agreement (CUSMA) has removed a major threat to the Canadian economy, although President Trump's "national security" steel and aluminum tariffs remain.

Table 2: Contributions to average annual real GDP growth
Percentage points*†

	2017	2018	2019	2020
Consumption	2.0 (1.9)	1.3 (1.3)	1.0 (1.2)	1.0 (1.1)
Housing	0.2 (0.2)	-0.1 (-0.1)	-0.1 (0.1)	0.1 (0.0)
Government	0.7 (0.6)	0.7 (0.6)	0.2 (0.3)	0.4 (0.4)
Business fixed investment	0.3 (0.3)	0.5 (0.7)	0.2 (0.4)	0.4 (0.3)
Subtotal: final domestic demand	3.2 (3.1)	2.4 (2.5)	1.3 (2.0)	1.9 (1.8)
Exports	0.4 (0.3)	1.0 (0.9)	1.0 (0.9)	0.8 (0.7)
Imports	-1.4 (-1.2)	-1.1 (-1.1)	-0.5 (-0.6)	-0.6 (-0.6)
Subtotal: net exports	-1.1 (-0.9)	-0.1 (-0.2)	0.5 (0.3)	0.2 (0.1)
Inventories	0.8 (0.8)	-0.3 (-0.2)	-0.1 (-0.2)	0.0 (0.0)
GDP	3.0 (3.0)	2.0 (2.1)	1.7 (2.1)	2.1 (1.9)
Memo items (percentage change)				
Range for potential output	1.4–2.0 (1.4–2.0)	1.5–2.1 (1.5–2.1)	1.4–2.2 (1.4–2.2)	1.3–2.3 (1.3–2.3)
Real gross domestic income (GDI)	4.1 (4.0)	2.2 (2.3)	0.9 (2.0)	2.2 (2.0)
CPI inflation	1.6 (1.6)	2.3 (2.4)	1.7 (2.0)	2.0 (2.0)

Q. WHAT IS YOUR OUTLOOK FOR INFLATION?

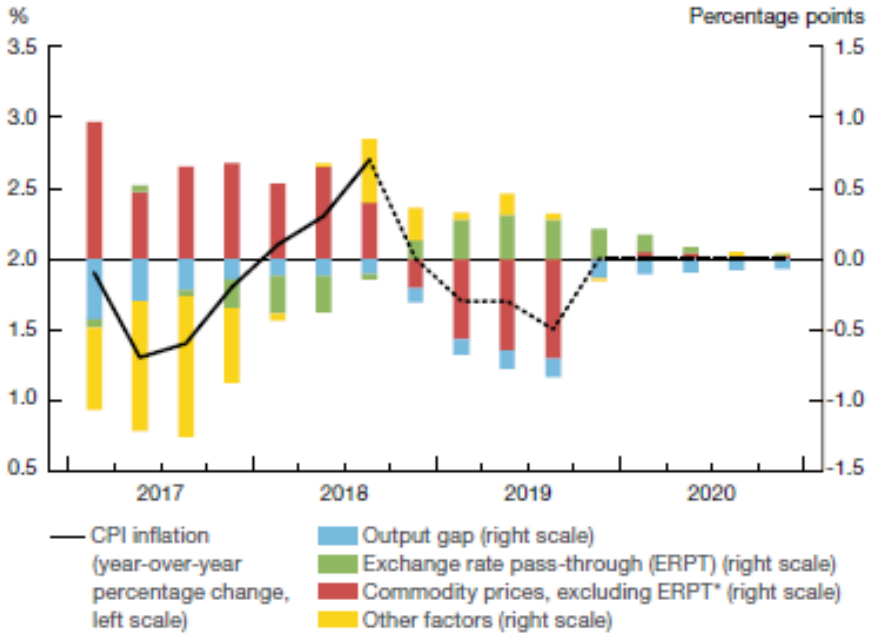
A. The Bank of Canada's 2.0% target rate of inflation, within a 1.0%-3.0% band, was renewed with the Government of Canada in the Fall of 2016. Currently. Canada is operating at close to capacity with very low unemployment, so there are some underlying inflationary pressures with the July 2018 headline CPI inflation rate hitting 3.0%.[10] However, deteriorating commodity

[10] The Bank actually focusses on three measures: CPI Trim, CPI Median and a factor model. All of which remove outliers and estimate underlying inflation.

prices (mainly oil) over the second half of 2018 are expected to take the sting out of inflation with the CPI inflation rate dropping to 1.5%, before returning to target. The following Table from the MPR highlights the significance of the role played by commodity prices in the CPI and the pass through impact of a weaker Canadian dollar, which has been consistently weakening since 2012 with the recovery of the US economy.

Chart 13: CPI inflation is expected to decline in 2019 due mainly to lower oil prices

Contribution to the deviation of inflation from 2 per cent, quarterly data



For longer run inflation we can look at the market's pricing of the nominal bond, where the interest rate is fixed and the real return bond, which guarantees the investor protection from inflation. The difference between the yields on these two bonds is called the break-even inflation rate (BEIR), since if actual inflation is higher than this, after the fact, you would have been better off investing in the real bond and vice versa. Consequently, the BEIR is a measure of the market's long run inflation expectations.

The following graphs the BEIR (as a %) since 1991, where we can clearly see the collapse in inflationary expectations in the late 1990's as the market finally believed the Federal Government's intentions not to inflate its way out of its deficit problems. Since then the BEIR has generally been slightly above the Bank of Canada's 2.0% inflation target, but never above

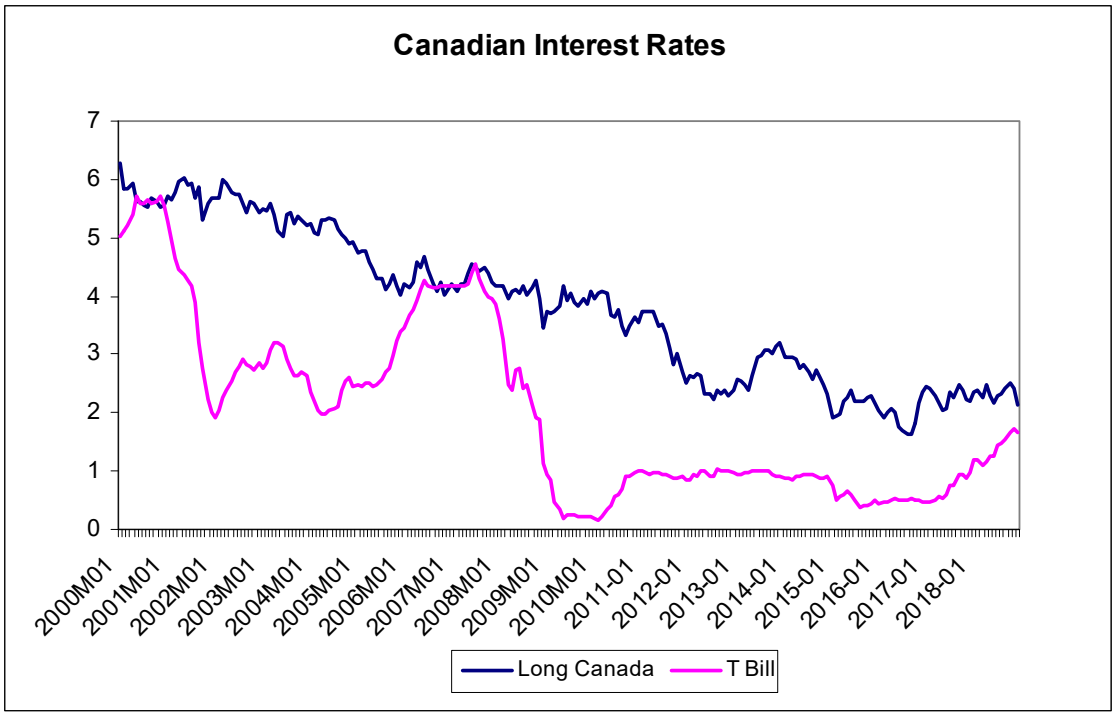
the 3.0% upper limit. In contrast, more recently the BEIR has been below 2.0% and was recently only 1.4% for reasons I will discuss shortly.

Q. WHAT HAS BEEN THE RECENT HISTORY OF THE LTC BOND YIELD?

Schedule 2 provides data on the full range of interest rates across the broad maturity spectrum as of early January 2019. The interest rate on the 30 year Government of Canada bond at 2.12% is 0.47% higher than the 1.65% yield on 91 day Treasury Bills. This is referred to as a "normal" yield curve as typically LTC yields are higher than short-term T Bill yields. However, this yield spread of 0.47% is significantly smaller than the typical spread of about 1.25%. The narrowing spread reflects the Bank of Canada's recent increases in the overnight rate of 0.25% and the reduction in the monetary stimulus the Bank is providing, which confirms the strengthening economy.

Normally yields on LTC bonds are not as affected by current monetary policy as short-term interest rates, since monetary policy works at the short end of the yield curve via the overnight rate; its influence then weakens as the maturity of the bond increases. The following graph shows that the LTC yield has been on a long run decline since 2000 when it was 6.48%. However, it was still 4.0% until 2011 when the markets realised that although Canada was recovering, neither

the US nor Europe were in good shape, particularly the weaker Euro area members (Portugal, Ireland. Greece and Spain, the PIGS). The result was that what started as conventional monetary policy in the US, UK, Japan and Europe morphed into large bond-buying programs known as "quantitative easing".



In 2011 economists (RBC June 3, 2011) were still forecasting that LTC yields would increase to 4.55%. However, in 2011Q4 the US Federal Reserve embarked on the most dramatic third round of bond buying (QE3) with an open-ended commitment to buy $85 billion of US government bonds and Federal Agency backed mortgages every month. In addition to the Federal Reserve, the Bank of England, the European Central bank and the Bank of Japan all embarked on ambitious bond buying programs designed to lower long-term interest rates and stimulate housing markets and investment. The result was that in August 2016 the over-ten year LTC bond yield was only 1.63%.

Since that time, the US has stopped its bond-buying program,[11] and other countries have scaled back in the face of stronger economies. This combined with rising short-term interest rates caused LTC yields to increase to 2.52% by October 2018 when the spread over T. Bills was still 0.85%. However, LTC bond yields are still not at the level they reached before the onslaught of these bond-buying programs as the US Fed alone purchased $3.7 trillion in government securities that were essentially taken off the bond market; if they had not been, yields would be much higher. However, even this uptick in bond yields has recently been reversed as investors have "suddenly" been concerned about the shape of the yield curve: that is the difference between the LTC yield and that on T. Bills.

Note in the prior graph that T.Bill yields were essentially the same as LTC yields in 2007. This is known as a "flat" yield curve and indicates the fact that the central bank was pushing up short term interest rates to slow down the economy. The Bank's tightening in 2007 did slow down the economy and we had a short recession in 2009. However, the cause of this was mainly the failure of Lehman Brothers in 2008 and spill-over effects from the US. Regardless, since the start of 2017, the yield curve has become flatter as the Bank has again increased the overnight rate. In contrast to 2007, this is to *remove* monetary stimulus, whereas in 2007 it was to deliberately slow down the economy. That is a significant difference between 2007/8 and currently, regardless similar yield curve changes in the US precipitated a fear of a recession. This fear combined with on-going concerns of a possible trade war between the US and China caused a stock market correction and rush to safety into government bonds as investors tried to get ahead of the curve.

The result was that the LTC yield dropped from 2.52% in October to 2.41% in November and 2.15% in December as buying pressure pushed up prices and pushed down yields. Currently, LTC yields are lower than they were at the time of my May 2010 report on MEC when they were at 3.85%. ***This is a significant drop of 1.70% and, all else, constant indicates a significant reduction from my recommended ROE at that time of 8.0%.***

[11] The US Federal Reserve is actually reducing its holding of US government bonds by not reinvesting the interest and maturing securities. The ECB halted its bond-buying program in December 2018.

Q. WHAT IS YOUR FORECAST FOR THE LONG CANADA BOND YIELD?

A. Currently, the Royal Bank of Canada's latest forecast (January 11, 2019) is below. RBC is forecasting that the current overnight rate of 1.75% will increase to 2.50% by the end of 2020. The US, in contrast, has a current Federal Funds rate of 2.50%, which is expected to increase to 3.00% over the same time-period. Both of these are downgrades from their December forecast, which had the overnight rate increasing to 2.75% and the federal funds rate increasing to 4.00%. In both cases, the downgrades are the result of the turbulence in the equity markets I will discuss shortly. Similarly, RBC is forecasting the 30-year LTC bond yield will increase from 2.18% at the end of 2018 to 2.65%, which is a huge drop from the 3.30% they were forecasting a month earlier. In the US, RBC is forecasting an increase in the government bond yield from 3.02% to 3.30%. Again, this is a substantial drop from the 4.00% they were forecasting a month earlier.

	Actuals				Forecast							
	18Q1	18Q2	18Q3	18Q4	19Q1	19Q2	19Q3	19Q4	20Q1	20Q2	20Q3	20Q4
Canada												
Overnight	1.25	1.25	1.50	1.75	1.75	2.00	2.25	2.25	2.50	2.50	2.50	2.50
Three-month	1.10	1.26	1.59	1.64	1.65	1.95	2.15	2.20	2.45	2.45	2.45	2.45
Two-year	1.78	1.91	2.21	1.86	2.00	2.30	2.40	2.40	2.55	2.50	2.50	2.50
Five-year	1.97	2.07	2.34	1.89	2.10	2.45	2.60	2.55	2.65	2.55	2.55	2.55
10-year	2.09	2.17	2.43	1.97	2.20	2.55	2.65	2.60	2.70	2.65	2.60	2.60
30-year	2.23	2.20	2.42	2.18	2.30	2.65	2.75	2.70	2.75	2.70	2.65	2.65
United States												
Fed funds**	1.75	2.00	2.25	2.50	2.75	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Three-month	1.73	1.93	2.19	2.45	2.65	2.90	2.90	2.90	2.90	2.90	2.90	2.90
Two-year	2.27	2.52	2.81	2.48	2.90	3.25	3.20	3.15	3.10	3.10	3.10	3.05
Five-year	2.56	2.73	2.94	2.51	2.95	3.30	3.30	3.20	3.20	3.20	3.15	3.10
10-year	2.74	2.85	3.05	2.69	3.05	3.40	3.40	3.30	3.25	3.25	3.20	3.15
30-year	2.97	2.98	3.19	3.02	3.25	3.60	3.60	3.50	3.45	3.40	3.35	3.30

The forecast indicates a significant movement toward "normality" at the short end of the yield curve. However, the enormous amount of excess global liquidity is still affecting LTC yields. Whereas in June 2011 RBC was forecasting a quick rebound to the 4.55%-5.05% level for LTC and US Treasury yields, this was scaled back to 3.65%-4.25% in 2016 and is now even lower at only 2.65%-3.30% for the two year ahead forecast.

Recently the Bank of Canada published research by its own internal economists and reduced their judgment on the neutral real interest rate to 1.0% from the 1.5% they last used in September 2014.[12] The summary from their analysis using a variety of models and sources is below.

Table 1: Summary of real neutral rate estimates for Canada (per cent)

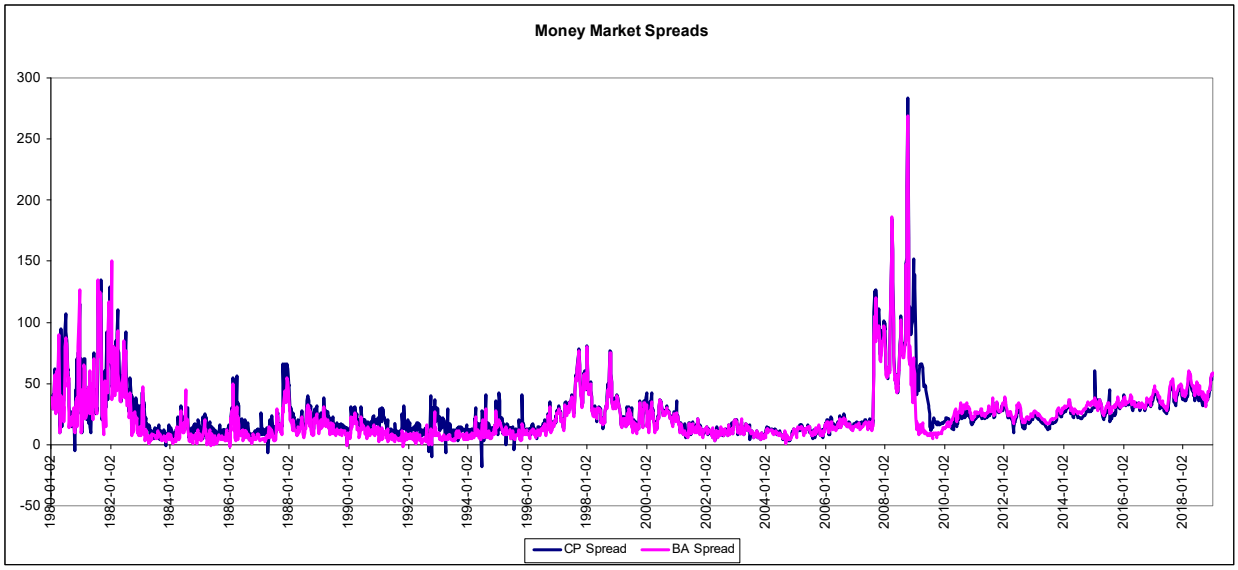
Approach	April 2017	September 2014
Pure interest parity	0.50 to 1.50	1.00 to 2.00
Neoclassical growth model	1.25 to 1.50	1.75 to 2.00
Reduced-form model	0.50 to 1.00	1.00 to 1.50
Overlapping-generations model	1.00 to 1.50	1.50 to 2.00
All approaches	0.50 to 1.50	1.00 to 2.00
Midpoint	1.00	1.50

The importance of the Bank's research is that a "neutral" overnight rate that neither slows down nor stimulates the economy is this 1% plus the Bank's 2% inflation target or 3%. A policy rate above 3:00% indicates deliberate tightening of monetary policy to slow down the economy. Unfortunately, what the Bank intends as a slow down or "soft landing" often turns into a recession. In this context, RBC's December forecast had the US policy rate increasing to 4.00% by 2020 which worried many investment professionals, since it indicated a recession in 2020. When the US yield curve flattened as higher short term rates popped up against long term US Treasury yields, the Fed seemed to not be concerned about its implications. Even though the Fed had not changed its views for at least six months, this attitude combined with other issues such as the China-US trade spat precipitated a correction in the stock market as investors tried to get ahead of the curve. Since then the Fed seems to have had a change of heart and RBC is no longer anticipating the same pace of interest rate increases in the US. In turn, this has brought down RBC's forecast of long term interst rates.

[12] J. Dorich et al, "An update on the neutral rate of interest," Bank of Canada Review, Autumn 2017.

Q. WHAT HAS HAPPENED IN THE CORPORATE FIXED INCOME MARKET?

A. The following graphs the spread between the yield on 91 day Treasury Bills (TB) and those on three month Bankers Acceptances (BA) and Commercial paper (CP). Treasury Bill yields are close to the rate that the chartered banks get from their deposits at the Bank of Canada when they have excess cash and are effectively default free, since they are obligations of the Treasury of the Government of Canada. In contrast, the Bankers' Acceptance rate is the rate the market requires on short-term investments in the main chartered banks, whereas the Commercial Paper rate is the rate that large Canadian companies with the best credit ratings can get by issuing notes in the money market. As a result, the spreads between these two private rates and that on Treasury Bills is indicative of the state of the short term lending market[13] and the willingness of large investors to lend to the banks and very low risk, stable, Canadian companies



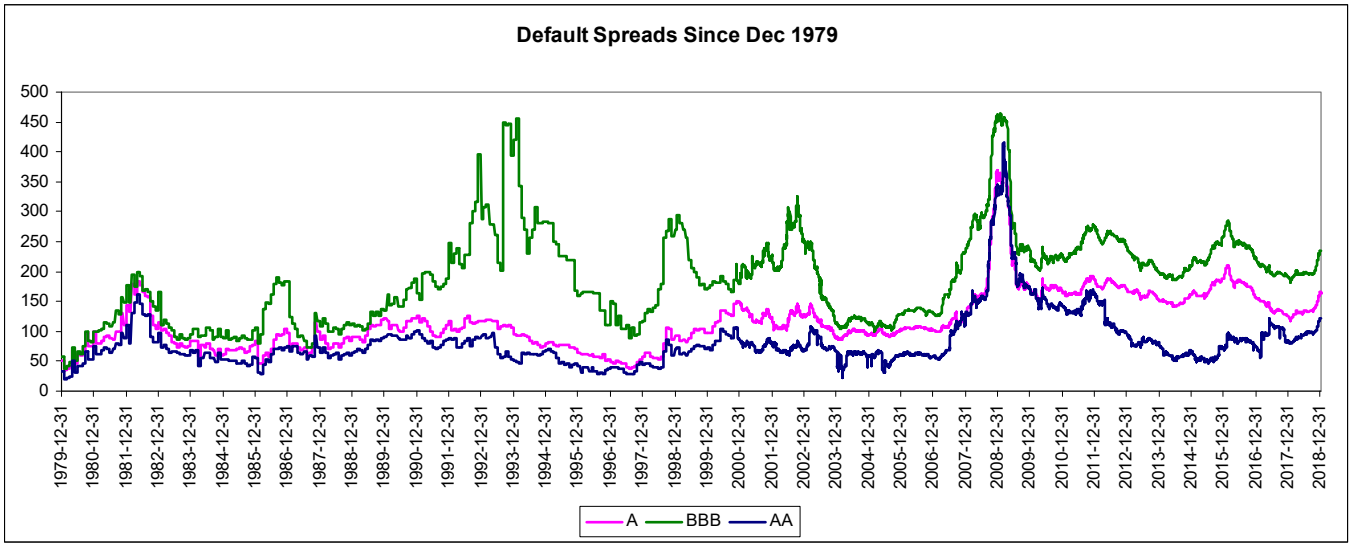
Before discussing these spreads, it is important to note that investors in the money market are mainly "parking" their money, rather than investing, since their main concern is security of principal, that is, getting their money back. Consequently, with any hint of default the market seizes up. This happens periodically in the CP market as seemingly low risk institutions default and investors panic and refuse to roll over or reinvest the money invested in CP. Their fear is of

[13] The main banks are generally rated R-1 (Mid) equivalent to an AA bond rating while CP is a mixture of R-1 (Mid) and R-1 (low), so generally these spreads are very similar.

further losses due to an inability to distinguish between good and bad risks. For example, we can clearly see the impact of the financial crisis in 2008/9 when investors did not know how healthy the Canadian banks were or how deep the recession would be.

Currently (December 26, 2018), T Bill yields have increased to 1.67% with the increase in the overnight rate, and the CP and BA spreads have widened to 0.40-0.50%. Generally, spreads have gradually increased since the aftermath of the financial crisis, but there is no question that top quality credits can access funds in the money market on favourable terms with commercial paper rates still only 2.20%.

The following graphs the generic credit or default spreads between corporate and government long-term bonds using the AA, A, and BBB indexes maintained originally by Scotia Capital markets.[14]



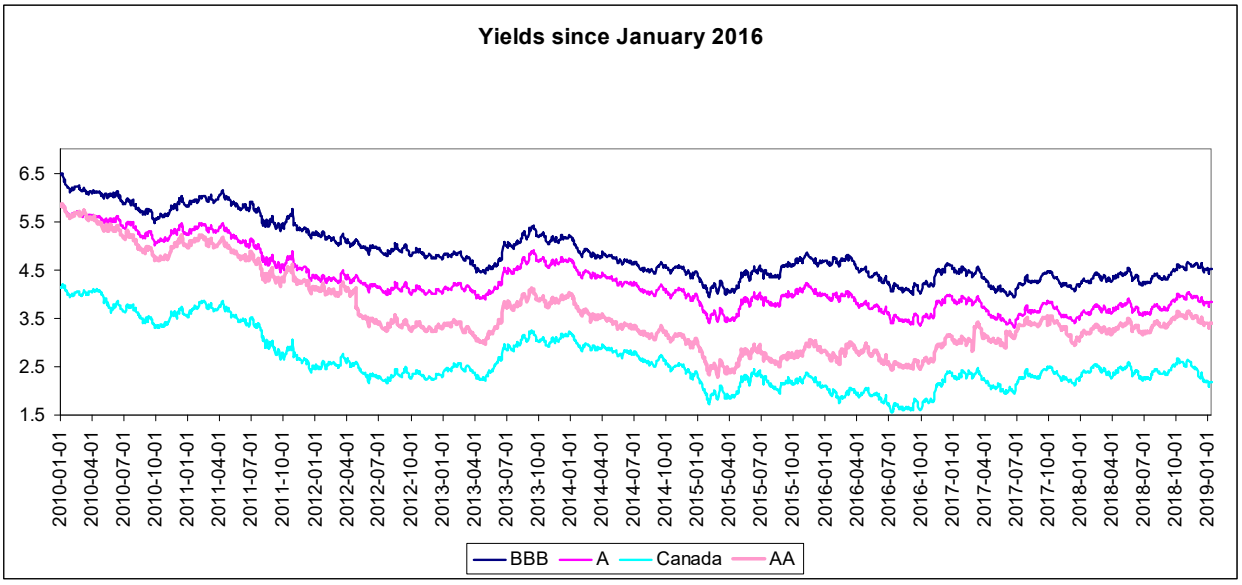
Corporate bonds have default risk, since companies can run into financial difficulty, whereas governments borrowing in their own currency like Canada cannot. These yield spreads usually behave in a predictable manner. In a recession as the risk of bankruptcy increases, investors sell off default-risky corporate debt and their liquidity drops. As a result, their bond prices fall and their yields increase relative to the long Canada bond yield causing a wider spread. Conversely

[14] The most recent data is from Datastream, which updates original data from Scotia Capital's Handbook of Debt Market Indices.

as the economy recovers and this risk recedes the spread narrows. We can see this clearly in the high spreads during the long recession of the early 1990s, the panic of the Asian crisis and the bursting of the Internet Bubble and in particular the financial crisis of 2008-9. Note also that usually the spread increases most for BBB bonds, which are the riskiest of investment grade bonds.

The critical spread for most utilities is the A spread since most Canadian utilities have A ratings. At the time of my 2010 testimony these spreads were about 1.60%-1.80% over similar maturity long Canada bonds. This reflected the fact we were still recovering from the financial crisis. Through most of 2018 these spreads had declined to 1.20-1.30%, but in the middle of the year they started to increase and by the end of the year were at 1.65% similar to 2010 as investors became nervous about the possibility of a recession.

However, investors do not borrow spreads; they borrow at an interest rate. The graph below shows the trend in actual borrowing costs since 2010. At the time of my 2010 testimony interest rates on generic A credits were about 5.50% whereas on January 9, 2019 they were 3.83% a decline of 1.67%. It is also noticeable from the graph that although spreads have recently widened, it is mainly because long Canada bond yields have fallen by more than the yield on A rated bonds, but both have fallen.



There is no reason why all interest rates should increase or decrease in the same manner, since they represent different markets. Many investors, particularly sovereign investors, will only invest in AAA rated bonds, which partly explains why Canada bond yields are so low. It is notable, for example, that LTC yields seem to have been more volatile over this period than have A bond yields, which have recently been relatively stable.[15]

Q. DO THESE GENERAL COMMENTS APPLY TO UTILITIES?

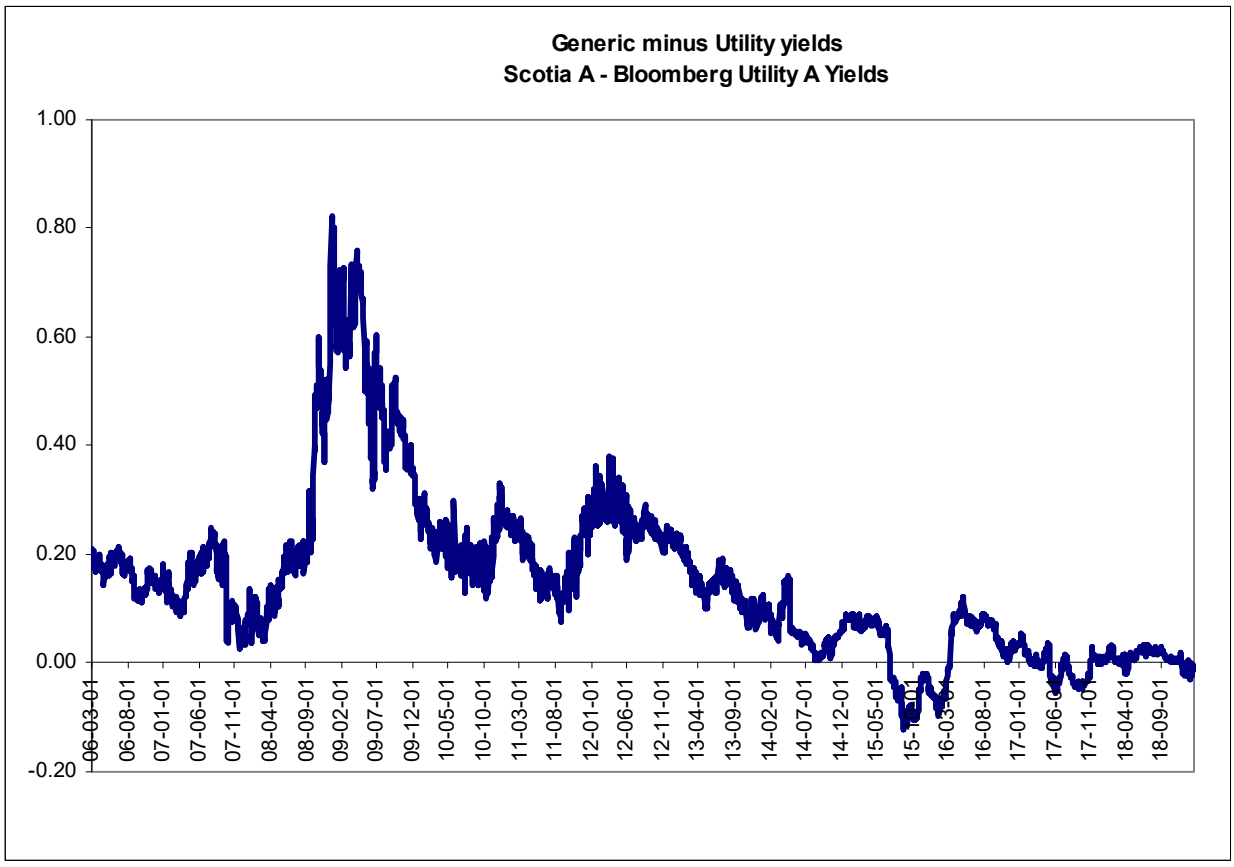
A. Yes. After the financial crisis, I started looking at the yield difference between utility "A" bond yields and the generic "A" bond yields provided by Scotia. I had looked at this at least a decade earlier when the Canadian Bond Rating Service (CBRS) provided the data, but with their takeover by S&P, this data was no longer available. However, Bloomberg started to provide synthetic[16] data that served the same purpose. The reason for looking at the difference between these two types of A bonds is that during a financial crisis and recession when firms are more likely to default, the value of regulatory protection serves to emphasise the low risk nature of utility debt in Canada. As a result, the spread or difference between generic "A" bond yields and utility "A" bond yields widens. This is another indicator of stress in the financial system as well as being directly relevant to utility financing.

The graph below shows this spread since 2002 when the Bloomberg series (C29530) begins. This series has been used by regulators in setting the allowed ROE, such as by the OEB in their ROE adjustment formula. Note that during the financial crisis the spread dramatically increased to 0.80% indicating that utility "A" rated bonds were selling on yields much lower than generic "A" rated bonds. Given that a "notch" or modifier such as a + or a – generally means a yield difference of 0.15%-0.25% this difference indicates that utility bonds were being valued as if they were a rating category better than generic "A" rated bonds. This is essentially the value of regulatory protection, that is, when a crisis occurs and investors rush for safety that safety is not just government bonds but also utility bonds.

[15] The standard deviation of the LTC yields has been 31% since 2016, whereas that for the A bonds 17%.

[16] In the sense that it is derived from underlying utility bond data rather than as a simple average of actual yields.

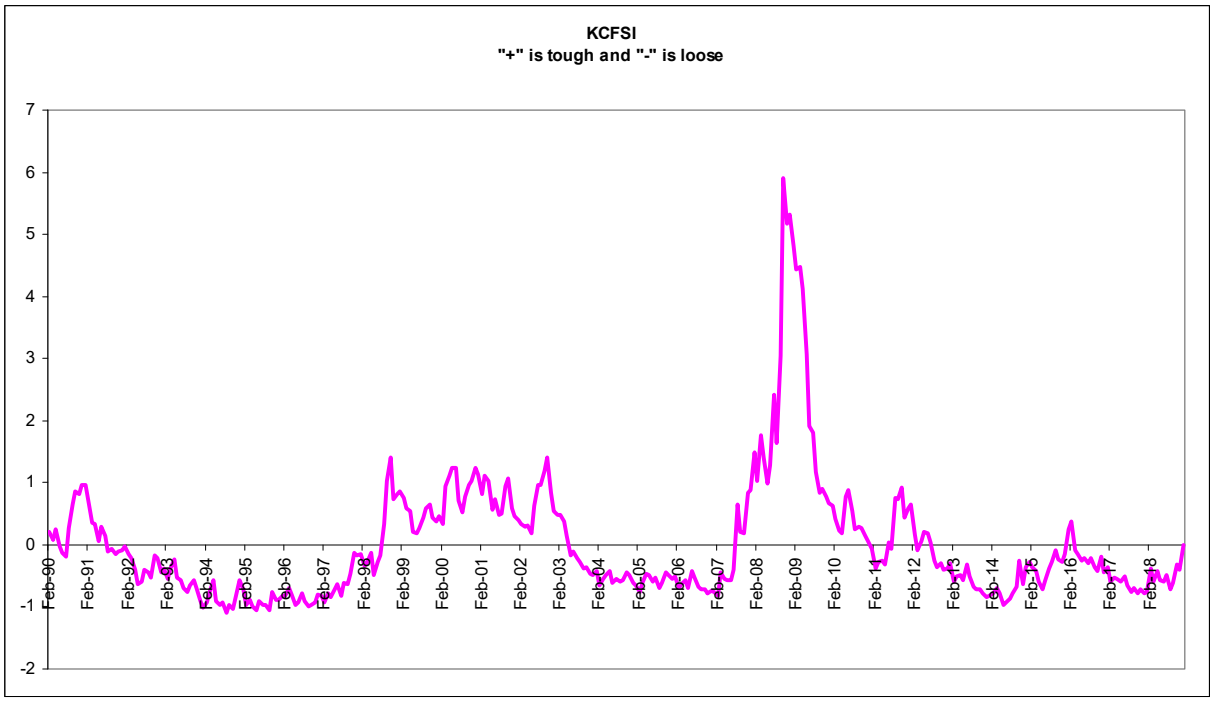
Typically, generic bonds have a slightly higher yield than utility bonds but this depends on the actual bonds in the "A" index and I would not read too much into relatively small differences, particularly as the nature of Canadian utilities has changed due to merger and acquisition (M&A) activity. However, since stock market volatility increased after the US market peaked this difference has averaged 0.0008% or essentially zero. I judge from this that the Canadian bond market currently sees no great value in utility regulation over the actual bond rating. Another way of saying this is that there is no significant concern in the bond market, the way there has been in the past.



Q. WHAT HAS BEEN THE GENERAL STATE OF CAPITAL MARKETS?

A. As indicated above the bond market has been heavily influenced by the actions of central banks and the rush to safety due to the stock market correction. It is useful therefore to look at broader measures of the state of the financial system. In the US the Federal Reserve Bank of

Kansas City has developed the Kansas City "Financial Stress" Index (KCFSI) which is graphed below.



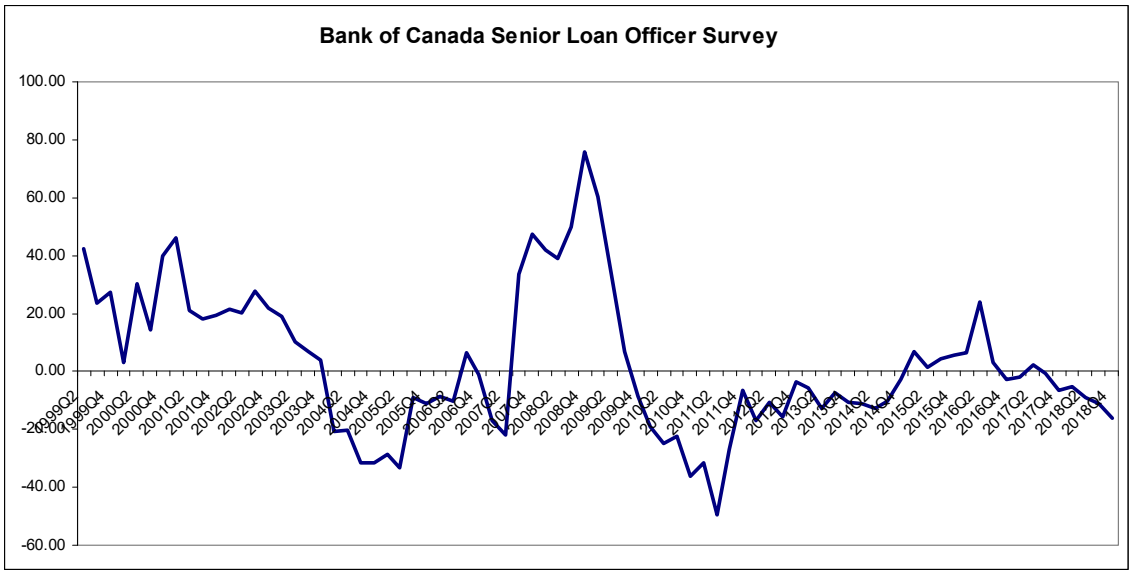
This index is designed to capture a variety of financial indicators in addition to the two which I have traditionally focussed on, which are the spreads in the money and bond markets. The additional indicators include the stock market volatility index, the state of bank share prices, and the behaviour of stock and bond returns. When the KCFSI is above 0 it indicates that capital markets are under stress or that access to markets is "tough" similarly when it is below 0 it indicates relatively easy or "stress-free" capital market conditions.

The value of the KCFSI is simply that it captures in one number the impact of a variety of capital market indicators.[17] The major insight of the KCFSI is that it emphasises the enormous pressure in the US financial system during the financial crisis. Unlike the internet bubble crash in 2001, the 2008/9 crisis struck at the very core of the US financial system, which is the banking system. Here liquidity or the ability to trade securities at close to their true market value, dried up in

[17] Technically, it captures the common element in all these indicators by using principal components analysis.

many parts of the capital markets and the US government had to intervene on a massive scale. Since the financial crisis, financial market conditions have been easy, except that in 2012 and again in 2016 they briefly tightened. Current; financial market conditions have again tightened in the second half of 2018 reflecting the stock market correction. However, they are still relatively easy and easier than they were in 2010 at the time of my last report to the Commission.

The work by the Kansas City Fed follows pioneering work done by researchers at the Bank of Canada. However, the Bank now prefers to rely on alternative measures, where one of the most important is the Bank's survey of senior lending officers. The following graph shows the results from the Bank's December 2018 survey that reflect both the pricing and the availability of credit.



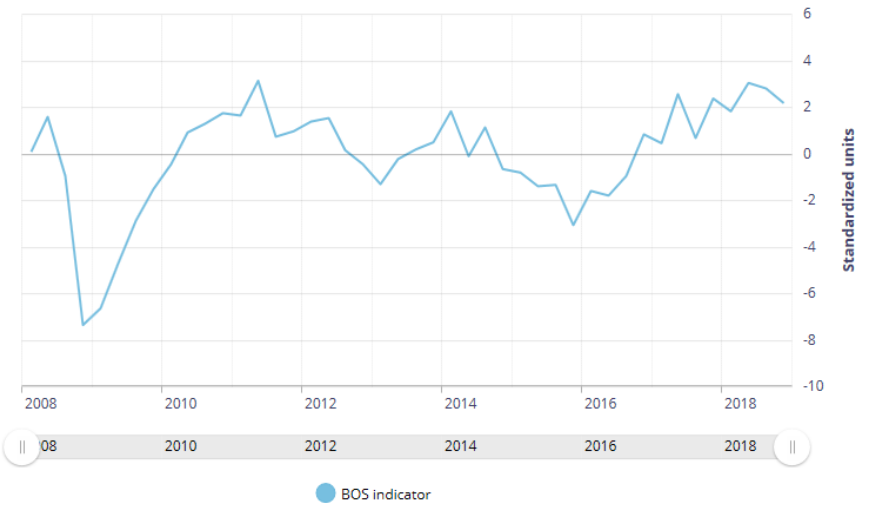
We can clearly see the tightening of credit market conditions during the financial crisis, followed by loosening thereafter and a gradual return to normality. Further and similar to the KCFSI it also shows the deterioration in credit markets in 2016, where the survey respondents reported the tightest credit market conditions since the financial crisis. However, this soon passed and currently we continue to be in easier credit markets.

The Senior loan officer's survey result mirrors that of non-financial executives. In their December 21, 2018 business outlook survey senior executives continued to reflect positive business sentiment. The following indicator from the Bank survey shows elevated business sentiment.

Business Outlook Survey indicator

The Business Outlook Survey (BOS) indicator decreased slightly but remains elevated (**Chart 11**), as responses to almost all BOS survey questions are holding above their historical averages. This continues to signal that overall business sentiment is positive.

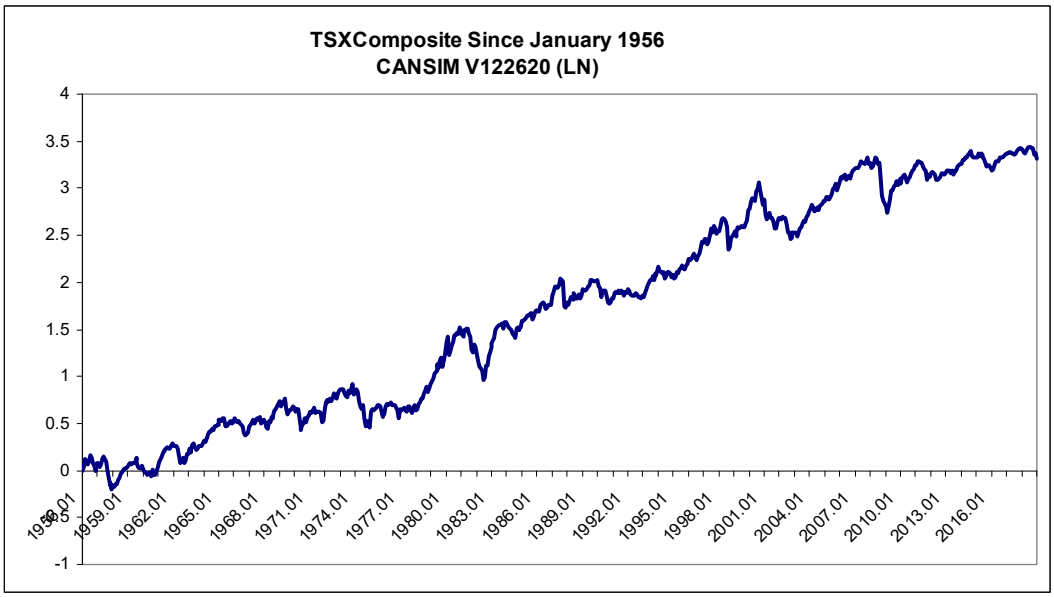
Chart 11: The BOS indicator decreased slightly but remains elevated



Q. WHAT ARE YOUR CONCLUSIONS ABOUT CONDITIONS IN THE "MONEY MARKET"?

A. The results of the Bank's surveys and the KCSFI show that despite the stock market correction and a slight rush to quality in the government bond market, overall business sentiment is still very strong and credit cheaply available. However, these are slightly backward looking indicators, whereas the stock market is a forward looking indicator. The following graph shows the performance of the TSX since 1956. Many commentators refer to the "recent" bull market as one of the longest ever, but that is not entirely correct. The problem is that a 50 point decline in the TSX Composite when it was around 600 in the 1950's was much more important than it would be now with the index just over 14,000. To adjust for this the graph shows the natural logarithm of the TSX Composite's value starting in January 1956. This means that increases and decreases are percentages rather than absolute values.What jumps out is how regularly the market goes through periodic booms and corrections. It is true that since late August, the TSX

has declined by about 13%[18] but this also happened in 2016, where between August 2014 and January 2016 the TSX decclined by 18%.



In recent testimony before the PUB of Newfoundland and Labrador dated September 25, 2018, I noted, *"In fact, financial market conditions are so good it is worrying!"* One of my concerns at that time was that part of the Bank of Canada's responsibilities was to promote the safety and efficiency of Canada's financial system. In doing this, it publishes its Financial System Review, where it gauged the severity of risks posed to the financial system. In this activity, it is the job of the Bank to find risks and highlight them so that policy makers can take action. Consequently, the fact the Bank finds risks should not be a surprise. I then pointed out that the risks that it could find in its June 2018 report were generally moderate and the worst "elevated, but declining" (a severe nationwide recession).

My concern was that in June 2018 the Bank saw very little risk, which tends to be just before bad things happens, just as when things are gloomiest it tends to be just before good things happen. Since that time, the underlying economy has not changed. What has changed is the equity market has worked through a correction as investors fretted about the policy direction for US interest rates and whether the US Fed was really on top of things. Although it has reminded people that

[18] At one point, the US SP500 index briefly lost over 20%, but soon recovered.

stocks go down, as well as up, the stock market is behaving exactly the way it always does. Moreover, it does not mean that the economy is heading for a recession anytime soon. As Paul Samuelson said "the stock market has predicted nine of the past five recessions." The reason it has not predicted all the recessions is partly that policy makers take note. In this respect, RBC judges that the Fed has changed policy direction and dropped its forecast of the US policy rate two years out by 1%. Essentially, the Fed has listened to the stock market, rather than economists. However, it does not change the fact we are in the relatively late stages of the business cycle and investors are nervous and sensitive to the actions of the central banks. The implication is that interest rates could rebound as quickly as they weakened.

Q. THESE COMMENTS ARE FOR CANADA IS THERE ANYTHING DIFFERENT ABOUT PEI?

A. While almost all the capital market data is relevant for Canada as a whole there are often important differences in regional economic performance. This is as true of Prince Edward Island as it is for any province. In its December 12, 2018 provincial forecast RBC's summary was

> *"Prince Edward Island is well on its way once again to lead Atlantic Canada in growth in 2018. The economy continues to thrive on rapid population growth, strong job creation and brisk consumer-related activity. While slowing from a supercharged growth of 3.5% in 2017, we forecast the provincial economy to grow by a still-respectable rate of 1.4% in 2018. We project the pace to accelerate slightly to 1.6% in 2019 before moderating to 1.2% in 2020."*

Obviously, PEI is still the smallest province in Canada with limited natural resources, but this has always been the case. More importantly, the recent unemployment rate was the lowest on record at 7.2% (October 2018) with signs of shortages of rental units despite a surge (+38% during the first 8 months) in construction during 2018. RBC Also points out there has been an upward revision in the provincial government surplus due to "robust" economic growth.

The table below comes directly from RBC's provincial forecast (December 12, 2018). It shows good economic growth, a declining unemployment rate, and solid housing starts though declining from the 2018 high. Overall, PEI looks a lot like the other provinces in the Maritimes with nothing to signal any changes from a generic recommendation.

Prince Edward Island forecast at a glance

% change unless otherwise specified

	2016	2017	2018F	2019F	2020F
Real GDP	1.8	3.5	1.4	1.6	1.2
Nominal GDP	4.5	4.8	3.1	3.7	3.1
Employment	-2.2	3.1	3.1	1.1	1.1
Unemployment Rate (%)	10.8	9.8	9.4	9.0	8.6
Retail Sales	7.3	6.3	4.1	3.8	3.7
Housing Starts (Thousands of Units)	0.6	0.9	0.8	0.6	0.8
Consumer Price Index	1.2	1.8	2.4	2.1	2.7

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III RISK PREMIUM ESTIMATES OF THE FAIR ROE

Q. WHAT IS THE MOST COMMON WAY OF ESTIMATING THE FAIR ROE?

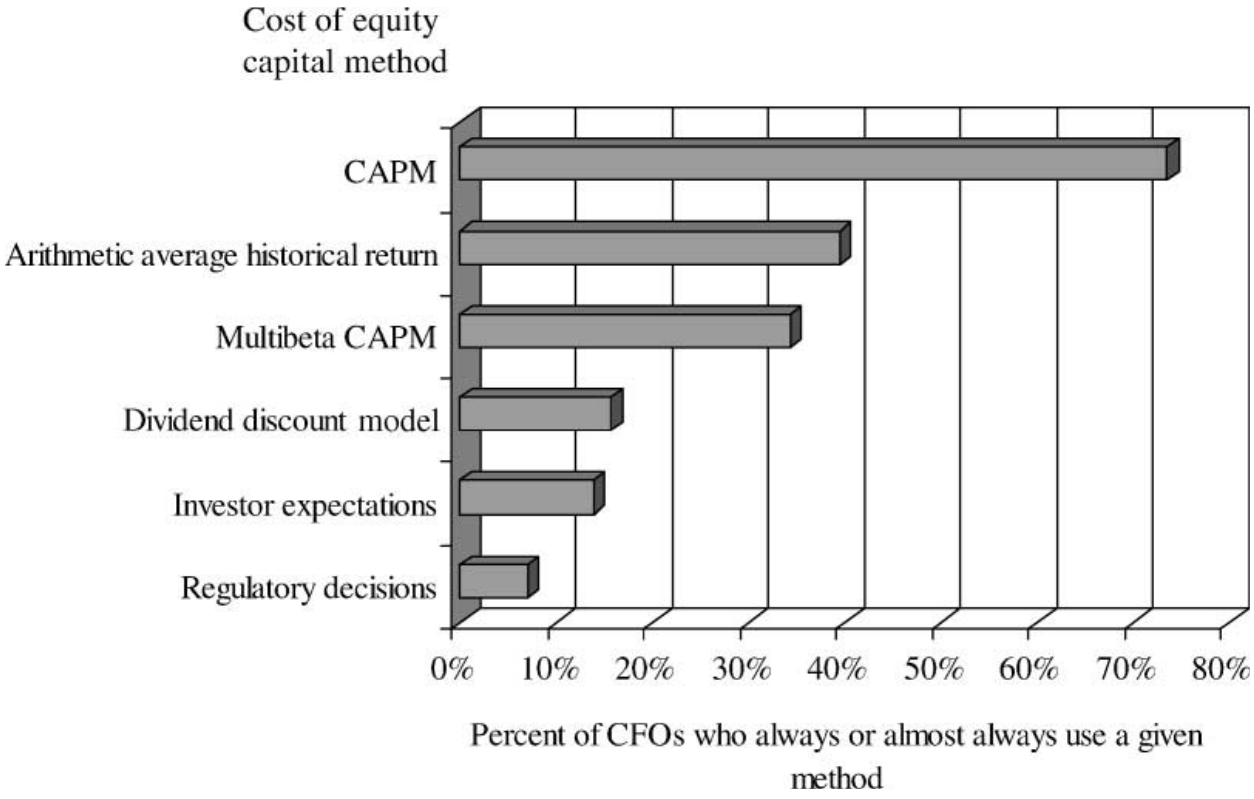
A. The capital asset pricing model or CAPM remains the most common way of estimating the fair rate of return. It is a special form of risk premium model, which simply says,

$$K = R_F + MRP * \beta$$

In words the investor's required or fair rate of return (K) is equal to the risk free rate (R_F) plus a risk premium. Where the CAPM differs from other risk premium models is that it specifies that the risk premium is comprised of the market risk premium (MRP) times the security's relative risk or beta coefficient (β). ***In this regard any fair ROE can always be decomposed into a risk free rate and a risk premium***, so the CAPM is perfectly general: its contribution is simply to relate an individual risk premium to the overall market risk premium and its relative risk coefficient.

Why the CAPM is so widely used is because it is intuitively correct. It captures two of the major "laws' of finance: the ***time value*** of money and the ***risk value*** of money. The time value of money is captured in the long Canada bond yield as the risk free rate. The risk value of money is captured in the market risk premium, which anchors an individual firm's risk. As long as the market risk premium is approximately correct the estimate will be in the right "ball-park." Where the CAPM normally gets controversial is in the beta coefficient; since risk is constantly changing so too are beta coefficients. This sometimes casts doubt on the model as people find it difficult to understand why betas change. Further, it also makes testing the model incredibly difficult. However, the CAPM measures the right thing: which is how much does a security add to the risk of a diversified portfolio, which is the central idea of modern portfolio theory. It also reflects the fact that modern capital markets are dominated by large institutions that hold diversified portfolios.

Currently, the CAPM remains the most important model used by a company in estimating their cost of equity capital. The following table comes from a survey of 392 US Chief Financial officers by Graham and Harvey in the Journal of Financial Economics 2001:



70% of US CFOs explicitly use the CAPM, while 35% use average historic returns, which as I discuss in Appendix B is a key input to estimating the market risk premium and a further 30% use a multi-beta approach similar to the two factor model I have used in the past. The dividend discount model is known as the DCF model in regulatory hearings and comes in a poor 4th, similar to investor expectations, which are largely from survey results similar to those I discuss in Appendix B.

The US survey results are for large US companies, Baker et al[19] performed a similar survey of large and small firms in Canada with the results in the following table. The most important "factor" was judgment, which is obviously required in any analysis. After judgment. the main two objective models were the cost of debt plus an equity risk premium and the CAPM, which is simply a specific way of setting the risk premium. As might be expected the CAPM is most popular among larger firms, where the Chief Executive officer has an MBA. In this way, the

[19] K. Baker, S. Dutta and S. Saadi, Corporate finance practises in Canada, where do we stand?" Multinational Finance Journal, December 2011.

main results are the same as in the US. Unlike the US survey results, the DCF and multi-beta models rank behind investor expectations, average risk adjusted returns and accounting ROE. Even for large firms and those managed by a CEO with an MBA, the DCF model and multi-beta models are simply not as important as the CAPM.

Table 6. How Canadian Firms Estimate Their Cost of Equity Capital

This table presents the responses by Canadian managers on how their firms estimate their cost of equity capital. Respondents indicate the frequency level based on a five-point equal interval scale where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Often or Always	Full Sample	Large	Small	Yes	No
1	Judgment	60.3	2.33	2.01	2.64***	2.39	2.30
5	Cost of debt plus equity risk premium	52.3	2.01	1.85	2.08	1.89	2.07
3	Capital asset pricing model (CAPM)	36.8	1.52	1.96	1.12**	2.36	1.13***
6	Earnings/price (E/P) ratio	21.8	1.02	0.53	1.20**	0.83	1.09
9	Based on what our investors tell us they require	20.0	1.00	0.85	1.07	1.56	0.76**
8	Average historical returns on common stock adjusted for risk	14.1	0.81	0.46	0.93***	0.94	0.79
7	Accounting return on equity	17.5	0.73	0.74	0.73	0.22	0.88**
2	Dividend growth model (dividend yield plus an estimate of growth)	12.9	0.66	0.48	0.74	0.44	0.73
4	Multi-factor asset pricing model	7.1	0.33	0.19	0.40	0.33	0.33
10	By regulatory decisions	5.9	0.29	0.19	0.34	0.01	0.38

In response to persistent criticism by some witnesses, I have started to look at alternatives to the CAPM, which are known as multi-factor models. Although not widely used by professionals, they are popular amongst academics. The CAPM is regarded as a one-factor model since market risk through beta is the only source of risk. Instead, multi-factor models extend the CAPM to include additional risk factors. The current "standard" is to include a size premium (the return difference between ***S***mall firms ***M***inus ***B***ig ones or SMB) and a value premium (the return difference between ***H***igh ***M***inus ***L***ow value or growth stocks). This is the Fama-French three-factor model (FF3), which states

$$K = R_F + \beta_1 MRP + \beta_{2,} SMB + \beta_{3,} HML$$

In this case as well as the market risk premium (MRP), an investor requires a premium for investing in smaller firms as well as high value stocks. Why the FF3 factor model is controversial is that while some believe that smaller value stocks are riskier and thus deserve a

larger risk premium, others believe that the market consistently miss-prices the opposite type of stocks, that is, larger growth stocks. The reason for this is that they tend to be faddish and sexier for financial advisors to sell. As a result, they tend to be over-valued and earn lower rates of return given their risk. During the Internet bubble, for example, it was internet stocks, like Nortel and Pets.com that had very high valuations with few hard assets to support them and yet crashed when the bubble burst.

I tend to believe the faddish argument, but regardless for individual stocks using the FF3 factor model versus the CAPM rarely makes much difference. For example, Estrada (2011)[20] estimated the equity cost for the Dow 30 firms using both the CAPM and FF3 models where the average equity cost using the CAPM was 9.70% versus 9.50% from using the FF3 factor model. The complete estimates are in Schedule 3, but the general point is that we are just allocating the stock's return to different risk factors. However, the sum of those factors should always (approximately) add up to the same number. Using one model versus another does not somehow increase the overall equity cost to a dramatic extent. The Dow 30 stocks have a beta close to 1.0 since they are a portfolio of stocks and the average ***has*** to add up to 1.0 for all stocks. As we would expect these stocks tend to have negative exposure to the size premium, since they are all large firms and positive exposure to the value premium since they are generally value stocks. In this respect, they are similar to utilities that tend to be relatively large value stocks.[21]

In terms of the "error" in using one model versus another, the difference ranges from +1.5% to -1.6% or a range of 3.0%. This is not an insignificant difference, but it stems from the confluence of the size and value premiums.[22] The +1.5% difference is for American Express, which has a 17.7% FF3 Factor equity cost estimate versus the 16.2% for the CAPM. This difference stems from the observation that AmEx is a relatively small value stock and generates a premium for both these factors, which offsets the lower beta estimate in the FF3 model. In contrast, Merck is a

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[20] Estrada, Journal of Applied Corporate Finance (Spring 2011). Estrada's estimates are for illustration only I do not recommend them or the process he used to get them.

[21] Schedule 10 confirms this, where the market capitalisation (size) of all the utilities tends to be much larger than average.

[22] Note also that the range of equity cost estimates is from 4.80% to 17.7% for the FF3 factor model and a slightly smaller 5.3% to 17.5% for the CAPM.

large growth stock and its much higher FF3 factor beta coefficient is not enough to offset the negative size and growth premiums. As a result, its CAPM equity cost at 9.1% is higher than its FF3 factor cost at 7.5%. The closest to a regulated utility would be AT&T, where the CAPM equity cost is 7.80% versus a FF3 factor estimate of 7.30%; again, its higher beta is more than offset by the impact of the size and value premiums.[23]

Despite the popularity of these multi-factor models amongst academics, and increasingly in the investment field, they have doubtful value in regulatory hearings. There are two reasons for this, first they do not make much difference in the overall estimates and second they need more inputs, each of which is likely to be extremely contentious. While the size of the market risk premium can be estimated with some degree of accuracy, that can-not be said for the size and value premiums. In fact, many believe the size premium has disappeared as coverage of small stocks has increased while for many the value premium causes theoretical problems.

Q. HOW DO YOU DERIVE A CAPM ESTIMATE FOR A UTILITY?

A. As indicated above the critical element of a fair return is the overall return on the equity market, since utilities are simply a sub set of the equity market. So for example, if equity investors want 9% for investing in the equity market as whole, then the required return for investing in a simple wires and polls electricity company must be less than that. Since the expected return on the long-term Canada (LTC) bond is the observable yield, one way of estimating this equity return is by adding the market risk premium on top of that expected return or yield.[24]

In Appendix B I estimate the market risk premium of common equities over long-term Canada bonds at 5.0-6.0%. This estimate is based on Canadian capital market history going back to 1924, so encompasses various economic periods such as the bleak 1930s of slow growth and

[23] Note the beta in the FF3 model is not the same as in the CAPM, since it captures market risk after the impact of size and value are removed.

[24] Note only the LTC yield is default free and an estimate of the expected rate of return. The yield on risky corporate debt is a promised return but with the possibility of default, as well as liquidity problems, this is *always* higher than the expected rate of return.

falling prices, as well as booms and serious inflation such as the 1970's. While the Canadian data points to a market risk premium of under 5.0%, I give weight to the US evidence for three main reasons. First, most of the restrictions on keeping Canadian capital within Canada have been removed, resulting in significant capital outflows and higher expected returns on Canadian investments. Second, the fiscal position of the Government of Canada improved dramatically after 1997 removing a risk premium built into LTC yields. Third, the Canadian bond market has received significant foreign capital inflows depressing yields below where they would have been with a segmented or closed capital market. The result has been lower interest rates in Canada than the United States for most of the last 12 years. This has removed the historic bias of a smaller Canadian market risk premium over a higher government bond yield as compared to the US.

My Appendix B is a free-standing analysis of the market risk premium, but I consider the survey results of Professor Fernandez[25] particularly relevant as confirmatory evidence. In particular, the following extract from his 2018 survey has the following estimates for the US and Canada. With 1,348 responses, the average (median) estimate of the market risk premium in the US was 5.4% (5.2%) whereas with 77 responses it was 5.8% (6.0%) in Canada. In other words, the average and median estimates were both within my 5.0-6.0% range. With so many responses in the US, there is bound to be a wide range, but in Canada the range for the market risk premium was relatively narrow at 4.1%-7.20%, that is, the extreme high value for the market risk premium from 77 responses from finance professionals in Canada was 7.20%. ***I would regard any estimate of the market risk premium above 7.2% as being an extreme outlier and note that Mr. Troganoski (page 35) uses a Canadian market risk premium of 8.60%. This seems to be a value that is not accepted by Canadian finance professionals.***

[25] "Market risk Premium and Risk-Free Rate Used for 59 countries in 2018: a survey," IESE Business School, 2018. Pablo Fernandez IESE, 2018

Table 2. Market Risk Premium (MRP) used for 59 countries in 2018

MRP	Number of Answers	Average	St. Dev.	Median	MAX	min	St.Dev. / Average
USA	1348	5,4%	1,7%	5,2%	17,8%	1,3%	32,1%
Spain	675	6,7%	2,4%	6,2%	20,0%	0,8%	36,2%
Germany	528	5,3%	1,7%	5,2%	15,2%	1,0%	32,5%
Argentina	73	13,9%	4,7%	16,3%	20,2%	1,9%	34,3%
Australia	74	6,6%	1,4%	7,1%	10,2%	3,3%	20,8%
Austria	56	6,2%	0,7%	6,4%	7,2%	4,2%	10,5%
Belgium	53	6,2%	0,8%	6,4%	7,2%	3,3%	12,5%
Bolivia	6	6,6%	2,9%	6,6%	9,4%	3,8%	43,3%
Brazil	100	8,4%	2,3%	8,6%	15,2%	2,3%	26,9%
Bulgaria	8	7,5%	1,3%	7,7%	9,5%	5,0%	16,8%
Canada	77	5,8%	0,7%	6,0%	7,2%	4,1%	12,7%
Chile	72	6,1%	1,1%	6,2%	8,2%	3,1%	17,7%
China	95	6,3%	2,8%	7,0%	13,2%	0,6%	43,4%
Colombia	72	8,7%	3,7%	7,9%	25,2%	3,8%	42,6%
Czech Republic	63	5,9%	0,7%	6,0%	8,2%	4,8%	12,3%
Denmark	53	6,0%	0,8%	6,2%	7,2%	3,8%	12,9%
Ecuador	7	9,0%	3,5%	8,0%	12,8%	5,5%	38,7%
Egypt	9	10,9%	4,5%	12,6%	15,2%	4,8%	41,6%
Estonia	7	5,1%	1,0%	5,2%	6,1%	3,0%	20,4%
Finland	53	5,9%	0,8%	6,0%	7,2%	3,8%	13,0%
France	83	5,9%	1,6%	6,4%	8,8%	1,3%	27,3%

The other interesting feature is that Fernandez now also asks for the risk free rate to match with the market risk premium to get the required return for investing in the equity market. For the US, this was an average (median) risk free rate of 2.8% and for Canada 2.9%. Of significance is that at the time of his survey the 30-year US government bond yield was about 2.9%, whereas that in Canada was about 2.2%. I would infer from this that Canadian finance professionals were adjusting for the extremely low LTC yields by implicitly adding 0.70% to the actual LTC yield. When the market risk premium is added to the risk free rate the average (median) required return on the US market was 8.20% (8.30%) and in Canada 8.70% (9.00%). It is important here to reiterate that if investors are requiring 8.2%-8.7% to invest in the overall, US and Canadian equity markets, the return required for a low risk utility investment must be significantly lower.

My Appendix C discusses relative risk adjustments or betas. The recent history of Canadian utilities in general is of beta coefficients in an approximate range of 0.30-0.40. However, in my judgment Canadian utility betas are currently partly "contaminated" by the fact they are seen as yield substitutes for long Canada bonds. As Schedule 1 in my Appendix C shows, the returns on Canadian utility shares are interest sensitive and have about 60% of the interest exposure of the long Canada bond. This is why they are seen as low risk defensive stocks. However, the

temporal decline in interest rates from 6.48% in 2000 to the current level of about 2.3%, while supporting their stock prices, has weakened their relationship with the general market. Consequently, their stock market risk (betas) has declined from the 0.55 level of 2000. The extent of merger and acquisition (M&A) activity has also reduced the sample and caused me to break my old sample into a pipeline sample (Enbridge, TransCanada and Pembina) and a utility sample (Canadian Utilities, Emera, Fortis and GMI). This has posed additional problems since smaller samples can make the estimates less reliable, while both Emera and Fortis have both made extensive acquisitions. For this and other reasons discussed in Appendix C, I continue to use a beta range of 0.45-0.55.

As a check on my Canadian beta estimates, I also use estimates for US gas and US electric utility holding company samples. Although I regard these companies as riskier than their Canadian counterparts my most recent estimates for the US gas and electric samples are both within my 0.45-0.55 range. As a final check I also provide beta estimates from respected sources; these are Yahoo finance that uses S&P data, the Royal Bank of Canada, and two new investment advisory services in the US. I take comfort in the fact that the average sample betas are generally lower than my own estimates.

Q. DO YOU ADJUST YOUR BETAS?

A. To the extent that I do not mechanically use my beta estimates, I adjust them. As indicated above in the survey of Canadian professionals by Baker et al the most important factor in estimating the required and fair rate of return is judgment. However, I do not use the Blume adjustment, which Mr. Troganoski relies on. This was a general adjustment for a sample of all stocks developed by Professor Marshall Blume and published 43 years ago. As far as I am aware this study has not been replicated recently and no-one has ever applied it with any success to utility stocks. As I discuss in Appendix C the only studies I am aware of on utility stocks show that any adjustment of utility stocks is toward their own average value not the average value of the market as a whole. Gombola and Kahl clearly showed this in their seminal article in 1990 and most recently Michelfielder and Theodossiou in 2013 concluded,

> "The diagnostic statistics strongly refute the validity of the Blume equation for public utility stocks. Most of the R^2s are equal or very close to 0.00 and the largest is 0.09. Only

one F statistic is significant and all but two slopes are insignificant….None of the 51 beta distributions display any tendency for the betas to drift toward one"

There is simply no justification for mechanically adjusting utility betas toward the market mean of 1.0.

Q. WHAT IS YOUR *SIMPLE* CAPM ESTIMATE FOR A BENCHMARK UTILITY?

A. With a market risk premium estimate of 5.0-6.0% and a beta range of 0.45-0.55 the range for the utility risk premium is 2.25%-3.30%. This is essentially the same range I used in 2010, since I do not judge that utility shares have become riskier while survey evidence indicates no material increase in the market risk premium. If this utility risk premium is added to the 2.65% medium term forecast for 2020 and a 0.50% flotation cost allowance added, the range for the CAPM estimate is as follows:

Simple CAPM Estimate

Low end	**5.40%**
High end	**6.45%**

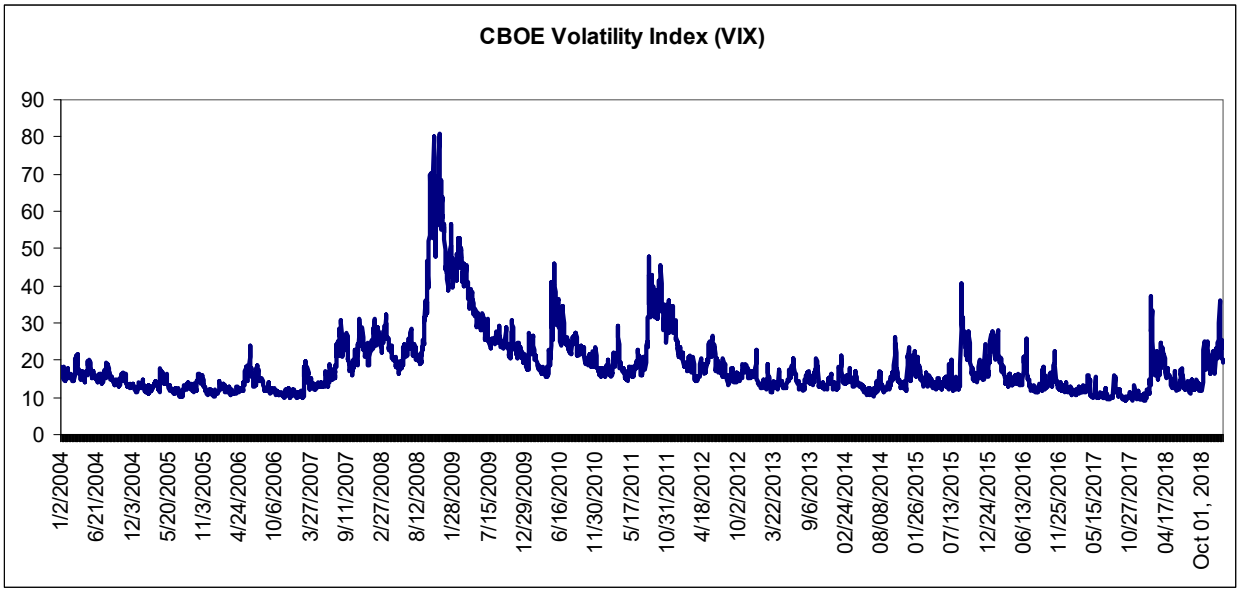
The average estimate of 5.93% is significantly lower than the 7.0%-8.1% range I estimated in 2010 mainly due to the significantly lower forecast LTC yield of 4.5% at that time versus 2.65% currently. However, I regard this simple CAPM estimate as too low.

Q. DO YOU USE THIS SIMPLE CAPM ESTIMATE?

A. No. I judge that the simple CAPM estimate is not a reflection of current market conditions. The CAPM estimate is appropriate under "normal" or average markets, since it uses a normal or average market risk premium estimated over long periods of time and assumes that conditions in the bond market affecting the long Canada bond yield are also driving conditions in the equity market. What this means is that the correct "opportunity cost" for an equity investor is the bond market plus a normal risk premium. However, at the current point in time conditions in the Canadian bond market are largely being driven by external factors and are still not "average" market conditions even though they are now normalising. To adjust for this I have been making two adjustments: the first is simply to make the CAPM estimate conditional on the state of the markets thereby converting it into a conditional CAPM or CCAPM; the second is to adjust for

the abnormally low LTC bond yields resulting from rampant bond buying programs by central banks.

In terms of the CCAPM there are a variety of financial variables to use to condition on the state of the markets. For example, I have previously discussed the Kansas City financial stress index which attempts to do this by looking at a composite stress index, which should be correlated with investor risk aversion. Another popular index is the Chicago Board of Exchange's (CBOE) volatility index (VIX). This calculates the expected standard deviation of the overall stock market return from at the money call options.[26] The standard deviation is a measure of the overall risk, or volatility of the stock market and has averaged 18-20% since 1926. Below is a graph of the VIX since 2004.



The average value for the VIX over the period 2004-2018 was 18.4%, close to the average from stock market data going back to 1926.[27] However, consistent with the KCFSI we can see the huge increase in uncertainty during the financial crisis as the VIX hit a peak value of 80% or 4X

[26] Call options pay off only if a certain event (usually the stock price) reaches a specific value and the only "unknown" to price them is the variability or standard deviation of the price. As a result, we can work back from the market price to estimate the implied standard deviation or volatility.

[27] It may surprise some but there is no evidence of any structural increase in uncertainty in the stock market: it has always been highly volatile!

its average value. The VIX reflected the huge panic during the financial crisis, but as always the panic subsides and over the last five years volatility has been below average until the recent stock market correction.

At the start of October the VIX was still at 12%, much lower than normal, but it started to increase as stock prices fell. It reached a maximum of 36.07% on Christmas Eve as the stock market corrected before gradually dropping to normal levels. Currently (January 10, 2019) the VIX is at 19.50% close to the long run average. This is still higher than people have gotten used to during the long bull market. Further, it confirms the KCFSI and credit spreads that market conditions have become tighter over the last three months even if credit is still easily available.

The problem with the VIX and the KCSFI is they are not direct estimates of a rate of return and cannot be used to reliably alter a CAPM expected return estimate. An alternative is to use the default or credit spread between risky corporate debt and default free Government of Canada bonds. This is the corporate spread discussed earlier and similar to the VIX and KCSFI shows the huge impact of the financial crisis when corporate A rated spreads peaked at 3.70% versus a pre-crisis average of 0.94% (1979-2007).

It is very difficult to disentangle liquidity spreads in bonds from the pure credit spread. However, since 2011 as Canadian capital market conditions were returning to normal, I have been recommending a 50% adjustment to changes in credit spreads. Over a normal business cycle, this adjustment should average out to zero as capital market conditions fluctuate around average levels. This adjustment has been incorporated into ROE adjustment models adopted by the OEB, the Regie and the BCUC. Currently A credit spreads are elevated at 1.65% compared to long run average levels of about 1.0%. As a result, I would add 0.33% to my simple CAPM estimate to reflect current market conditions.

My estimate for the CCAPM is as follows:

CCAPM Estimates

Low end	**5.73%**
High end	**6.78%**

The average of the range is 6.26% and would be appropriate as an estimate for a fair ROE at this stage of the business cycle in a capital market that is ***also*** typical for this stage in the business cycle. However, I still regard the resulting ROE as an under estimate at the current point in time.

Q. WHY DO YOU JUDGE THIS CCAPM TO BE AN UNDER-ESTIMATE?

A. In Appendix B Schedule 6, I develop a model to explain the behaviour of the real yield on long Canada bonds, defined as the nominal yield minus the average of past, current and future CPI inflation. Ignoring the indicator or dummy variables for WW2 and the 1970s, when there was huge liquidity during the petro dollar recycling period, the model essentially says that the real LTC bond yield is 1.34% plus a premium based on bond market uncertainty and a premium based on the size of the government deficit. The model does well in explaining the very high yields when there was huge volatility in the bond market and Canada was running deficits approaching 10% of GDP.

However, since the financial crisis while we have seen bond market uncertainty go down, the aggregate deficit in Canada has gone from a surplus to a deficit of about 1% of GDP. Normally this would cause an increase in government debt pushing down prices and pushing up yields. Plugging numbers into the regression model would predict a real long Canada yield of about 3.71% for 2017, rather than the actual 0.39% (2.18% average 2017 Canada yield minus 1.79% inflation). However, the increased government debt is being bought in part by non-residents due to the impact of loose monetary policy elsewhere in the world. Once an indicator (dummy) variable is added for the years since 2010, the 2017 real yield estimate is reduced by 2.65%. What this indicates is that during 2017, the long Canada bond yield remained severely depressed and below where it would have been had Canada remained partially segmented from external events.

For 2017 the model forecasts a real Canada yield of 3.71%, which with average CPI inflation of 1.87% means an LTC yield of 5.58%. If that seems high, the last time government in Canada ran

a deficit similar to 2017 was in 2004 when the LTC yield was 5.08%.[28] The fact that LTC yields are not at that level I put down partly to the flood of liquidity generated by central banks and the fact that the size of the Canada bond market has not been swollen by deficit financing similar to the US, the UK, Japan and many Euro area members. With an AAA bond rating this has made Canada attractive to foreign investors.[29]

In the Fernandez survey of the market risk premium in my Appendix B he documented that Canadian professionals on average used a long Canada bond yield 0.70% higher than actual rates. This is consistent with RBC's interest rate forecast for 2020 where Canadian LTC yields are similarly 0.70% below those in the US. Further, the Bank's estimate of the neutral overnight rate of 1.0% in real terms or 3.00% nominal or actual implies a normal LTC yield of 4.25% or 1.60% higher than forecast, and double the LTC rate at the end of 2018. I would judge the difference between forecast LTC yields of 2.65% and those in the US, as well as "normal" LTC yields, as being partly the result of factors unique to the government of Canada bond market.[30]

Q. WHAT FACTORS ARE UNIQUE TO CANADA?

A. As a AAA rated country, Canada's debt is attractive for sovereign reserve funds. The International Monetary Fund (IMF) tracks these reserve holdings by their composition, how much in US dollars, Euros etc., and until 2014Q4 the IMF did not even break out holdings of Canadian government debt and when it started to at that time the holdings were only 1.43% of total reserve holdings. Even by 2018Q3 this share had only increased to 1.95% which seems inconsequential. However, in the 4th quarter of 2018 the total Canada bond market outstanding in public markets was only just over C$500 billion or US$386 billion of which fully US$208.7 billion or 54% was held as foreign reserves.

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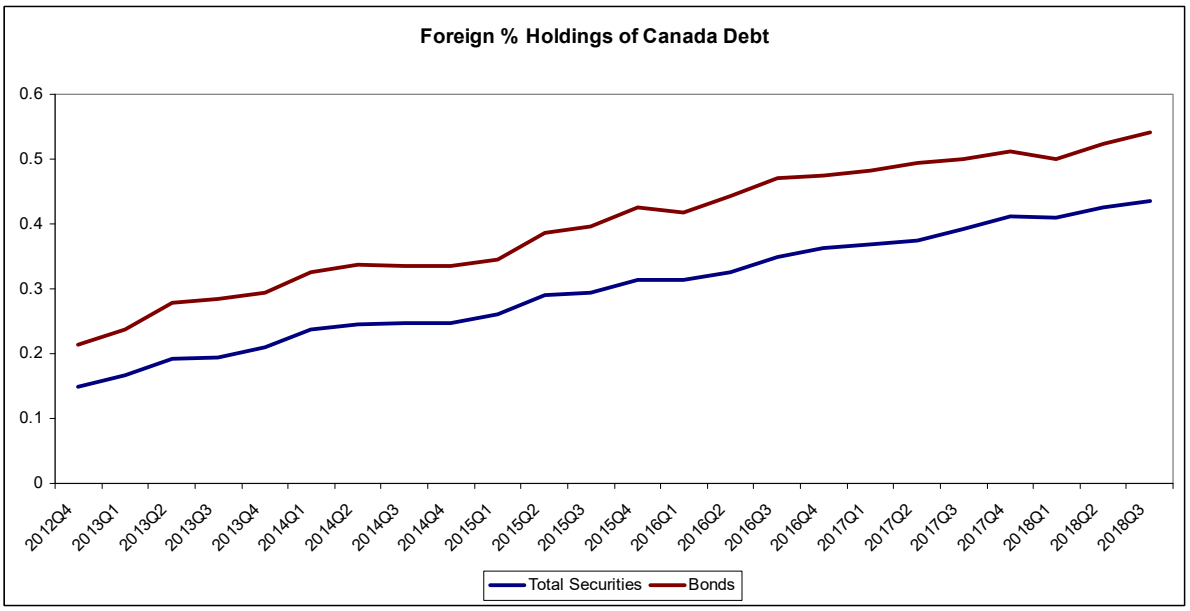
[28] J. P Morgan, "How demographic change will affect savings growth and interest rates," set the real interest rate without government bond buying at 3.0-3.5%, which would similarly translate into a nominal bond yield of at least 5.0%.

[30] The difference between A bond yields in Canada and the US is not 0.70%.

Below is a graph of the share of foreign reserve holdings, as reported by the IMF, as a percentage of both total Government of Canada securities (bonds plus treasury bills) and bonds outstanding in the public market. In 2015 the Bank of Canada noted[31]

> "In the post-crisis period, Canada has experienced sizable foreign portfolio investment flows, particularly in Government of Canada (GoC) bonds, which has resulted in an increase in the share of GoC bonds held by foreigners. These portfolio investment inflows had a significant downward influence on interest rates in Canada."

Clearly, the trend noticed by the Bank of Canada has continued and a significant share of the "small" Canadian government bond market is now held by sovereign reserve funds, leaving a shrinking share to be sought by institutional buyers like insurance companies and pension funds.



Like the Bank of Canada, I judge the current levels of long Canada bond yields to be artificially low and in my judgment not reflective of the base for an equity risk premium.

In the past, I have added 0.80% to adjust for the impact of bond buying by central banks based on the level of preferred share yields, which are quintessentially "made in Canada" due to the operation of the dividend tax credit. I cannot do this anymore since the TSX data I used is no

[31] Bank of Canada, *Financial System Review*, June 2015 page 25

longer available. However, I continue to judge a 0.80% addition to my CCAPM estimates as necessary to reflect current capital market conditions.

My overall adjusted CAPM fair return estimates are therefore as follows:

Low end	**6.53%**
High end	**7.58%**

The average estimate is 7.06%. Taking into account the 0.50% flotation cost I have added to get the fair ROE, I would regard the underlying estimate of the required rate of return of 6.56% to be consistent with the survey results on the market's required rate of return of 8.3-8.7% and the current level of preferred share yields. That is, I am estimating a required return for investing in a low risk pipes and wires utility at about 2.0% less than for the overall stock market and 2% more than for equivalent preferred shares.

IV DCF ESTIMATES OF THE FAIR ROE

Q. WHAT ARE YOUR DCF ESTIMATES?

A. In appendix D I review the DCF model, apply it to the market as a whole and highlight the problems in applying it to individual stocks. For the market as a whole, it is difficult to envisage a situation where dividends and earnings can consistently increase substantially as a share of GDP. This constrains the value of the DCF estimate to consider short run growth and departures from the economy's long run growth potential. As I have already discussed, currently there is very little spare capacity in Canada and the unemployment rate is very close to or at the minimum rate consistent with non-accelerating inflation. Consequently, I see no reason to add a short run growth potential to the long run GDP nominal growth rate. On this basis, I estimate the DCF required return on the equity market at 8.21-8.76% for Canada and about 1.0% higher for the US. These estimates are broadly consistent with those provided by the respondents to Fernandez's survey.

In Appendix D I also analyse Standard and Poors data for the electric utility sub index where they provide earnings, dividends, book value per share and yield data back to 1993. This provides a long series of consistent data to use the DCF model to extract an electric utility risk premium. I estimate this utility risk premium as 3.00-3.70% over 10 year US Treasury Yields. Given the normal use of a 30-year bond yield in Canada to estimate the fair ROE I would regard this as broadly consistent with my CAPM utility risk premium of 2.25-3.30%.

Consistent with survey results in both the US and Canada the DCF estimate of the fair rate of return is not placed in as high regard as the CAPM estimate. Partly in response, I have traditionally viewed my DCF estimates as "checks" on my CAPM estimates, since in my view CAPM estimates have usually been in the right "ball-park." However, the recent very low long Canada bond yields have forced me to re-evaluate this and look at what drives the difference between the DCF and simple CAPM estimates. This is because they should be consistent. The CAPM equation is as follows:

$$K = R_F + MRP * \beta$$

In words, the required (fair) return is the risk free rate (R_F) plus the risk premium comprised of the market risk premium (MRP) times the beta coefficient (β). For the market as a whole we can simply set the beta to one since this is definitional, so the required return is the risk free rate plus the market risk premium.

The constant growth version of the DCF model is most appropriate for the market as whole for the reasons I give in Appendix D and states:

$$K = \frac{d_1}{P} + g$$

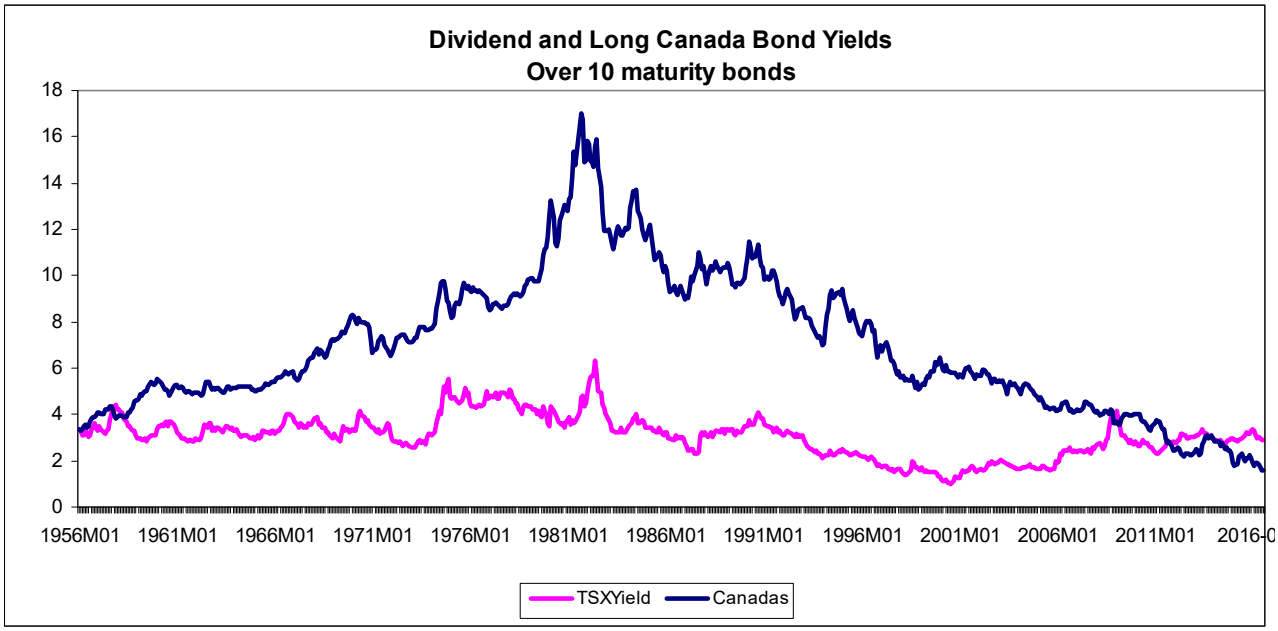
In words, the required rate of return is the forecast dividend yield plus the long run growth rate. Conceptually the DCF model and CAPM should give exactly the same values but, of course, since they approach it from a different perspective there is always estimation error. For the market as a whole, the forecast dividend yield can be estimated with very little error, so the estimation error is with the forecast long run growth rate. As a result, if the CAPM and DCF estimates differ significantly, then it is mainly due to the difficulty in estimating the growth rate in the DCF model and the risk premium in the CAPM.[32]

We can assess the relative value of the DCF and CAPM by graphing the "known" parts of both models for the overall market, which are the long Canada bond yield and the TSX dividend yield. Note that in the following graph lately the dividend yield on the TSX is *higher* than the LTC bond yield, which is unusual. However, this has been a persistent phenomenon due to the very low LTC bond yields. Since both the DCF model and CAPM should give the same answer, we can set them equal to each other, which indicates that for the market as a whole

$$DCF - CAPM = {}^{d_1}\!/_{P} - R_F = MRP - g$$

[32] Note since for the CAPM we are dealing with the market return the following analysis is general for ***any*** risk premium model

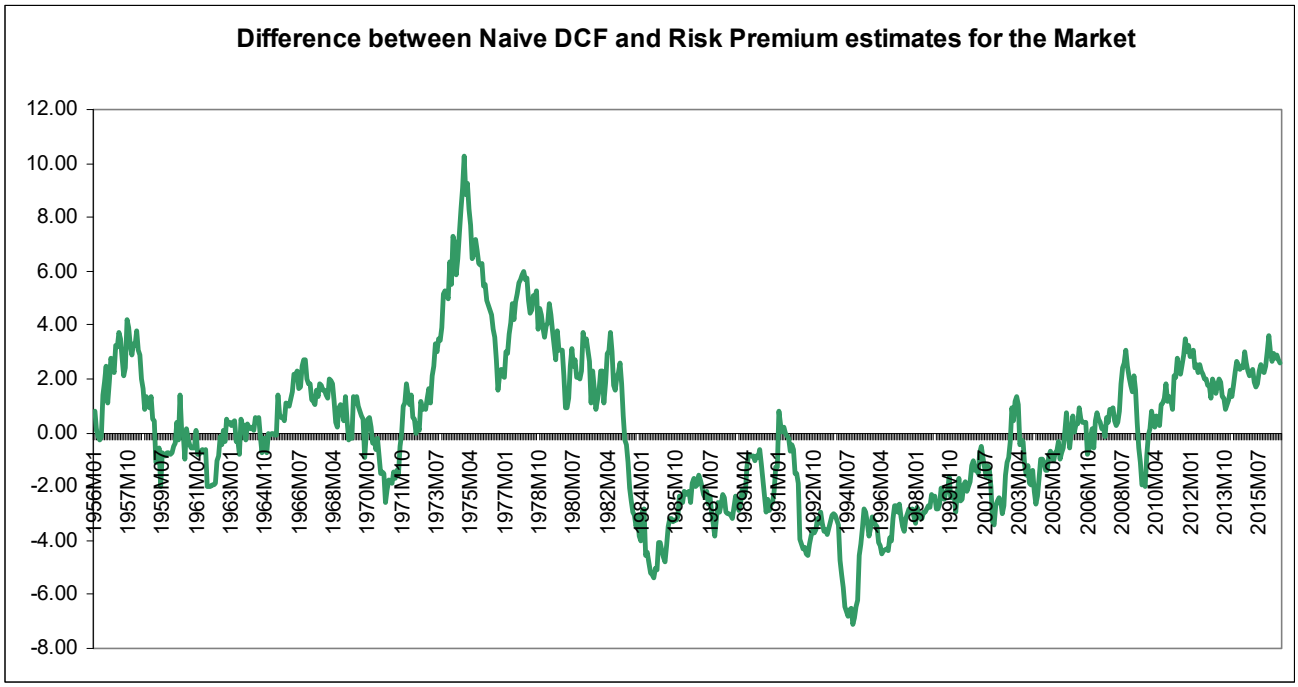
This simply indicates that the gap between the dividend yield and LTC yield reflects the difference between the market risk premium and the growth rate. As is immediately obvious the difference was greatest in the 1970s and 1980s when from Schedule 1 inflation was greatest.



This also means it is possible to come up with a simple or "naïve" estimate of the market return by adjusting for this bias. For example, I can assume that for the DCF model the forecast growth rate is the actual CPI inflation rate at the time, based on year over year changes, and then add a 3.50% real growth rate. This gives a simple growth rate forecast to add to the dividend yield and thus a simple or naïve DCF estimate for the market as whole. Similarly, we can add a long run market risk premium of 3.5% to the long Canada yield for a simple CAPM estimate. For the entire period the average naïve DCF estimate is 10.55%, while the average naïve CAPM estimate is 10.44%, or a difference of only 0.11% between the two, so "on average" these assumptions seem to make sense.

To see how robust this simple procedure is, the following graphs the difference between the two estimates for every month since 1956. The graph indicates that the difference was very large from the mid 1970's until the early 2000's, but not consistent. The reason was twofold. First, in the 1970s inflation was increasing and was captured in the DCF estimate whereas bond investors did not believe that the Bank of Canada would allow these high levels of inflation to continue.

This resulted in very low real yields on LTC bonds and a positive difference between the DCF and CAPM estimates. In other words, during this period the naïve DCF estimate was higher.



Once investors caught up to the impact of high inflation the reverse set in, as the budget deficits at the Federal level convinced the market that the government would inflate its way out of its deficit problems, rather than bring down inflation. As a result, while the year over year inflation rate dropped dramatically, LTC bond yields did not at first similarly drop, leading to very high real yields and simple CAPM estimates that exceeded the DCF estimate. It is this phenomenon of low real bond yields in the 1970 into the 1980s and high real bond yields in the 1990s that is a major reason for these significant differences.

The second reason is simply that the real GDP growth rate and the market risk premium have not remained constant since 1956. I testified extensively in the 1990s to the effect that the market risk premium was very low due to the high real interest rates and risks attached to government bonds. Subsequently, I have increased my estimates of the MRP as this risk has been removed and now use an estimate of 5.0-6.0%, rather than the 3.5% I used in the 1990's. Similarly, the long run real growth rate may have dropped and could be lower than the 3.5% used in the naive model as most forecasts are now for 2.0-3.0% growth.

However, the point is that we can "ballpark" the broad range for the DCF estimate for the market just as we can for risk premium models like the CAPM. The most recent naïve estimates are 7.63% for the DCF estimate and 5.05% for the risk premium model. I regard both of these as abnormally low and naïve, but the 2.58% difference supports an adjustment from the 3.5% market risk premium I used to use, as well as from the historic Canadian estimate in Appendix B, Schedule 9 of 4.67%. It also supports the value of currently looking at DCF estimates despite the fact they are downplayed by both professionals and academics.

Q. WOULD YOU USE THESE ESTIMATES?

A. No. These are very simple or naive estimates that use average numbers over a very long time-period. They are presented simply to show that while the DCF and CAPM estimates are consistent over long periods of time, they both have problems when used *mechanically* during periods of very high or low real Canada bond yields. The analysis also helps explain why DCF estimates fell out of favour in the 1990s, while the validity of CAPM estimates has been questioned due to the low level of bond yields.

Q. IS THERE ANY OTHER EVIDENCE ON THE VALIDITY OF THESE TYPES OF EXPECTED RETURN ESTIMATES?

A. Yes. What is important is that there is another side to estimating the fair ROE and cost of equity capital. This is that the required rate of return on the part of the investor (cost of equity capital) is also the expected rate of return. Defined benefit pension funds need this expected rate of return to determine whether a fund is in deficit or surplus. On October 19, 2012 TD Economics produced its own analysis of the long run returns of the type needed in defined benefit pension plans.[33] The important point about the TD Economics forecast is that the going forward risk premium for equities minus bonds is 4.00%. This is not the market risk premium, since adjustments need to be made but it is certainly in the right ballpark.

[33] TD Economics, An Economic Perspective on Long-term Financial Returns.

FINANCIAL PROJECTIONS OVER THE NEXT DECADE	
Financial Instrument	Average Annual % Return
Cash (3-Month T-bills)	2.00%
Bonds (DEX Universe Bond Index)	3.00%
Equities	
Canada (S&P/TSX Composite)	7.00%
U.S. (S&P 500)	7.00%
International (MSCI EAFE)	7.00%
Source: TD Economics	

Q. WHAT ADJUSTMENTS ARE NEEDED?

A. As TD Economics notes, its return forecast is for ten-year geometric returns so they have to be converted to arithmetic one year returns. To make this adjustment for very long returns we add half the variance of the arithmetic return as explained in my Appendix B, with data in Schedule 8. Historically the standard deviation of equity returns has been about 20% (0.20) so the variance is 0.04 and half this is 0.02 or 2.0%. Similarly, the volatility of the long Canada bond return has been about 9% (0.09). I would suspect that this overstates the future volatility, since it is unlikely we will see LTC yields at almost 20% again, but this means a variance of 0.0081 and half this is 0.4%. So converting these long run returns to arithmetic returns means a market risk premium of 5.60% as follows:

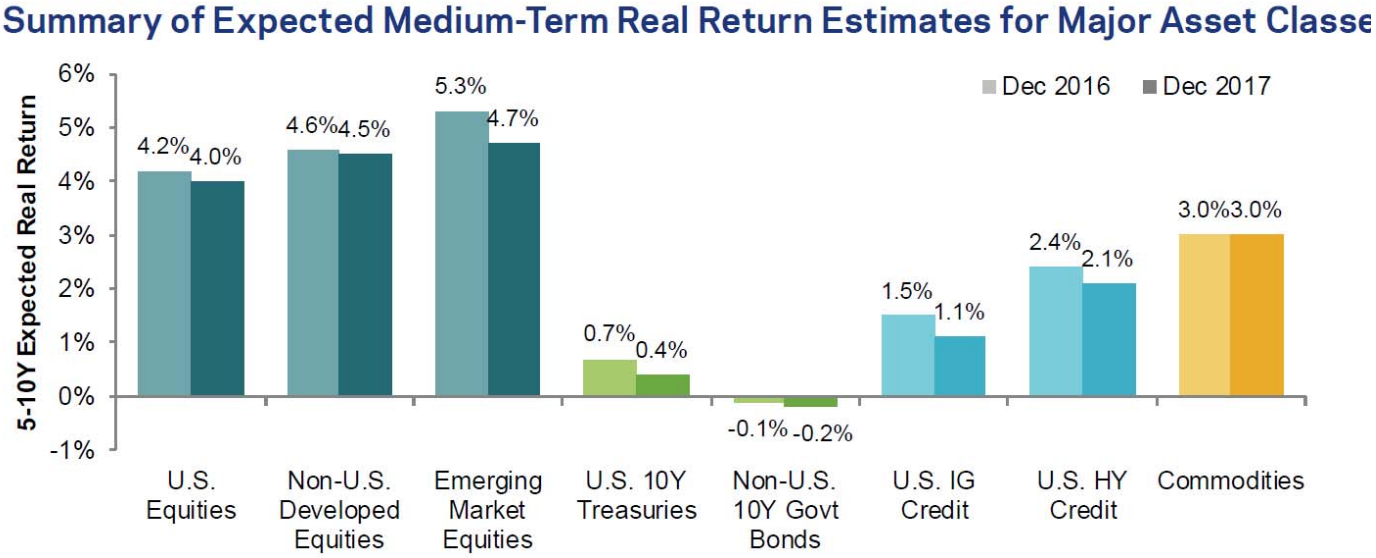
	Long run	1/2 the variance	Arithmetic
Equities	7.0%	2.0%	9.0%
Bonds:	3.00%	0.40%	3.40%

However, the TD Economics forecast is over the yield on the DEX universe bond index and not over long Canada bonds. The universe of bonds would have lower duration or maturity than the 30 year long Canada bond, but can be expected to earn more since they have default risk, but I would take these estimates as broadly consistent with my own.

Q. ARE GENERAL FORECASTS AVAILABLE?

A. Yes. There are now lots of capital market forecasts readily available from reputable firms and I have looked at several. The first is from AQR,[34] which is a value investing shop,

Exhibit 1



For US equities they are forecasting real returns of 4.0%, which with 2.0% inflation puts the nominal return at about 6.0% What is important is that they are down from their 2016 real equity return forecast, in this case down from 4.2%

The following is from the Quantitative Research Group[35]

[34] Capital market assumptions for major asset classes, 1Q18.

[35] Capital markets assumptions 2018.

Table 2: Capital Markets Assumptions by Asset Class

	2018 Estimates		2017 Estimates		Year 2018 vs 2017	
	expected return	standard deviation	expected return	standard deviation	expected return	standard deviation
All Cap	6.11%	15.29%	6.19%	15.45%	-0.08%	-0.15%
Global Equity	6.50%	14.67%	6.57%	14.83%	-0.07%	-0.16%
Large-Cap Core	6.06%	15.12%	6.15%	15.28%	-0.09%	-0.16%
Large-Cap Growth	5.90%	16.80%	6.01%	16.92%	-0.11%	-0.12%
Large-Cap Value	6.23%	14.71%	6.28%	14.91%	-0.06%	-0.20%
Mid-Cap Core	6.55%	16.86%	6.83%	17.01%	-0.28%	-0.15%
Mid-Cap Growth	6.45%	20.51%	6.83%	20.63%	-0.38%	-0.11%
Mid-Cap Value	6.62%	15.79%	6.83%	15.99%	-0.21%	-0.20%
Small-Cap Core	6.74%	19.66%	6.69%	19.76%	0.05%	-0.10%
Small-Cap Growth	6.72%	22.89%	6.66%	22.97%	0.06%	-0.07%
Small-Cap Value	6.76%	17.41%	6.71%	17.56%	0.04%	-0.15%
Int'l Developed Mkts	7.19%	16.70%	7.30%	16.88%	-0.11%	-0.18%
Foreign Large Cap Core	7.19%	16.84%	7.31%	17.03%	-0.13%	-0.19%
Foreign Large Cap Growth	6.93%	17.01%	6.84%	17.17%	0.10%	-0.15%
Foreign Large Cap Value	7.42%	17.42%	7.72%	17.64%	-0.30%	-0.23%
Foreign Small Mid Cap Core	7.21%	16.95%	7.25%	17.22%	-0.04%	-0.26%
Foreign Small Mid Cap Growth	7.14%	18.02%	6.93%	18.26%	0.20%	-0.24%
Foreign Small Mid Cap Value	7.33%	16.92%	7.66%	17.23%	-0.33%	-0.30%

Their equity market forecast is 6.11% and unlike AQR it is a small increase from 2017 when it was 6.19%. The following is from the Bank of New York Mellon[36]

Exhibit 18: 10-Year Equity Market Expected Returns From 2018 to 2027 (in USD)

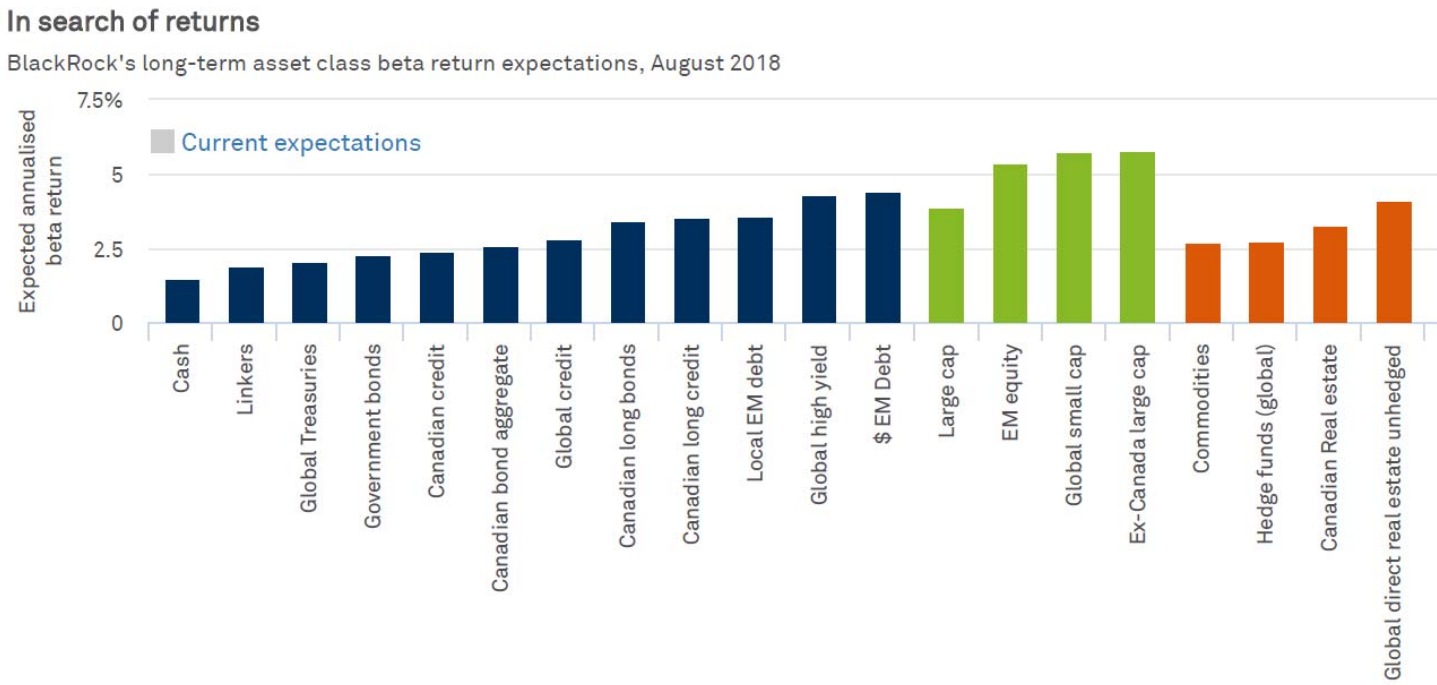
U.S. Equity	6.2%
U.S. Large Cap Equity	6.1%
U.S. Mid Cap Equity	6.5%
U.S. Small Cap Equity	7.0%
International Developed Equity	5.8%
International Small Cap Equity	5.9%
Emerging Equity	8.3%

Source: BNY Mellon Wealth Management. Data as of October 31, 2017.
Please see page 9 for a list of representative indices.

[36] Calendar year 2018 10-year capital market return assumptions.

Similar to QRG, BNY is forecasting long run 10 year equity market returns of 6.2% and a bit more for small capitalisation (value) stocks.

Blackrock is the largest asset manager in the world with $6.2 trillion under management. The following is their forecast of long run returns.

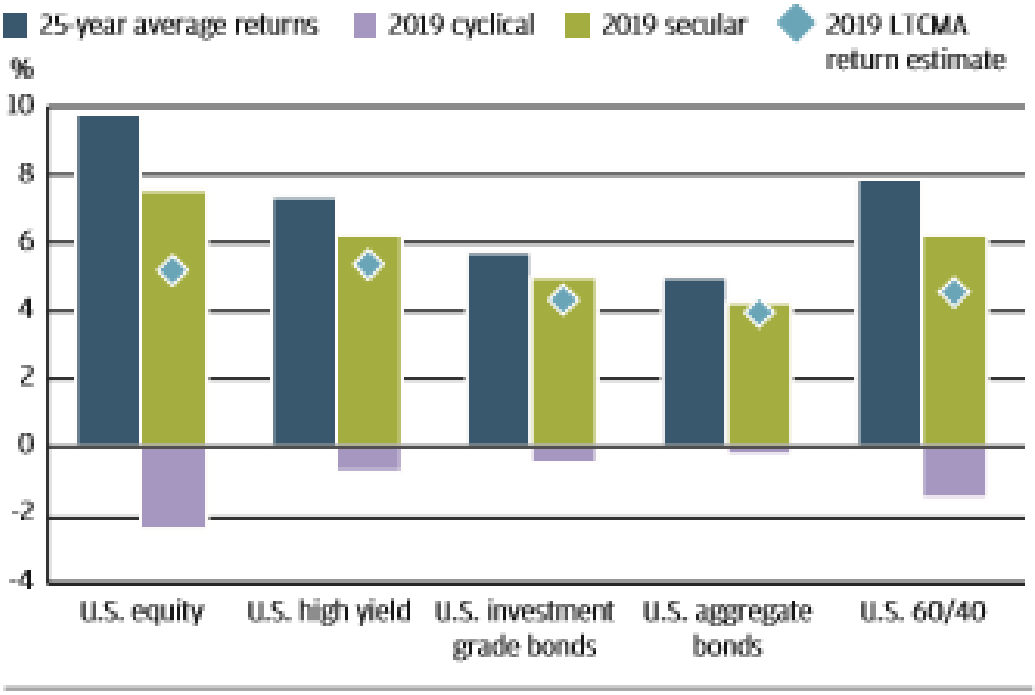


Blackrock is more pessimistic than BNY-Mellon and QRG and closer to AQR.

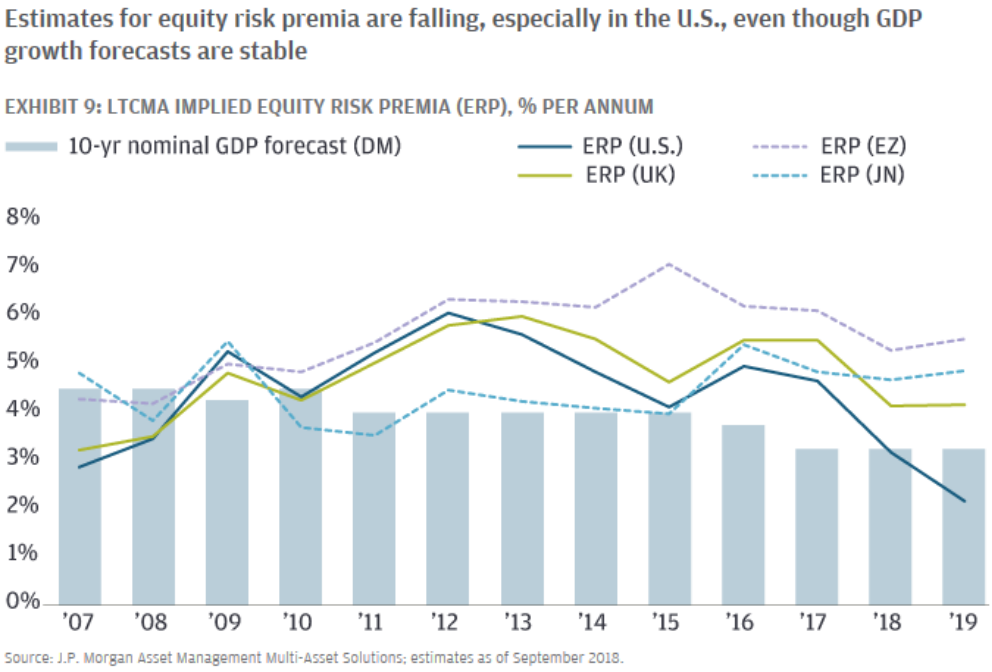
The final forecast is from J.P Morgan the largest US bank where the forecast is the most recent one.[37] J.P Morgan reports the 25 year average US equity return at just under 10% with an equilibrium forecast for US equities of 7.0% and a negative cyclical adjustment of 1.5% leading to a forecast of 5.5%. Implcitly J.P Morgan was saying that US equities were marginally over valued, which was probably in part due to the date the report was issued.

[37] 2019 Long-Term Capital Market Assumptions, J.P Morgan Asset Management 29, October 2018.

EXHIBIT 2: HISTORICAL 25-YEAR AVERAGE RETURNS FOR KEY ASSETS AND THIS YEAR'S ESTIMATES, SPLIT INTO THEIR SECULAR (EQUILIBRIUM) AND CYCLICAL COMPONENTS

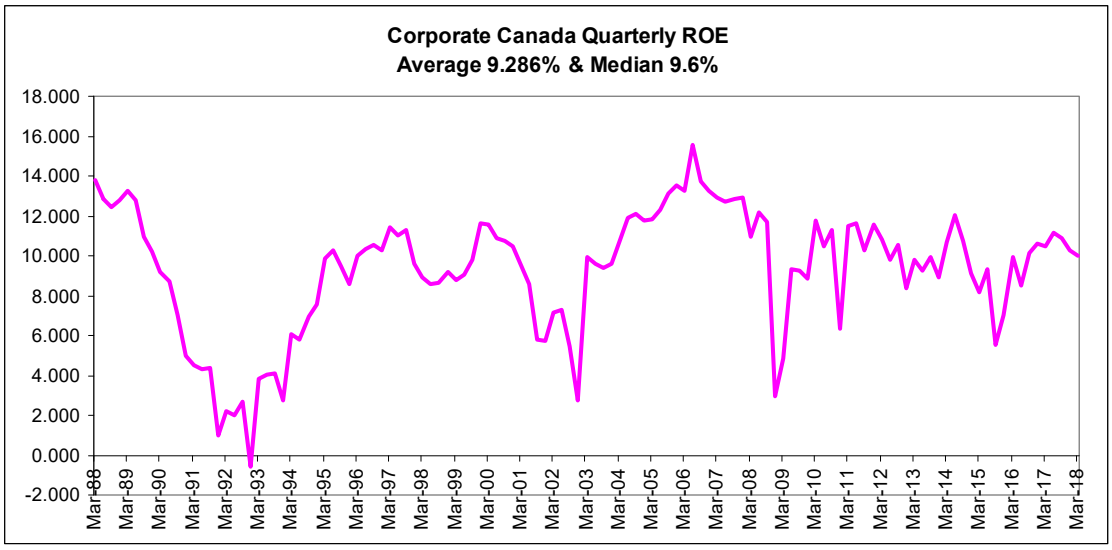


One final observation is that J.P Morgan also shows how its market (equity) risk premium has evolved over time. The intersting feature is that despite the gradual reduction in the 10 year US Treasury yield J.P Morgan sees a declining equity market risk premium not just in the US but also the UK, Japan and the Eurozone. J. P Morgan's 2019 equity market risk premium over ten year US Treasuries is barely 3.0% Like all these long-term forecasts, they need some adjustment to simple arithmetic returns, equivalent to my adjustment to the TD's forecast, but this would increase the expected equity retun by 1.50-2.0% and J.P Morgan's equity risk premium by at most 1.5%. This would still put their equity risk premium below my 5.0-6.0% range.



Q. IS THERE ANY OTHER EVIDENCE SUPPORTING YOUR ESTIMATE?

A. Yes. Ultimately, stock market returns are driven by the returns earned by companies. Below is a graph of the average ROE for "Corporate Canada", as estimated by Statistics Canada. This is the quarterly version of the average annual data in Schedule 1.



From 1988 until 2018-Q1 the average ROE has been 9.286% and the median 9.60%. I regard these as representative of the typical ROEs earned by Canadian firms. These corporate ROEs are tied to the market rates of return earned by investors. For example, in 1925 John Maynard Keynes pointed out[38] that there were two sources of returns from investing in the stock market. The first he called the ***investment return,*** which Keynes defined as "forecasting the prospective yield of an asset over its entire life."[39] In modern terminology, this would be the internal rate of return on the firm's cash flows, or an approximate ROE. The second component he called the ***speculative*** return, which involved forecasting the psychology of the market and what Keynes referred to as the change in the "basis of valuation." In modern terminology, this would be a change in the price earnings ratio. Keynes discussed this speculative return as being generated by the "state of confidence" and "animal spirits" but he also pointed out it is affected by the level of interest rates.[40]

Keynes' point would be that a firm may earn an ROE of 10%, but if the valuation of that firm changes by 10% then the investor would earn both a speculative return as well as an investment return. This total return is what we look at when we examine stock market returns over long periods of time. However, in aggregate the change in the basis of valuation cannot go on forever. We cannot continue to have a state of high confidence any more than interest rates can continue to increase or decrease: both of them will tend to revert back to some long run average. However, professional investors according to Keynes are mainly concerned with speculative returns or forecasting the change in this basis of valuation six months out. In contrast, buy and hold or fundamental investors are mainly concerned with the investment return: finding good companies and holding them regardless of the speculation in the stock market.

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[38] Quoted in John Bogle, The Lessons of History, September 12, 2011, John Maynard Keynes, 1925, Review of Common Stocks as Long Term Investments, Edgar Lawrence Smith

[39] This definition comes from chapter 12 of the General Theory of Employment Interest and Money, Macmillan London, 1936

[40] Page 149 of the General Theory

Warren Buffet is probably the most successful fundamental investor of the last fifty years. He repeated Keynes' argument by stating:[41]

> "*The most the owners in aggregate can earn between now and judgment day is what their businesses in aggregate earn*.(italics in original) True by buying and selling that is clever or lucky, investor A may take more than his share of the pie at the expense of investor B. And yes, all investors feel richer when stocks soar. But an owner can exit only by having someone take his place. If one investor sells high, another must buy high. For owners as a whole, there is simply no magic - no shower of money from outer space – that will enable them to extract wealth from their companies beyond that created by the companies themselves."

Buffet's main criticism was for the financial professionals who help individuals to trade so that in aggregate investors lose part of the pie to fees. However, Keynes, Bogle and Buffet all point out the basic fact that short run stock market returns can deviate from the returns earned by firms, that is the investment return or ROE, but in the long run this is all there is!

This discussion of what generates stock market returns is provided since in the long run the average stock market return should approximate the average investment return or ROE,[42] that is the speculative return should average out to zero. There are two ways in which we can look at the investment return; the first, is to look at average rates of return on equity and the second, to look at a DCF model for the economy as a whole.

In Schedule 4 is the average annual ROE for Corporate Canada since 1980, as reported by Statistics Canada (Table # 1800003). Over this period, the average ROE has been 9.92%. The third column reports the annual return on the TSX Composite, which over the same period has been 10.14% or 0.22% more. However, the rough equality over this period hides the significant year-to-year variation where speculative returns have been significantly high or low. For example in 1980 Corporate Canada earned 15.05%, but the TSX Composite earned 30.13% as the basis of valuation (PE ratio) increased for a short term speculative gain of 15.09%. Then in 1981, Corporate Canada earned an ROE of 11.70% while the TSX lost 10.25%! In each year, we can see that the speculative return is highly volatile and on average 5-6 times more volatile than the investment return.

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[41] Berkshire Hathaway's 2006 Annual Report, reported in Fortune (March 20, 2006).

[42] It is an approximation since it depends on the market to book ratio at the start of the period.

The second way of looking at the investment return is that used by Jack Bogle, the founder of Vanguard Mutual funds. He estimated the investment return using the constant growth DCF model, where at the start of each year he added the subsequent five-year earnings growth to the dividend yield. He then took this analysis back to 1900 and provided the graph in Schedule 5. This marginally understates the investment return since he should have used the forecast dividend yield, but as he noted it did not materially affect the results. He estimated this investment return at 8.8% or slightly less than the average US stock market return of 9.1%. However, since he underestimated the investment return the difference in reality is *de minimis*. Just like Keynes, Bogle also noted the persistent tendency for reversion towards the mean, which is another way of saying that high or low stock markets and PE multiples do not last. As Bogle noted (page 11)

> "Over the long run it is the durable economics of enterprise – enterprise – that has determined total return: the evanescent emotions of investing – speculation –so important over the short run, has ultimately proven to be meaningless."

The approach of Keynes, Buffet and Bogle is a standard approach used by fundamental investors who look at individual stocks, rather than trying to time the equity market. The basic message is that the equity marked return is tied to the ROE earned by the overall stock market, which has been around 10%.

Q. WHAT IS YOUR FAIR ROE FOR A BENCHMARK UTILITY?

A. I would judge a fair ROE based on my adjusted CCAPM to be in a range 6.53%-7.58% with a mid-point of 7.06%. This estimate is developed below:

Risk Premium

Base LTC forecast:	2.65%
Normal utility risk premium:	2.78%
Issue costs:	0.50%
Normal Fair ROE	5.93%
Credit Spread Adjustment	0.33%
Operation Twist Adjustment	0.80%
Fair ROE:	**7.06%**

My DCF analysis I use to support my overall expected market return and to directly estimate DCF risk premiums for both the S&P500 electric utility index and my sample of US electric utilities.

DCF:

Overall equity market return:	8.50-9.50%
Normal US SP500 Electric risk premium:	3.00-3.70%
US Electric UHC DCF:	6.50%

Finally, I take into account broader measures such as:

Average Canada ROE since 1980:	9.92%
Asset Manager long run equity returns:	7.00-9.00%

A final consideration is that Fortis in part finances its investment in its operating subsidiaries, including MEC, with preferred shares. On January 11, 2019, I retrieved the following yields on the preferred shares listed on Fortis's web page and reproduced in Schedule 6. All of these shares traded on that day so the values are not dated or stale.

Fortis Preferred series F	5.55%
Fortis Preferred series G	5.62%
Fortis Preferred series G	5.62%
Fortis Preferred series H	4.01%
Fortis Preferred series I	5.09%
Fortis Preferred series J	5.52%
Fortis Preferred series K	5.35%
Fortis Preferred series M	5.07%

Preferred shares are part of shareholder's equity just like common shares. In fact, technically they are just a particular class of shares within shareholder's equity in the same way that common shares are. The main difference is that they offer a preferential dividend.[43] The important point is that the dividends attract the dividend tax credit the same as common share

[43] They normally have limited voting rights.

dividends and are thus “unbiased” compared to debt instruments, where interest is fully-taxed. The average dividend yield on these preferred shares is 5.17% compared to the dividend yield on Fortis’ common shares of 3.99%; the difference reflects the fact that investors expect a capital gain through growth on the common shares.

I would expect the investors required return on MEC’s common equity to be in between the yield on these preferred shares (5.17%) and the overall return on the stock market (8.50-9.50%). My risk premium estimate of 7.06% satisfies this requirement. However, balancing the risk premium estimate with the DCF estimates, the volatility in the bond market and the low LTC yields, I would recommend a 7.5% fair ROE for MEC. This recommended ROE is 0.50% lower than I recommended in 2010.

V: BUSINESS RISK, FINANCING AND CONCLUSIONS

Q. WHAT IS YOUR JUDGMENT ON MEC's BUSINESS RISK?

A. I see nothing in the evidence filed by MEC to cause me to change my judgement from 2010 that MEC is a low risk Canadian utility and should have the same common equity ratio and allowed ROE as other low risk Canadian utilities. MEC remains an effective monopoly provider of electricity on the Island with no viable competition. Further there is very little industrial load which limits the variability in earnings. As a regulated utility forecast costs are passed on to ratepayers as a cost of service, so most of the risk raised by MEC's experts are actually borne not by the company but by ratepayers. An example of this was the risk raised in 2010 that the short-term balances in the energy cost adjustment account (ECAM) were becoming excessive. However, these were largely the result of delays in refurbishing the Point Lepreu nuclear plant in New Brunswick causing higher replacement power costs. This lead to the PEI Energy Accord where the province assumed "certain extraordinary costs" incurred by MEC.[44]

The Accord illustrates two phenomena. First, that a utility' shareholders are rarely at risk due to the regulatory compact in Canada where almost all risks resulting from prudent operation are passed on to ratepayers with after the fact deferral accounts truing up these costs. Second, MEC is a small utility, but it operates in a small province, where its activities are important not just for the regulator but also the provincial government. It is difficult to think of another utility that has the same level of support from both the government as well as the regulator. In Ontario, for example the Ontario Energy Board has to regulate dozens of small electric distribution utilities and can not be as hands on with each one as the Commission and provincial government in PEI.

Further, the situation has improved to some extent since 2010 as a result of the addition of a weather normalisation reserve granted in 2016. MEC was actually in a very favourable position to the extent it built up significant balances in its rate of return adjustment account (RORA) which captured the excess earnings above the allowed ROE. This balance peaked at over $15

[44] These costs are met by a separate rider on electricity rates designed to fund the province's borrowing costs. As such, the ECAM balance is no longer a significant risk factor.

million in 2015 (Schedule 5.4 MEC evidence page 27). After 2015 MEC again recorded sizable balances each year in its RORA (Schedule 5.5) with the balance currently sitting at almost $10 million. Risk by definition is the probability of harm, where harm in a financial sense is losing money. The risks raised in 2010 clearly have not prevented MEC's ability to earn its allowed ROE as the persistent positive balances in the RORA indicate.

As MEC explains (page 28)

> "stronger than expected economic growth on PEI have resulted in sales growth levels exceeding that previously forecast and used in establishing customer electricity rates during the General Rate Agreement period. As a result, the Company has recorded RORA in both 2016 and 2017 and is forecasting a RORA for 2018 as well."

A standard way for a utility to lower its risk is simply to under estimate its revenues and over estimate the costs in its revenue requirement. There is more than a hint that this is what MEC has been doing. However, like most utilities in Canada MEC does not seem to have borne any significant risks since 2010, while earning a generous risk premium.

Q. **AREN'T INTEGRATED UTILITIES LIKE MEC MORE RISKY?**

A. Not really, as it depends how they are regulated. Generation is inherently more risky than transmission and distribution if it is independent with no captive market. As a result, the independent power producers in Ontario I would regard as more risky than a pipes and wires utility. Similarly, we would expect nuclear generation to be inherently riskier than most other sources of power. However, in practise nuclear plants in Ontario, for example, have so many deferral accounts that most of the risks are passed on to governments not ratepayers or shareholders.[45] As long as the costs are accurately forecast, with deferral accounts for difficult items, then generation per se adds no additional risks. Moreover, for MEC this is not a material consideration given its minimal generation assets.

[45] This is the case with Ontario Power Generation, for example, that operates most of the nuclear plants in Canada. OPG is allowed the same ROE as T&D operations with a slightly higher common equity ratio.

Q. WHAT ABOUT LONG RUN RISKS?

A. The basic long run risk is that the commodity being distributed becomes uneconomic causing significant numbers of customers to drop off its system. As the utility tries to reallocate costs to other customers rates have to rise and so even more customers drop off and they reach a level that many would regard as unjust or unfair and unreasonable. This is the "death spiral" and is real.

TransCanada had a hearing before the National Energy Board in 2012 to consider changing its rate design due to a reduction in load on its Mainline. Due to the emergence of different supply basins closer to its Central Canadian markets, the concern was that its bullet pipeline could not support the tolls required for it to earn its allowed ROE. In this case, there was a concern that ***bypass*** of the Mainline would strand some of its assets.

Another example is local Telco service; the final loop. In the early 1990s the development of telecommunications technology allowed the local cable companies to compete with the incumbent copper wire providers. Further, as the technology developed even the long distance market became threatened with competition which limited the cross subsidisation of local service with "excess" long distance revenues. Now we take it for granted that competition allows a variety of services to provide both short and long distance telco service, but this was not the case 25 years ago. The CRTC decided to refrain from direct rate of return regulation of the cable and telephone companies as their markets became competitive.

I provide these two examples to indicate that the death spiral is a real long run risk to some distribution utilities either as a result of ***technological change*** or the development of ***alternative supplies*** closer to market. However, neither of these longer run risks seem to be relevant to MEC. As a result its risk assessment is primarily based on the short run risk of earning its allowed ROE which appears to be minimal.

Q. DO OTHERS SHARE YOUR OPINION?

A. Yes. MEC is rated by Standard and Poors, which notes that it is a low risk integrated electric utility with supportive regulation and stable and predictable cash flows. In particular, S&P assumes that MEC will continue to earn its allowed ROE.

S&P is a US company that uses standardised ratios in its assessment across different countries and provides two ratings for a company. The first rating is an "issuer" rating based on its fundamental analysis of the company; for S&P this is its corporate credit rating. The second rating is an "issue" rating, which is a rating attached to a specific issue of securities. For MEC the assessment is as follows:

Business And Financial Risk Matrix

	Financial Risk Profile					
Business Risk Profile	Minimal	Modest	Intermediate	**Significant**	Aggressive	Highly leveraged
Excellent	aaa/aa+	aa	a+/a	**a-**	bbb	bbb-/bb+
Strong	aa/aa-	a+/a	a-/bbb+	bbb	bb+	bb
Satisfactory	a/a-	bbb+	bbb/bbb-	bbb-/bb+	bb	b+
Fair	bbb/bbb-	bbb-	bb+	bb	bb-	b
Weak	bb+	bb+	bb	bb-	b+	b/b-
Vulnerable	bb-	bb-	bb-/b+	b+	b	b-

S&P judges MEC to have an excellent business risk profile, that is, very low business risk, but a signficant financial risk profile. This financial risk profile is normal for Canadian utilities since they use significantly more debt than US utilities partly for historic reasons. S&P then lowers the rating of A- to BBB+ for an issuer rating due to management and governance issues, but is vague on this. S&P then raises the issue rating on MEC's first mortgage bonds by two notches, where a notch is + or – modifier to the credit rating. S&P then rates MEC's first mortgage bonds as A, which is an extremely high credit rating.

Q. DO ALL RATING AGENCIES OPERATE THE SAME AS S&P?

A. No. S&P entered Canada largely by acquiring the Canadian Bond Rating Service (CBRS) and then harmonised its ratings over a period of time. The other Canadian rating agency is the Dominion Bond Rating Agency (DBRS), which does not follow the same procedures as S&P and is often more generous than S&P for two reasons. First, S&P was burnt in the early 2000's when many regulated telecommunication companies were taken over by Internet companies which then increased their debt ratios resulting in downgrades. Consequently, S&P places signficant weight on ring fencing and regulatory protection, since in some US. states it was lacking. Second and similar to Moodys, S&P gives a lift for secured debt financing. This is

added protection in the US, but in Canada DBRS takes a heirarchic approach, So without any higher priority debt, the covenant provisions in the debt contract are regarded as enough protection, meaning that there is rarely a lift for first mortgage bonds. Consequently, there is less spread between the issue and issuer rating. Why this is important is that Mr. Troganoski (page 57) refers to MEC as a BBB+ utility when in fact that is simply a mid-way point in its rating. As indicated above MEC starts at A-, gets downgraded to BBB+ for M&G before being upgraded to A as S&P develops its rating on MEC's only oustanding debt, its first mortgage bonds.

What is important is that an A rating is a very strong bond rating indicative of very high financial integrity. Under the circumstances, it is misleading to characterise MEC as an S&P B++ issuer when it is not.

Q. DO YOU HAVE ANY COMPARATORS FOR THIS COMMENT?

A. Yes, the obvious one is Fortis, MEC's parent. At Schedule 7 is a slide from a Fortis presentation where it describes itself as "one of the lowest risk utility businesses in North America." I wonder from this comparison whether Fortis is saying in fact that its businesses are lower risk than Duke, Evergy, Eversource, Allete, PNW and OGE? If not, I wonder who Fortis is using as comparators.

Further in Schedule 8 is another slide where Fortis describes itself as having "investment grade credit ratings and ample liquidity." Of note is that Fortis is rated BBB (High) from DBRS, and BAA3 from Moody's. Fortis is rated A-/BBB+ by S&P, which is a strong rating for both the issue and issuer ratings. Schedule 9 has recent S&P bond ratings for Canadian and US electric utilities followed by TD Securities. These appear to be the issue ratings since Fortis is listed as A-. Of importance is that 9 of the 17 US utilities have BBB type S&P bond ratings and only 8 have the same ratings as Fortis. For the Canadian utilities, 4 have lower ratings than Fortis and 3 the same, while Valener is unrated. Out of the 24 utilities, ***only one*** has a better S&P rating than Fortis, which is Hydro One, which is controlled by the Province of Ontario. So effectively, no privately controlled, public utility has a better S&P bond rating than Fortis and yet MEC has a better bond rating at A than Fortis at A-.

Q. WHAT IS YOUR RECOMMENDATION?

A. I regard MEC as a typical Canadian utility where for a long time I have been recommending 35% common equity for distribution utilities and 30% for transmission utilities. The only distinguishing features for MEC are its relatively "small" size and ownership of some generation assets. However, the impact of this on shareholder risk is not obvious. It is clear that its size limits its access to debt market simply because there are economies of scale in debt issues. This leads MEC to rely on secured debt financing similar to other utilities like Newfoundland Power.[46] Additionally, there is the risk of "lumpy" debt issues that might cause it to raise funds at what in retrospect is a high cost. However, this cost is passed onto ratepayers and does not affect shareholders.

MEC notes (page 88) that

> "Changes to the EPA, effective January 1, 2017, requires that the Company (i) maintain at all times not less than 35 per cent of its capital invested in the power system in the form of common equity; and (ii) ensure that, for the year, not more than 40 per cent of its capital is invested in the power system in the form of common equity."

This is a change from the minimum of 40% that existed in 2010, at the time of my last report. Given a range, utilities invariably use the top of the range, since consistent with the Averch Johnson effect this is the optimal strategy if the allowed return is excessive which I believe it to be. True to form, MEC is forecasting 40% common equity through the test period.

At Schedule 12-2 MEC lists current common equity ratios for Canadian electric companies. I would discount the Ontario guideline of 40% since as the OEB notes[47]

> "The bulk of the rate-regulated utilities in Ontario are electricity distributors, currently over 70 in number. These vary greatly in size and operational characteristics. The smallest municipally-owned distributor serves about 1200 customers, while Hydro One Networks serves over 1.2 million distribution customers. Hydro One Networks serves a mix of urban and rural parts of the province, while most other electricity distributors serve largely urban and suburban areas."

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[46] Other small utilities have relied on term bank financing due to these scale effects in the debt market.

[47] OEB Staff Report EB-2009-0084 review, January 14, 2016, page 13.

The result is that the OEB has to regulate a very large number of electric utilities many of which are tiny and much smaller than MEC. Consequently, the OEB *imputes* the cost of capital for these utilities. For the smaller ones that includes not just the allowed ROE and common equity ratio but also the cost of long and short-term debt. In fact, the financial affairs of most of these small utilities are not formally reviewed by the OEB, so they actually adopt varying financial structures. Of note is that many of these utilities are much smaller than MEC and yet they have 40% common equity.

What I would regard as most comparable are the Alberta utilities[48] where the AUC recently released its latest decision (AUC 22570-D01, August 2, 2018), where it allowed the same 8.5% ROE and 37% common equity ratio for both distributors and transmission companies. I do not normally recommend that regulators follow other regulators since the process is circular. However, the AUC targets an A bond rating and produced the table in Schedule 10. The objective of the table is simply to see what credit metrics drop out of certain parameters set by the regulator to assess the potential impact on the credit rating. The table is based on an allowed ROE of 8.5%, a 27% tax rate, an embedded debt cost of 4.7% and an average depreciation rate of 5.73%. As the table shows, a distributor could meet the standard 2X interest coverage ratio with a 31% common equity ratio. An interest coverage ratio of 2X is standard for distributors since many have it in their bond covenants that a new issue test of 2X has to be met before the utility can issue debt.[49] In contrast, MEC is targetting a 40% common equity ratio and 2.4-2.6X interest coverage. The AUC's actual allowance of 37% common equity on an ROE of 8.5% results in a 2.4X coverage ratio, at the bottom of MEC's target range.[50]

I regard MEC as being a low risk utility with a conservative common equity ratio. It is significantly lower risk than the comparable companies used by either myself, or Mr.

[48] Note Newfoundland Power is an outlier with 45% common equity. I have been recommending that as a first step the PUB change 5% of this common into preferred equity, but the PUB have not accepted this. Note Newfoundland is the home of Fortis.

[49] This differs from that contained in the financial statements, since there is some averaging of earnings allowed and it is adjusted for changes in the debt outstanding.

[50] MEC's higher tax rate would boost its interest coverage ratio.

Trogonoski. The closest comparable companies are the Alberta T&D companies where the AUC recently allowed an 8.5% ROE on 37% common equity. I would regard this as a useful step towards my own recommendation of a 7.5% ROE on 35% common equity.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

Schedule 1

Macro data

	Unemployment Rate	Real Growth	CPI Inflation	T Bill Yield	Canada Yield	FX Rate US$	Average ROE
1987	8.81	4.17	4.42	8.17	9.93	0.75	11.19
1988	7.77	4.70	3.94	9.42	10.23	0.81	12.97
1989	7.58	2.47	5.06	12.02	9.92	0.84	11.79
1990	8.16	0.17	4.81	12.81	10.81	0.86	7.48
1991	10.32	-2.11	5.61	8.83	9.81	0.87	3.53
1992	11.24	0.88	1.45	6.51	8.77	0.83	1.56
1993	11.42	2.50	1.90	4.93	7.88	0.78	3.69
1994	10.43	4.65	0.12	5.42	8.58	0.73	6.57
1995	9.54	2.74	2.22	6.98	8.35	0.73	9.55
1996	9.73	1.61	1.48	4.31	7.54	0.73	10.29
1997	9.16	4.25	1.69	3.21	6.47	0.72	10.86
1998	8.35	3.99	1.00	4.74	5.45	0.67	8.83
1999	7.58	5.35	1.75	4.70	5.68	0.67	10.70
2000	6.85	5.21	2.69	5.48	5.92	0.67	11.70
2001	7.23	1.78	2.52	3.85	5.79	0.67	9.00
2002	7.66	2.97	2.25	2.57	5.67	0.65	6.90
2003	7.61	1.84	2.80	2.87	5.29	0.72	11.30
2004	7.18	3.10	1.85	2.27	5.08	0.77	12.40
2005	6.77	3.11	2.21	2.71	4.41	0.83	13.90
2006	6.32	2.72	2.00	4.02	4.29	0.88	14.90
2007	6.03	2.13	2.14	4.17	4.32	0.94	13.30
2008	6.15	0.84	2.37	2.62	4.06	0.94	10.90
2009	8.23	-2.86	0.30	0.40	3.85	0.88	9.00
2010	7.99	3.15	1.78	0.50	3.71	0.97	11.10
2011	7.46	2.77	2.39	0.94	3.22	1.01	12.10
2012	7.29	1.75	2.03	0.96	2.35	1.00	10.40
2013	7.07	2.48	0.94	0.98	2.71	0.97	9.70
2014	6.90	2.86	1.91	0.91	2.65	0.91	10.70
2015	6.90	1.00	1.13	0.50	2.06	0.78	6.90
2016	7.00	1.41	1.43	0.50	1.80	0.75	9.80
2017	6.36	3.05	1.60	0.71	2.18	0.77	10.68
Cansim	V13682111	v62305752	v41690973	V122484	V122501	V37426	V634672/V634628

Schedule 2

CANADA BOND YIELDS

Overnight money market rates		1.75
Benchmark bonds		
Canada	Three month Treasury Bill yield	1.65
Canada	Six month Treasury Bills	1.77
Canada	One year Treasury Bills	1.87
Canada	Two year	1.89
Canada	Three year	1.89
Canada	Five year	1.89
Canada	Seven year	1.90
Canada	Ten year	1.96
Canada	Long term (30 year)	2.17
Canada	Real return bonds	0.74
Marketable Bond Average yields		
Canada	1-3 year	1.88
Canada	3-5 year	1.89
Canada	5-10	1.93
Canada	Over tens	2.12

Source: Bank of Canada's web site at http://bankofcanada.ca/en/securities.htm, for January 2, 2019 for T. Bills, January 8, 2019 for bonds.

Schedule 3

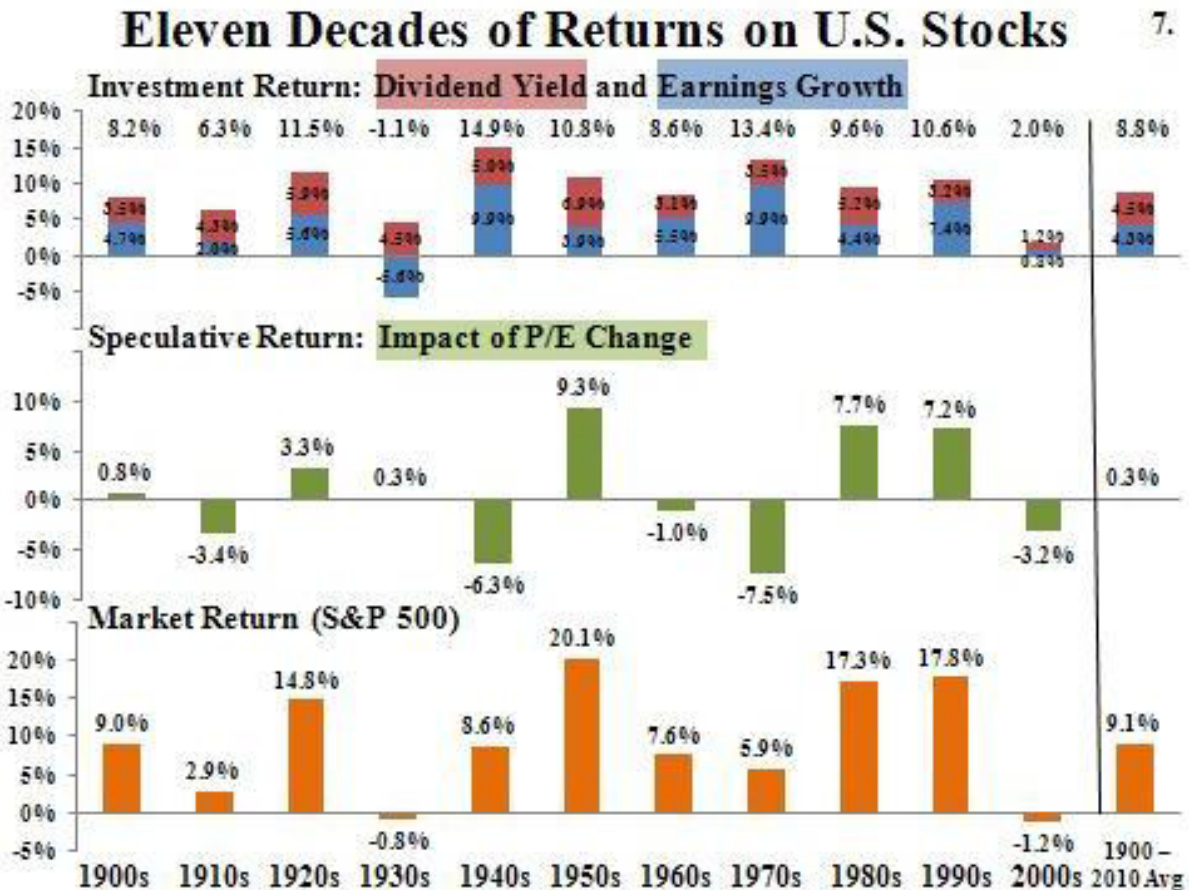
Fama-French Application

Company	β_i	β_i^S	β_i^V	3FM	β_i	CAPM	Diff
3M	0.66	0.05	0.18	8.5%	0.76	8.4%	0.2%
Alcoa	2.11	0.69	-0.38	17.1%	2.10	16.3%	0.8%
American Express	1.15	0.38	1.79	17.7%	2.08	16.2%	1.5%
AT&T	0.82	-0.23	-0.23	7.3%	0.66	7.8%	-0.5%
Bank of America	1.55	-1.15	2.20	17.1%	2.30	17.5%	-0.4%
Boeing	1.21	-0.64	0.44	10.7%	1.26	11.3%	-0.7%
Caterpillar	1.67	0.00	0.25	14.6%	1.78	14.4%	0.1%
Chevron	0.96	-0.58	-0.44	6.5%	0.62	7.5%	-1.1%
Cisco Systems	1.20	0.67	-0.31	11.8%	1.22	11.1%	0.8%
Coca-Cola	0.75	-0.72	-0.01	6.2%	0.56	7.2%	-1.0%
DuPont	1.10	-0.18	0.67	12.1%	1.37	12.0%	0.1%
Exxon Mobil	0.72	-0.70	-0.30	5.2%	0.41	6.3%	-1.2%
General Electric	1.21	-0.36	0.79	12.6%	1.49	12.7%	-0.1%
Hewlett-Packard	1.03	0.48	-0.26	10.5%	1.02	9.9%	0.5%
Home Depot	0.38	0.55	0.41	9.1%	0.71	8.1%	1.0%
Intel	1.45	-0.09	-0.58	10.3%	1.16	10.7%	-0.5%
IBM	0.81	0.36	-0.18	9.1%	0.81	8.7%	0.4%
Johnson & Johnson	0.60	-0.51	0.09	6.3%	0.52	7.0%	-0.7%
JPMorgan Chase	0.45	-0.50	1.51	10.2%	1.04	10.0%	0.1%
Kraft Foods	0.46	-0.17	0.29	7.1%	0.56	7.2%	-0.1%
McDonald's	0.86	-0.58	-0.25	6.5%	0.60	7.4%	-1.0%
Merck	1.36	-0.89	-0.55	7.5%	0.88	9.1%	-1.6%
Microsoft	1.09	-0.04	-0.30	9.2%	0.94	9.4%	-0.2%
Pfizer	0.71	-0.68	0.38	7.4%	0.72	8.2%	-0.8%
Procter & Gamble	0.61	-0.27	0.04	6.9%	0.56	7.2%	-0.4%
Travelers	0.71	-0.51	0.12	7.0%	0.64	7.7%	-0.7%
United Technologies	0.87	-0.32	0.32	9.2%	0.95	9.5%	-0.3%
Verizon Communications	0.87	-0.30	-0.43	6.8%	0.60	7.4%	-0.7%
Wal-Mart	0.30	-0.41	0.09	4.8%	0.24	5.3%	-0.5%
Walt Disney	0.89	0.12	0.35	10.7%	1.08	10.3%	0.4%
Min	**0.30**	**-1.15**	**-0.58**	**4.8%**	**0.24**	**5.3%**	**-1.6%**
Max	**2.11**	**0.69**	**2.20**	**17.7%**	**2.30**	**17.5%**	**1.5%**
Avg	**0.95**	**-0.22**	**0.19**	**9.5%**	**0.99**	**9.7%**	**-0.2%**

Investment and Speculative TSX Returns back to 1987

	ROE	TSX	Spec
1980	15.05	30.13	15.09
1981	11.70	-10.25	-21.95
1982	6.80	5.54	-1.26
1983	9.34	35.49	26.15
1984	10.53	-2.39	-12.92
1985	10.47	25.07	14.60
1986	9.49	8.95	-0.54
1987	11.19	5.88	-5.31
1988	12.97	11.08	-1.89
1989	11.79	21.37	9.58
1990	7.48	-14.80	-22.28
1991	3.53	12.02	8.48
1992	1.56	-1.43	-2.99
1993	3.69	32.55	28.86
1994	6.57	-0.18	-6.75
1995	9.55	14.53	4.98
1996	10.29	28.35	18.06
1997	10.86	14.98	4.12
1998	8.83	-1.58	-10.42
1999	10.70	31.71	21.01
2000	11.70	7.41	-4.29
2001	9.00	-12.57	-21.57
2002	6.90	-12.44	-19.34
2003	11.30	26.72	15.42
2004	12.40	14.48	2.08
2005	13.90	24.13	10.23
2006	14.90	17.26	2.36
2007	13.30	9.83	-3.47
2008	10.90	-33.00	-43.90
2009	9.00	35.05	26.05
2010	11.10	17.61	6.51
2011	12.10	-8.71	-20.81
2012	10.40	7.19	-3.21
2013	9.70	13.00	3.30
2014	10.70	10.55	-0.15
2015	6.90	-8.32	-15.22
2016	9.80	21.08	11.28
2017	10.68	9.10	-1.58
Average	9.92	10.14	0.22
Volatility	2.92	15.85	15.56

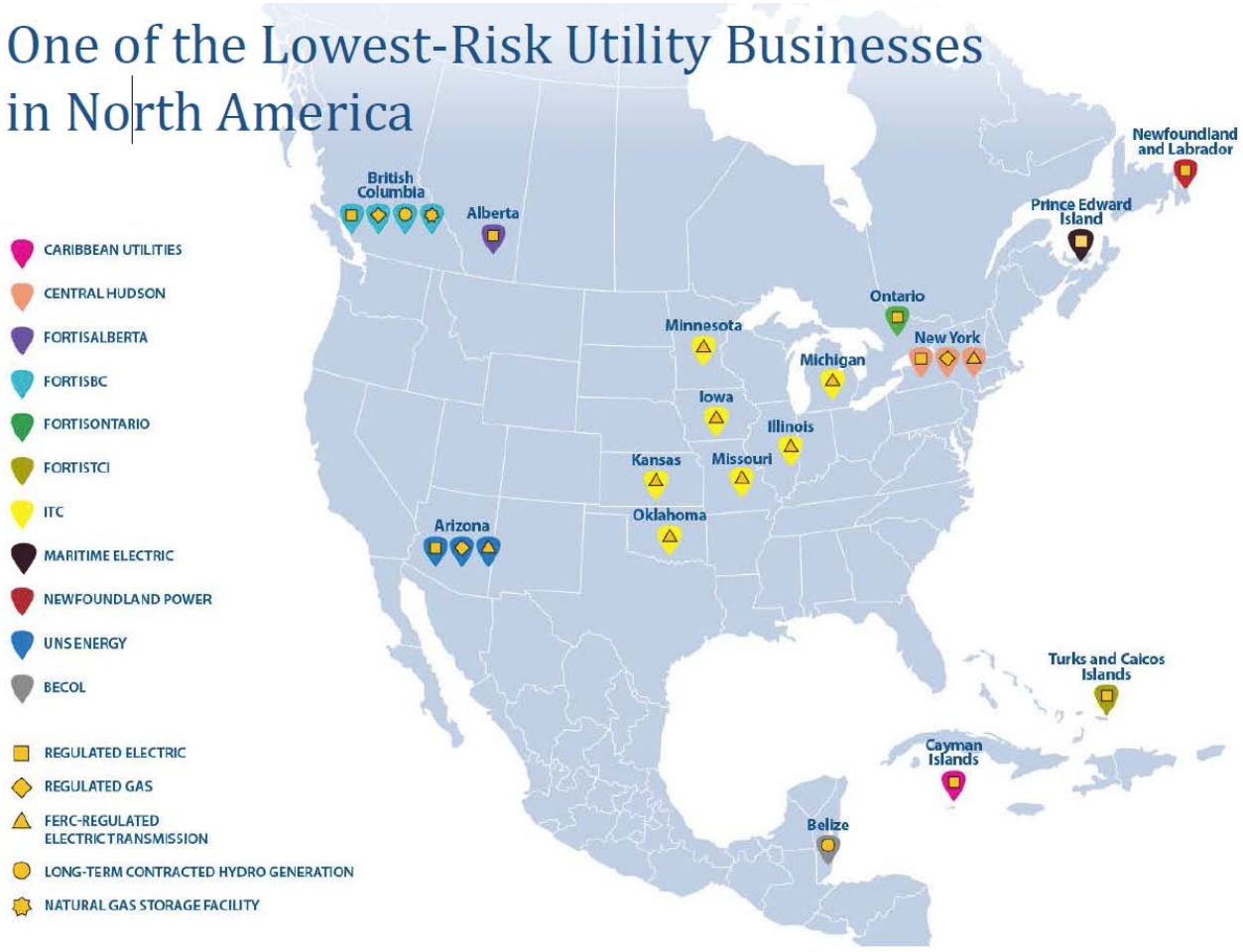
Jack Bogle's Investment and Speculative Returns in the US back to 1900



Fortis Preferred Shares

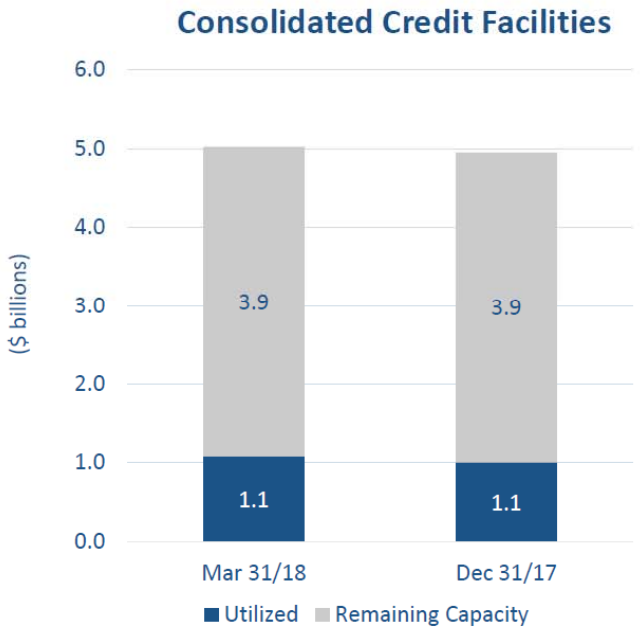
ISSUE	TICKER SYMBOL	RATE PER ANNUM*	DESCRIPTION	PAR	REDEMPTION DATES
Series F	FTS.PR.F	$1.2250	Cumulative Redeemable	$25.00	Dec 1, 2015
Series G	FTS.PR.G	$1.09825	Cumulative Redeemable 5-yr Fixed Rate Reset	$25.00	Sep 1, 2018
Series H	FTS.PR.H	$0.6250	Cumulative Redeemable 5-yr Fixed Rate Reset	$25.00	Jun 1, 2020
Series I	FTS.PR.I	3-mth T-Bill rate + 1.45%	Cumulative Redeemable Floating Rate	$25.00	Jun 1, 2020
Series J	FTS.PR.J	$1.1875	Cumulative Redeemable	$25.00	Dec 1, 2017
Series K	FTS.PR.K	$1.0000	Cumulative Redeemable 5-yr Fixed Rate Reset	$25.00	Mar 1, 2019
Series M	FTS.PR.M	$1.0250	Cumulative Redeemable 5-yr Fixed Rate Reset	$25.00	Dec 1, 2019

*Except the Series I dividend rate which will be reset every quarter based on the applicable 3-month Government of Canada Treasury Bill rate plus 1.45%.


One of the Lowest-Risk Utility Businesses in North America
CARIBBEAN UTILITIES
CENTRAL HUDSON
FORTISALBERTA
FORTISBC
FORTISONTARIO
FORTISTCI
ITC
MARITIME ELECTRIC
NEWFOUNDLAND POWER
UNS ENERGY
BECOL
REGULATED ELECTRIC
REGULATED GAS
FERC-REGULATED ELECTRIC TRANSMISSION
LONG-TERM CONTRACTED HYDRO GENERATION
NATURAL GAS STORAGE FACILITY
British Columbia
Alberta
Newfoundland and Labrador
Prince Edward Island
Ontario
Minnesota
New York
Michigan
Iowa
Illinois
Kansas
Missouri
Oklahoma
Arizona
Turks and Caicos Islands
Cayman Islands
Belize

Investment-Grade Credit Ratings and Ample Liquidity

Credit Ratings	
S&P Global (1)	A- / BBB+
DBRS	BBB (high)
Moody's (2)	Baa3



(1) In March 2018, S&P affirmed the Corporation's credit ratings. The outlook was revised to negative from stable, due to modest temporary weakening of financial measures as a result of U.S. Tax Reform, which reduces cash flow at the Corporation's U.S. utilities.
(2) In April 2018, Moody's issued a credit opinion with no change to the Corporation's credit ratings or outlook.

Electric companies S&P Bond ratings

January 7, 2019	Ticker (Exch.)	Recent Price	Market Cap.	EV	EV/EBITDA 2016A	2017A	2018E	2019E	2020E	For.	vs. Peers	Debt-to-Cap.	S&P Debt Rating
Canadian Power & Utility													
AltaGas Ltd.	ALA-T	14.44	3,939	14,088	20.0	17.6	14.1	11.4	10.8	11.4	106%	44.2	BBB-
ATCO Ltd.	ACO.X-T	38.34	4,401	18,407	9.4	8.0	9.0	8.6	8.3	8.6	n.a.	58.0	A-
Canadian Utilities Ltd.	CU-T	31.24	8,513	20,159	11.6	11.1	10.7	10.1	9.7	10.1	117%	60.6	A-
Capital Power Corp.	CPX-T	26.42	2,692	4,850	9.7	8.4	6.8	6.1	6.1	6.1	71%	41.4	BBB-
Caribbean Utilities Ltd.	CUP.U-T	12.47	414	687	11.3	10.3	10.3	9.6	9.2	9.6	112%	54.8	A-
Emera Inc.	EMA-T	42.94	10,004	26,273	16.5	11.2	10.8	10.1	9.9	10.1	118%	67.8	BBB+
Fortis Inc.	FTS-T	44.39	18,942	45,358	18.1	12.1	12.0	11.1	10.5	11.1	130%	56.8	A-
Hydro One Ltd.	H-T	20.20	12,037	24,301	11.8	12.0	10.7	9.1	8.4	9.1	106%	52.8	A-
TransAlta Corp.	TA-T	5.92	1,693	6,842	6.5	6.5	6.7	7.4	7.2	7.4	87%	45.8	BBB-
Valener Inc.	VNR-T	19.49	765	948	7.3	3.1	14.2	1.9	13.9	2.1	25%	9.9	NR
Average					**12.5**	**10.2**	**10.7**	**8.5**	**9.5**	**8.6**		**48.2**	
U.S. Electric Utilities													
Ameren Corp.	AEE -N	64.59	15,763	24,678	11.0	10.4	10.3	10.2	9.6	10.2	110%	53.5	BBB+
American Electric Power	AEP-N	73.44	36,214	60,229	10.9	11.4	11.3	10.7	10.1	10.6	115%	55.5	A-
Centerpoint Energy Inc.	CNP-N	28.68	14,374	22,027	10.8	10.3	10.7	8.2	7.9	8.1	88%	65.3	A- *-
CMS Energy Corp.	CMS-N	48.85	13,841	24,707	12.0	11.2	11.3	10.7	10.4	10.6	115%	70.1	BBB+
Consolidated Edison Inc.	ED-N	76.55	24,887	42,613	11.6	10.6	10.8	10.0	9.6	10.0	108%	51.8	A-
Dominion Resources Inc.	D-N	72.21	54,294	94,164	16.2	14.7	13.9	11.9	11.0	11.8	128%	65.8	BBB+
DTE Energy Co.	DTE-N	109.99	20,010	34,087	13.4	12.8	12.4	11.5	11.0	11.5	124%	56.4	BBB+
Duke Energy Corp.	DUK-N	85.37	60,869	117,437	12.5	12.0	12.2	11.4	10.9	11.4	123%	56.6	A-
Edison International	EIX-N	58.42	19,034	35,967	8.3	8.0	8.2	7.6	7.6	7.6	82%	51.1	BBB+
Entergy Corp.	ETR-N	84.80	15,361	33,056	9.7	9.4	9.1	8.0	9.1	8.1	87%	67.1	BBB+
FirstEnergy Corp.	FE-N	37.17	19,010	38,029	8.6	8.6	9.8	9.6	9.4	9.6	104%	85.1	BBB
NextEra Energy Inc.	NEE-N	172.53	82,460	117,636	14.3	12.7	13.0	11.7	10.9	11.7	126%	54.3	A-
PG&E Corp.	PCG-N	24.40	12,656	31,828	5.1	5.1	6.2	5.0	6.0	5.0	55%	49.6	BBB- *-
Pinnacle West Capital	PNW-N	84.74	9,498	14,780	11.0	10.2	10.6	10.0	9.5	10.0	108%	49.2	A-
PPL Corp.	PPL-N	28.87	20,778	41,739	10.2	10.7	10.2	9.6	9.1	9.6	103%	66.4	A-
Public Service Enterprise	PEG-N	51.37	25,965	40,655	11.3	11.1	11.2	10.4	9.6	10.4	112%	49.6	BBB+
Southern Co./The	SO-N	44.71	45,342	94,009	13.1	11.1	11.2	10.7	10.4	10.7	115%	66.3	A-
Average					**11.1**	**10.5**	**10.6**	**9.8**	**9.5**	**9.2**		**59.2**	

Source: TD Securities, Pipelines, Power and Utilities Weekly Update January 7, 2019.

Table 11. Credit metrics compared to equity ratios – Commission calculations – distribution utilities – income tax rate of 27 per cent

	EBIT coverage		FFO coverage		FFO/debt %	
Equity ratio (%)	2016 GCOC decision	2018	2016 GCOC decision	2018	2016 GCOC decision	2018
30	1.9	2.0	3.3	3.4	11.3	11.6
31	2.0	2.0	3.4	3.5	11.6	11.9
32	2.0	2.1	3.4	3.6	11.9	12.2
33	2.1	2.2	3.5	3.6	12.2	12.5
34	2.1	2.2	3.6	3.7	12.5	12.8
35	2.2	2.3	3.6	3.8	12.6	13.2
36	2.2	2.3	3.7	3.8	13.2	13.5
37	2.3	2.4	3.8	3.9	13.5	13.8
38	2.4	2.4	3.8	4.0	13.8	14.2
39	2.4	2.5	3.9	4.1	14.2	14.6
40	2.5	2.6	4.0	4.1	14.6	14.9
41	2.5	2.6	4.1	4.2	14.9	15.3
42	2.6	2.7	4.2	4.3	15.3	15.7
43	2.7	2.8	4.2	4.4	15.8	16.2
44	2.8	2.9	4.3	4.5	16.2	16.6
45	2.8	2.9	4.4	4.6	16.6	17.0