TRANSCANADA PIPELINES LIMITED

BUSINESS AND SERVICES RESTRUCTURING AND MAINLINE 2012 – 2013 TOLLS APPLICATION
RH-003-2011

REPLY EVIDENCE OF TRANSCANADA

Appendix F:
Written Reply Evidence of A. Lawrence Kolbe
(The Brattle Group)

May 18, 2012
NATIONAL ENERGY BOARD

IN THE MATTER OF the National Energy Board Act, R.S.C. 1985, c. N-7, as amended, and the Regulations made thereunder;

AND IN THE MATTER OF an Application for (1) approvals required to implement a Restructuring Proposal that affects the businesses and services of TransCanada PipeLines Limited, NOVA Gas Transmission Ltd. and Foothills Pipe Lines Ltd., and (2) approval of final tolls for the TransCanada Mainline for 2012 and 2013.

TRANSCANADA PIPELINES LIMITED

WRITTEN REPLY EVIDENCE

OF

A. LAWRENCE KOLBE

THE BRATTLE GROUP

May 18, 2012
TABLE OF CONTENTS

I. INTRODUCTION AND SUMMARY .............................................. 4

II. PROPOSALS THAT BREACH THE REGULATORY COMPACT ................. 8

III. CLAIMS OF PRIOR COMPENSATION ...................................... 13
A. INTERVENOR STATEMENTS ................................................. 13
B. HAS THE MAINLINE BEEN COMPENSATED IN ADVANCE? ................ 16
   1. Nature of Compensation Required ..................................... 16
   2. Was Such Compensation Received? ..................................... 18

IV. COMMENTS MADE IN THE BOOTH EVIDENCE ............................ 26
A. DO TARGET DEBT RATIOS IMPLY AN “OPTIMAL” CAPITAL STRUCTURE? ..... 28
B. IS THE USE OF EMBEDDED INTEREST RATES A REPUDIATION OF ATWACC? . 30
C. IS A MORE DEPRECIATED PIPELINE OBVIOUSLY LESS RISKY THAN A LESS
   DEPRECIATED PIPELINE? .............................................. 32
D. IS THE MAINLINE’S COST OF CAPITAL LOW AT THIS TIME? ............. 34
E. DO BOOK OR MARKET VALUES GOVERN THE COST OF CAPITAL? ........ 35
F. DOES A HAPPY OUTCOME PROVE THERE WAS NO RISK? ................ 37
G. IMPLICATIONS FOR STATEMENTS REGARDING PRIOR COMPENSATION ...... 39
I. INTRODUCTION AND SUMMARY

Q1. Please state your name and address for the record.

A1. My name is A. Lawrence Kolbe. My business address is The Brattle Group, 44 Brattle Street, Cambridge, Massachusetts, 02138.

Q2. Did you provide written evidence earlier in this proceeding?

A2. Yes.

Q3. What is the purpose of your reply evidence?

A3. I have been asked by TransCanada PipeLines Limited (“TransCanada,” or the “Company”) to address parts of the intervenor evidence in this proceeding that concern risk and return, specifically:¹

- Implicit or explicit recommendations by several parties to breach the regulatory compact;
- Claims by several parties that TransCanada has already been compensated for the risk of material losses on the Mainline, and
- Various statements in the Evidence of CAPP witness Laurence Booth, dated March 2012 (the “Booth Evidence”) as supplemented by CAPP responses to Information Requests (“IRs”).

Q4. Please summarize your findings.

---

¹ For completeness, I would note that a failure to address a particular aspect of a party’s evidence in this reply evidence does not signify that I agree with that aspect, whether or not it falls within this list of issues.
A4. **Breach of the Regulatory Compact:** Four of the intervenors’ proposals breach the regulatory compact. APPrO, MAS and IGUA do so explicitly. CAPP does so implicitly. APPrO recommends a $50 million per year “contribution” from the Mainline for five years. The MAS recommend denying the equity return on the NOL assets, without a realistic chance of making up the loss. IGUA recommends removing “underutilized” assets from the rate base, with TransCanada funding half the loss. All of these explicitly lead to expected rates of return well below the cost of capital on the prudently incurred cost of the Mainline’s investments.

CAPP proposes a deferral account, the “TSA,” which is risky but on which CAPP proposes to award only a debt-like return. Moreover, there is no provision for over-recovery of the TSA but a material chance of under-recovery, which further reduces the Mainline’s expected return below its cost of capital.

All of these proposals have the effect of denying the Mainline a fair opportunity to earn the cost of capital and to recover its investments, when the Board has the power to avoid such an outcome by approving the Restructuring Proposal.

**Absence of Prior Compensation:** TransCanada has not been compensated for the risk of such a loss. Various intervenors argue that compensation for such a loss has somehow been included in the returns the Mainline has been allowed in the past. This is not true.

As explained in detail in Section III of my reply, compensation for the risk of such a loss would be an unmistakable part of a regulatory decision (as an example from the Alberta EUB demonstrates). In the past, I have recommended that TransCanada not ask for an asymmetry risk premium over and above the cost of capital as compensation for
the asymmetric risk that the Board might someday be unable to grant a fair return, and
TransCanada has not done so. One reason I made this recommendation was precisely
because of the danger that future intervenors might argue that an asymmetry premium
calculated to provide compensation for the risk of an inability to grant a fair return would
be used to try to justify a voluntary decision not to grant a fair return. What is happening
here is even worse: intervenors effectively are arguing that the compensation “must have
been in there somewhere,” despite the complete absence of an asymmetry risk premium
in addition to the Mainline’s cost of capital in previous cases.

The intervenors’ claims of past compensation are incorrect. TransCanada clearly
has not been compensated for the losses the intervenors recommend that the Board
impose.

**Statements in the Booth Evidence:** Various parts of the Booth Evidence and CAPP
responses to IRs repeat arguments that Dr. Booth has long made and to which I have long
replied, so far without corrections in the Booth Evidence to address the objections raised
in my reply. As I did in the TQM proceeding, here I address those points in an appendix,
Appendix R to this reply, with a table providing a guide to the present location of a
particular argument in the Booth Evidence and the locations and responses to the same
argument in past cases.

The body of my reply addresses points in the Booth Evidence that do not fall in
this category. Specifically, Section IV of this evidence shows that:

- The fact that companies use target debt ratios does not imply that there is an
  optimal capital structure;
• Use of embedded interest rates to set the revenue requirement does not imply a repudiation of the ATWACC methodology;

• A more depreciated pipeline is not obviously less risky than a less depreciated one;

• The Mainline’s cost of capital is well above the level the Booth Evidence recommends;

• Market, not book, values govern the risk shareholders bear;

• A happy outcome \textit{ex post} does not prove there was no risk \textit{ex ante}, particularly when measurement of whether risk was borne focuses on book returns rather than the risk shareholders bear in the market.

The last two of these points relate also to the “prior compensation” argument. Various intervenor statements imply that the fact that the Mainline has not borne an asymmetric loss to date implies they have been overcompensated for risk in the past and accrued a pool of unjustified returns that can fairly be tapped now to impose a loss. But risk is borne in the stock market minute by minute. Bad news about the fundamental risk to which the Mainline is exposed affects the share price instantly, even if the likely realization of the risk is well in the future. Someone owning the share bears that risk at the time. If he or she happens to sell the day after the bad news comes out, less money is received than would have been otherwise. This is true whether or not full compensation for the risk has been requested and granted (which it has not been for the Mainline), and whether or not the changed future outlook has yet affected one dime on the Mainline’s books. The intervenors’ statements to the contrary are incorrect.

---

2 Note also that putting investors at risk of recapture of returns earned many years, or even decades, earlier amounts to a particularly acute form of retroactive ratemaking, which standard regulatory practice avoids for good reason.
Q5. How is your evidence organized?

A5. It addresses the above issues in order. Section II focuses on the recommendations that breach the regulatory compact. Section III addresses claims that TransCanada has already been compensated for such breaches. Section IV discusses the above-mentioned aspects of Dr. Booth’s evidence. Appendix R contains extracts of evidence from previous proceedings addressing other aspects of Dr. Booth’s evidence.

II. PROPOSALS THAT BREACH THE REGULATORY COMPACT

Q6. What do you mean by the “regulatory compact”?

A6. I mean that the procedures under which the Mainline has been regulated to this point imply that the Board should establish tolls in this proceeding that provide TransCanada with an expected rate of return equal to the cost of capital on, and full recovery of, the prudently incurred cost of its investments in the Mainline.

Q7. What aspects of the intervenor evidence constitute a proposal to breach the regulatory compact, in your view?

A7. There are four, three explicit, by APPrO, MAS and IGUA, and one implicit, by CAPP.

Q8. What does APPrO recommend?

A8. APPrO witness Safir recommends, “a five year, $50 million annual contribution from TCPL”³ via “a 5 year TransCanada commitment to reduce the carrying costs of the

³ Written Evidence of Dr. Andrew Safir, March 9, 2012 (“Safir Evidence”) at p. 7.
restructuring program by $50 million annually [which] would be paid for directly through
a credit to the TCPL annual revenue requirement.”

Q9. What does the MAS recommend?

The MAS recommend,

... 3) Removal from the revenue requirement of the equity return
associated with the NOL segment from the revenue requirement in each
year from 2012 to 2020. This element recognizes that the NOL segment
is not, nor is it likely to become, sufficiently utilized during this period.
Removal of the equity return on the NOL segment will serve to reduce the
revenue requirement for the next nine years; 4) Implementation of an
incentive mechanism that allows TransCanada an opportunity to earn back
the foregone equity return on the NOL segment via cost savings over the
term of the proposal. For cost savings amounts less than a certain
threshold TransCanada would not be required to pass these savings onto
shippers. However, cost savings greater than the threshold would be
shared with shippers; ...

The MAS “incentive mechanism” is,

The MAS propose that, if in any of the years over the term of the MAS
Alternative Proposal TransCanada is able to reduce costs related to
Operations, Maintenance & Administration (“O&M”) and the cost of debt
capital below amounts approved by the Board in this proceeding, then
100% of such savings would accrue to the benefit of TransCanada up to
a maximum value equal to 50% of the foregone equity return on the NOL
segment for that year. Cost savings exceeding 50% of the foregone NOL
segment equity return would be shared equally between TransCanada and
shippers with the shippers' share being applied to reduce tolls via the
Short-Term Adjustment Account.

Q10. What does IGUA recommend?

4 Safir Evidence at p. 20.
6 MAS Proposal, p. 7.
The NEB should require TransCanada to remove underutilized net plant from the toll calculation. Furthermore, the associated rate base reduction should be accompanied by a capital reduction funded in equal measure by TransCanada shareholders and shippers. Finally, the shipper portion of funding should be accomplished through the issue of government-sponsored long term debt amortized annually with the proceeds of a throughput toll rider.\(^7\)

**Q11. What does CAPP recommend?**

Our first proposed measure involves using TransCanada’s Long-Term Adjustment (LTA) Account to allow TransCanada to prudently manage its costs, while fully depreciating the NOL segment within its remaining useful life, without causing adverse impacts to the depreciation of the other two Mainline segments. TransCanada would continue to depreciate its rate base as specified in its Status Quo scenario; however, a pre-specified portion of its annual revenue requirement would be diverted to the LTA, allowing TransCanada to earn a full return on equity on the accruing balance over a longer time horizon. This would enable the retirement of the NOL rate base within TransCanada’s estimate of its remaining useful life, without unduly changing depreciation schedules for the other segments or placing excessive burden on Mainline customers in the immediate future.

Our second proposed measure is a transitional Toll Stabilization Adjustment account (TSA) accompanied by a freeze in tolls at 2013 levels for a period of up to five years. Such a mechanism would mitigate future risk to both TransCanada’s customers and shareholders by encouraging TransCanada to minimize what appear to be only temporarily unrecoverable costs. Based on TransCanada’s forecasts of future Mainline throughput, the mechanism provides an opportunity for those costs to be recovered over a relatively brief transitional period ...\(^8\)

---

\(^7\) Written Evidence of Mr. Geoffrey B. Inge, March 9, 2012 (“Inge Evidence”), p. 4.

The CAPP recommendation should TransCanada’s throughput forecast not materialize is,

... our proposal does not guarantee full revenue collection of authorized costs. Our analysis uses TransCanada’s Base Case throughput forecast to derive estimates of annual earnings, but such forecasts are inherently uncertain and cannot account for unforeseen changes in market conditions. In the event that the throughput forecast by TransCanada does not materialize, the growth of throughput may not allow sufficient revenue growth to achieve full cost recovery. Such circumstances would cause a large outstanding TSA balance, and additional consideration would be necessary to determine how to address the TSA balance. In this case, an additional rate case would be necessary to resolve the issues arising from this situation. ...

We propose that the rate case trigger be based on the Mainline’s common equity ratio. The testimony of Dr. Booth recommends a common equity ratio for the Mainline of 40 percent. Since the TSA is entirely debt-funded, large balances would have the effect of reducing this ratio. Therefore, setting a minimum equity ratio for Mainline assets of 36 percent, which is approximately $650 million, using TransCanada’s 2013 rate base, would serve as an adequate trigger. While we propose this minimum equity ratio as a trigger for TransCanada to bring a case before the NEB, this is not to suggest that meeting this minimum equity ratio is the only reason TransCanada should do so. Should unforeseen market conditions materialize such that TransCanada would expect the TSA balance to be unrecoverable within the rate stabilization period, we would expect TransCanada to bring a case before the NEB as soon as such information came to light.9

Q12. How do these proposals breach the regulatory compact, in your view?

A12. The APPrO, MAS and IGUA proposals explicitly recommend disallowing some of the Mainline’s return on equity on assets now in the Mainline’s rate base.10 This produces

---

9 E3 Evidence, pp. 36-37.

10 The MAS “incentive mechanism” might be said to provide a way for the Mainline to make up the lost return, if it could achieve savings equal to three times the amount of the lost return, but as the Company’s reply evidence explains, there is no realistic chance of making up the loss. Thus, this proposal, too,
expected rates of return below the cost of capital on those assets, directly breaching the regulatory compact.

The CAPP proposal’s breach is implicit. The CAPP proposal acknowledges that TransCanada might not recover the TSA, yet grants only a debt-like return on this asset.11 This would not compensate the Mainline for the risk borne on CAPP’s proposed TSA asset even if the odds of over- or under-recovering the TSA were symmetric. Moreover, since there is a chance the TSA cannot be recovered but no mechanism for over-recovery, the expected recovery on the TSA is below the actual amount of the TSA, producing an asymmetric distribution of TSA recovery that makes the debt-like return proposed by CAPP even more inadequate. Finally, the risk of CAPP’s proposal is aggravated by the associated delay in dealing with the Mainline’s current situation should the Mainline’s base case throughput forecast not materialize. By the time a serious problem arose and went through CAPP’s recommended procedure of a new rate case, it could be too late for the Board to provide fair compensation over the Mainline’s remaining life.

Thus, the CAPP proposal also breaches the regulatory compact.

Q13. What are the consequences if a regulatory body breaches the regulatory compact when it has the ability not to do so?

10 (...continued) clearly produces an expected rate of return well below the Mainline’s cost of equity.

11 See the E3 Evidence, p. 26, which wrongly states that this approach “fully compensates” TransCanada. See also the Booth Evidence, p. 4, and the CAPP response to TransCanada IR 1.15(b), which indicates that Dr. Booth recommended 9.5 percent as a rate of return on equity because the TSA only was to earn 2.5 percent. (I reply to this aspect of Dr. Booth’s cost of equity recommendation in Section IV, below.)
A13. Such a breach unfairly harms investors. It therefore also increases the longer run costs to the customers of companies subject to the jurisdiction of that regulatory body. It also could be expected to increase the costs to customers of companies subject to other regulators’ jurisdiction.

III. CLAIMS OF PRIOR COMPENSATION

A. INTERVENOR STATEMENTS

Q14. Have some parties stated that TransCanada has been compensated in the past for the risk that it might not receive tolls that provide the opportunity for a fair return of and on its investment in the present proceeding?

A14. Yes, APPrO, CAPP and IGUA make such statements. For example, APPrO witness Safir states,

Throughout its history, TCPL has earned a rate of return based on an element of business risk reflecting a probability that assets could become underutilized due to changing economic circumstance. For example, to the extent that contracts fall short of the depreciation length of a pipeline’s assets, the risk of underutilized assets is always positive and falls to pipeline owners, not ratepayers.

Because the potential for economic obsolescence has been embedded in the return structure, TransCanada has already been financially compensated for accepting much of the risk of the underutilized assets on TCPL. There is no manner in which to precisely quantify this dollar amount. However, given the decades over which these payments have

12 Please refer to my Written Evidence, September 1, 2011, revised October 31, 2011, Appendix D3 to the Company’s filing (“Kolbe Written Evidence”), pp. 31-38 (PDF pp. 34-41) and to the TransCanada Responses to NEB 1.3(c) and NEB 1.4(a) and (b). Please refer also to Section III.C, pp. 28-30 (PDF pp. 31-33), of the Kolbe Written Evidence for a discussion of how the underlying economic concepts relate to the language of various legal decisions.
been embedded in the TCPL revenue requirement, such transfers were undoubtedly substantial. Yet in the ATM, the reduction in underutilized assets is now being largely financed by ratepayers, not TCPL shareholders. Consequently, past returns to pipeline shareholders should have been lower. The TCPL contribution is essentially an offset to this past over-recovery of investment return.\(^\text{13}\)

The APPrO response to TransCanada’s Information Request 23(b) states,

\[\text{The Underutilized Asset Symmetry Program is consistent with [the Fair Return Principle] because TCPL has already been compensated through its rate of return these past years for the risks it took in building capacity. If it is to be held reasonably whole for these risks, through return of $2.2 billion of its invested capital at the expense of shippers, then it should disgorge some portion of its historical returns earned on account of taking a risk for which it will not ultimately be held accountable.}\]

Further, in some ways, the costs being incurred are due in part to TCPL decisions to expand capacity in the past, fully knowing the risks. Thus, at least some of the costs should be borne by TCPL.

CAPP witness Johnson’s evidence states,

\[\text{Most of the expansion shippers are no longer shippers on the Mainline under long-term contracts as of November 1, 2011. This fact highlights the importance of the economic feasibility evidence which looked at long-term supply and demand. Such evidence was that, once the long-term contracts with expansion shippers ended, as long as the pipeline provides competitive services and supply and markets are available, the pipeline should be used. The pipeline has not maintained the markets that it made significant investments to attach, that was a risk that it took at the time of construction and for which it has been compensated. The responsibility for such failure to maintain those markets rest with no party other than the Mainline.}\]

When the Mainline entered into expansions it was fully aware of the risks it was taking with respect to long-term use of the pipeline after long-term

\[\text{\textendash}\]

\[\text{\textendash}\]

\[\text{\textendash}\]
contractual obligations ended. In addition, the Mainline was compensated for the service it provided at the time the service was provided in all periods and has no call on past or present shippers to now compensate it for the risks that it undertook and that may have now have materialized in a manner that it had not anticipated.\textsuperscript{15}

IGUA witness Newton states,

TransCanada’s request for a higher cost of capital is especially vexing given the fact that, for decades, the NEB has awarded TransCanada’s shareholders higher returns to compensate for perceived future long term business risk. Now that some of these risks have materialized, TransCanada suggests it should be further compensated with an even higher cost of capital, notwithstanding the fact that its shippers have borne all of the increased costs associated with the realization of risks that have materialized over the past several years. Approval of this request would allow TransCanada to effectively double dip into the pockets of its Canadian and American customers since TransCanada’s shareholders have already received significant financial benefits from the risk premiums that have been added to the historic rates of return awarded by the NEB.\textsuperscript{16}

Additionally, various aspects of the intervenors’ statements in this area relate both to (1) the difference between \textit{ex ante} risk compensation and \textit{ex post} risk realization, and (2) the distinction between risk as measured by accounting income and risk as it occurs in the stock market. Both of these topics are addressed in the final section of my reply evidence. Here, I focus on the idea that compensation for the risk of asymmetric losses at this time must somehow have been included somewhere in the risk premiums the

\textsuperscript{15} Johnson Evidence, p. 48.

\textsuperscript{16} Written Evidence of Murray A. Newton on behalf of IGUA, March 9, 2012, p. 21. See also the response of IGUA to NEB IR 1.3(a):

TransCanada has already been awarded in prior years higher returns to compensate for future long term business risk. Now that some of those risks have materialized, TransCanada suggests it should be further compensated with an even higher cost of capital, notwithstanding the fact that its shippers have paid all of the increased costs associated with the realization of these risks.
Mainline has been provided over the years, even though none of the intervenors can say precisely how this happened or how much compensation was granted.

**B. HAS THE MAINLINE BEEN COMPENSATED IN ADVANCE?**

**Q15.** Has the Mainline been compensated in advance for the risk that the Board would approve tolls that do not provide a reasonable opportunity for a fair return of and on the prudently incurred costs of the Mainline’s investments when the Board had the ability to do otherwise?

**A15.** No.

1. Nature of Compensation Required

**Q16.** Please explain why not.

**A16.** Such a decision would cause an asymmetric loss for the Mainline. Recall from my written evidence that the risk of the kinds of asymmetric losses the intervenors are proposing that the Mainline now bear (see Section II of this reply evidence, above) have two distinct implications for the fair return, one definite and one a possibility.\(^1\)

- First, asymmetric risks definitely mean the company will not have a fair opportunity to earn the cost of capital unless it receives the equivalent of a premium over and above the cost of capital in its allowed rate of return.
- Second, if the asymmetric outcome is correlated with the business cycle or other non-diversifiable risks of concern to investors, the company’s cost of capital will be higher than it would otherwise be.

---

\(^1\) Kolbe Written Evidence, pp. 10-13 (PDF pp. 13-16). A number of IRs to TransCanada touch on aspects of these concepts, including NEB 1.1, 2.15, 2.43, 2.45, 2.48 and 2.53, and CAPP 217.
TransCanada has neither requested nor received a premium for the first effect of asymmetry, although it has requested a higher cost of capital due to the second effect of asymmetry, which exists in these circumstances but which does not always exist.

Q17. Could you provide an example to clarify the distinction between the two impacts of asymmetric risk?

A17. Yes, by using an unrealistic thought experiment just to illustrate the logical distinction. Suppose a law were passed that said that in a year’s time, a coin would be tossed for each regulated company in a particular jurisdiction. For each coin that came up heads, the company would keep its rate base intact. For each coin that came up tails, one quarter of the company’s rate base would be eliminated without any compensation whatsoever. Suppose also that the government passing the law had unquestioned authority to take the companies’ property in this way.

The companies in this jurisdiction clearly now suffer from asymmetric risk of the first type. They have a 50 percent chance that one quarter of their rate base will vanish in one year. However, their cost of capital, strictly defined, has not changed at all, because the risk of coin tosses is random and hence diversifiable. Absent compensation, these companies’ stock prices will fall for the expected loss from the coin toss, but not due to any increase in their cost of capital. Restoration of a fair return would require an asymmetry risk premium in the allowed rate of return on the rate base, over and above

---

18 For further explanation of the fact that the first effect of asymmetry does not automatically affect the cost of capital, see generally the articles cited in the Kolbe Written Evidence in footnote 8, p. 11 (PDF p. 14), and particularly those identified in footnote 10, p. 12 (PDF p. 15).
the cost of capital, equal to 12.5 percentage points, but no adjustment to the cost of capital itself.¹⁹

Suppose instead that the law stated that the loss would occur if the stock market were down more than expected in one year, and not if the stock market were up more than expected in a year, implemented in a way that still provided a 50-50 chance of the loss. Now the risk is correlated with the return on the market, and the companies’ costs of capital would go up. Absent compensation, their stock prices will fall not only based on the expected dollar loss, but also because their future value is more correlated with the market than in the coin toss example. In this case, the companies suffer from both effects of asymmetric risk. Restoration of a fair return would require not only an asymmetry risk premium over and above the cost of capital equal to 12.5 percent of the rate base, but also an increase in the previously allowed cost of capital itself.

2. Was Such Compensation Received?

Q18. How do you know that the Mainline has not requested or received a premium for the first effect of asymmetry?

A18. There are two reasons. First, I have been the Mainline’s cost of capital witness in the last two litigated proceedings, RH-4-2001 and RH-2-2004, Phase II, which cover the period since increased competition and unforeseen downturns in Western Canada Sedimentary

¹⁹ That is, an expected loss of (50% × 25%) = 12.5%. Adding this amount to the previously allowed rate of return on the rate base offers a fair return for the first effect of asymmetric risk imposed by the new law. Note that for fair compensation, the companies that end up not bearing the loss get to keep the rate base writeup from the 12.5 percent asymmetry risk premium as compensation for the risk that they might have borne the loss, while companies suffering the loss lose only 12.5 percent of their rate base on balance (i.e., −25% + 12.5% = −12.5%).
Basin gas supplies combined to create the principal asymmetric risks the Mainline has faced up until now. The Mainline explicitly did not ask for such a premium in those cases, as it did not in the present proceeding, either. Second, the effort needed to assess the issue and calculate a fair premium for the first type of asymmetric risk would be an unmistakable part of a tolls application and a regulatory decision. As explained below, no such effort was made in the Mainline’s previous hearings.

**Q19. Please provide relevant passages from your evidence on this issue in RH-4-2001 and RH-2-2004, Phase II.**

**A19.** My evidence in RH-4-2001 stated,

**Q62.** What consideration do you give to the fact that TransCanada has filed with the Board a proposed settlement that removes its exposure to decontracting risk for 2001 and 2002?

**A62.** This settlement, if approved, would reduce or remove for two years the asymmetry in possible outcomes that a combination of regulation and competition can produce. Therefore, it eliminates the need for an asymmetry risk premium, over and above the cost of capital, in TransCanada’s allowed rate of return at this time. That is the principal risk impact of the settlement.

**Q63.** But does not the cost of capital automatically take the risk of such asymmetries into account?

**A63.** No. The cost of capital by definition is the rate of return investors require on average. Were the protections afforded for two years by the proposed settlement not present, a combination of regulation and competition would mean investors would not be able to earn the allowed rate of return on average. If the allowed rate of return were set equal merely to the cost of capital under these conditions, investors would not be able to expect to earn the cost of capital on average, either. The allowed rate of return that would give investors a fair opportunity to earn the cost of capital would have to equal the cost of capital plus an

---

20 See the Kolbe Written Evidence, Q&A 48, p. 51 (PDF p. 54).
asymmetry risk premium over and above the cost of capital, just
as the yield to maturity on corporate debt equals the bond’s cost
of capital plus a default premium. Fortunately, the settlement
temporarily removes the need to address this issue, which has
been newly created by interaction of regulation and competition.

This is a simple mathematical fact: if \( E \) equals the expected rate of return
on the rate base and the asymmetry created by the combination of
regulation and competition means \( E \) is less than \( A \), the allowed rate of
return, then if \( A = C \), the cost of capital, \( E \) must be below \( C \), also. Yet
fair regulation requires that \( E = C \).

My evidence in RH-2-2004, Phase II, stated,

A practical problem facing the Mainline is that compensation for risks
such as the asymmetric possibility of underrecovery of its return on and
of capital is very difficult to achieve in a regulated setting, because the
very act of asking for the compensation may change the amount of
compensation required. Why? Suppose future regulators decide it is
acceptable to let the Mainline suffer a greater level of premature
truncation of its cash flows because the Mainline asks for and receives
compensation for this risk at this time. Then the amount the Mainline
would need to request in the first place to get fair compensation goes up.
Moreover, even if the current members of the Board were to be committed
not to take such prior compensation into account in future decisions on
whether to approve rate increases, the current members of the Board
cannot guarantee to investors that future members of the Board might not
take a different position.

Accordingly, the Mainline is not requesting and I am not including a
premium for this risk in the deemed equity ratio the Mainline is requesting
in this proceeding. Instead, the Mainline is requesting (and I
recommend) that the Board make every possible effort to avoid letting the
Mainline suffer premature truncation in its investor cash flows.

Unfortunately for the Mainline’s and its parent’s investors, this is a policy
that the Board cannot necessarily enforce. Future market forces may
overwhelm the Board’s best intentions.

---


My RH-2-2004, Phase II evidence also noted that

- [The Mainline’s asymmetric risk exposure] means some sort of premium over and above the cost of capital times the equity rate base is warranted in principle, even though it is not practical to ask for it and the Mainline is not doing so here.\(^{31}\) ...

\(^{31}\) Calculation of such a premium is a difficult and case-specific exercise, for the same reason that bond rating agencies evaluate one bond issue at a time. It does not and cannot show up automatically in a properly performed cost of capital estimate. ...\(^{23}\)

Thus, the Mainline neither requested nor received a premium over and above the cost of capital to compensate for the risk of asymmetric losses. It has only requested that the impact of the systematic portion of the risk that the Board may someday be unable to provide a fair return of and on capital, the second of the two effects of asymmetry, be reflected in the cost of capital itself.

**Q20.** You indicated that the effort needed to assess and compensate for the first effect of asymmetric risk would be an “unmistakable” part of a regulatory decision. Can you provide an example?

**A20.** Yes. An example from Alberta exists in the procedures adopted when electric power was deregulated around the turn of the century. Under the Electric Utilities Act, the Province established an Independent Assessment Team (“IAT”) to develop procedures by which the rights to revenues from the sale of power from existing generation units would be auctioned off to Buyers, while the existing Owners of the power plants would continue to operate them. The IAT conducted an exhaustive process to hear the views of affected

\(^{23}\) *Ibid.*, p. 69, emphasis added. See also pp. 70-71.
parties and to develop the terms of the Power Purchase Arrangements ("PPAs") under which the Buyers would receive power and the Owners would be compensated for the costs and risks they bore for the multi-year terms of the auctioned rights, ranging up to 20 years. The Alberta Energy and Utilities Board ("EUB") was charged with reviewing the IAT’s proposed procedures before they went into effect. The EUB reported its findings in two decisions, U99073, dated 30 August 1999, and U99113, dated 24 December 1999.

As part of this process, the IAT explicitly addressed possible asymmetries in the provisions of the PPA. One such asymmetry had to do with the fact that power prices when a plant was unavailable would be higher than when it was available. Additionally, the treatment of hydro plants when an event of force majeure occurred was different from the treatment of thermal plants. The EUB summarized the IAT’s treatment of these issues as follows:

The IAT stated that it accepted the Owners’ argument that price asymmetry existed in the IAT’s availability penalty compensation scheme that forms part of the PPAs. The IAT said that when a plant is unavailable, that unavailability in itself tends to increase pool price, which in turn inflates any penalties the Owner has to pay for failing to have its plant available. At other times, when the Owner might be able to recover those penalties due to additional availability, the pool price is likely to be lower. Therefore, because pool price asymmetry exists, and even with the overall availability correctly determined, the Owner would not be able to fully offset its position financially and therefore would be unduly penalized.

24 Other possible asymmetries explicitly considered by the IAT addressed “High Impact, Low Probability” ("HILP") events that were not instances of force majeure. See, for example, in one part of the IAT’s 9 July 1999 report to the EUB, “Cost of Capital in Power Purchase Arrangements, Supplemental Appendix, Volume X,” at p. 20.
The IAT stated that it had chosen to handle this issue in the thermal PPAs by allowing for an asymmetry factor. Within the Hydro PPA, price asymmetry also existed, and in addition TransAlta was required to assume all of the force majeure risk, a risk the IAT had protected the thermal PPA Owners from via the Balancing Pool. In those circumstances, the IAT believed it was reasonable to give explicit recognition to price asymmetry and force majeure risks through the hydro risk premium. The IAT stated that although it had handled these issues differently for the Hydro PPA and for the thermal PPAs, it believed it had handled them evenly.

The IAT stated that the premium was intended to compensate for stochastic factors that could be loosely called “risk” and to deliver to TransAlta the correct compensation for those factors. In the case of the Hydro PPA, there was an associated risk caused by the correlation between flow volume and price due to the variability of water flow volumes.

In determining the hydro risk premium, the IAT stated it had used value-at-risk methodology, as used in the financial and investment communities. Value at risk is a single, summary, statistical measure of losses due to “normal” market movements. Losses greater than the value at risk are suffered only with a specified small probability. Subject to the simplifying assumptions used in its calculation, value at risk aggregates all of the risks into a single number.

The IAT stated that it made any adjustments to the calculation that it deemed necessary to recognize the specifics of the Hydro PPA, such as changing the “abnormal” loss probability of 1 per cent suggested by TransAlta to 5 per cent. The IAT determined that an extra annual “risk premium” of $1.3 million should be included in the Fixed Operations and Maintenance Costs for the Hydro PPA. The IAT noted that this was significantly less than TransAlta’s original request.

Having explicitly compensated TransAlta for bearing these asymmetric risks, there was no need to further compensate TransAlta in the ROE determination where the IAT dealt with compensating Owners for symmetric risk.25

Nothing like this appears in RH-4-2001 or RH-2-2004, Phase II, nor, to the best of my knowledge, in any other NEB decision regarding the Mainline’s return. For

25 EUB Decision U99113, 24 December 1999 at pp. 53-54. Based on the IAT’s reasoning, the EUB did not grant a request for a variance from the IAT’s treatment of these asymmetries.
example, no one has tried to estimate the probability that the Board would be unable to
grant a fair return of and on capital to the Mainline and calculated the premium *over and
above the cost of capital* (or the equivalent cost allowance in another part of the revenue
requirement) necessary to compensate the Mainline for the first effect of asymmetry.26

Had TransCanada requested such a premium, it would have been incumbent on
TransCanada to perform such an analysis and subject it to review by other parties and the
Board. Instead, as noted above, TransCanada explicitly has *not* requested compensation
for the first effect of asymmetry. In lieu of compensation for the asymmetric risk, the
request was that the Board make every possible effort to avoid letting the Mainline suffer
premature truncation in its investor cash flows.

Q21. **Please explain further why TransCanada did not ask for such compensation.**

A21. I understand that at least part of the reason was that I recommended the Company not do
so. My recommendation had two primary bases. First, it is difficult to compute the
appropriate asymmetry risk premium over and above the cost of capital. Estimates of the
cost of capital do *not* automatically reflect such compensation.27 Instead, a specific study
of the specific risk must be performed (and as just discussed, such a study would be
unmistakable). Additionally, there is a more fundamental estimation problem that is

---

26 APPrO acknowledges the absence of such probability calculations in the response to TransCanada’s IR 30.

27 See generally the articles cited in the Kolbe Written Evidence in footnote 8, p. 11 (PDF p. 14), and
particularly those identified in footnote 10, p. 12 (PDF p. 15). The APPrO, CAPP and IGUA statements
quoted above appear to believe the contrary, that an allowed return equal to the cost of capital somehow
automatically includes such compensation, so that the compensation is “in there” someplace. That is
simply not true. (Another article Dr. Tye and I wrote to address this misconception was entitled, “It Ain’t
In There: The Cost of Capital Does Not Compensate for Stranded-Cost Risk,” *Public Utilities
Fortnightly*, May 15, 1995.)
associated with the second reason I recommended that the Mainline not ask for
compensation for the first effect of asymmetry.

This second reason was the danger of having a request for compensation against
the asymmetric risk that the Board would be unable to provide fair compensation
misconstrued as compensation against the risk the Board would be unwilling to provide
fair compensation. That is, I was concerned that the Mainline might face an argument
that because it had received prior compensation for the risk that the NEB might be unable
to provide fair compensation in the future, therefore it would be acceptable for the NEB
to choose voluntarily not to provide such compensation at some future time. Asking for
an asymmetry premium in addition to the cost of capital in circumstances in which the
realization of the risk may depend on the existence of a premium creates what
economists’ call “moral hazard”: a condition in which the odds of having something
adverse occur are influenced by the existence of compensation associated with the
adverse event.

This is exactly where the above statements by intervenors now try to place the
Mainline, even though the Mainline did not ask for either sort of compensation. That is,
today’s regulators are being asked by APPrO, CAPP and IGUA to penalize the Mainline
because (APPrO, CAPP and IGUA wrongly assert) the Mainline has received
compensation for such a risk in the past.

This danger also complicates the measurement problem. Had the Mainline
performed a specific study of the asymmetry risk premium required for the Board’s
inability to provide fair compensation under the assumption that no future Board would
accept an argument such as that being offered by APPrO, CAPP and IGUA, but the future
Board nonetheless did accept the argument, the asymmetry risk premium that had resulted from the study would *necessarily* have been too small. Moreover, even if regulators at the time had been committed to never let such an outcome occur, those regulators could not guarantee that future regulators would share their view, even if they spelled the issues out explicitly and in detail in the decision describing their findings. Measurement of a fair premium in these circumstances involves circularity.

Thus, part of the reason I recommended that the Mainline not ask for compensation for the first effect of asymmetry was specifically to avoid the danger that a future Board would accept the logic that APPrO, CAPP and IGUA advance here. Despite having not paid an insurance premium in prior years’ tolls over and above the cost of capital so they would not have to cover a future asymmetric loss for the Mainline, these intervenors are asking the Board to impose the loss anyway.

Instead of asking for compensation for the first effect of asymmetry, at least for as long as I have been associated with the Mainline’s requested returns, the Mainline has requested that the Board do all it can to avoid an asymmetric loss if the risk of such a loss arises. The Board can do so here by approving the Restructuring Proposal.28

IV. COMMENTS MADE IN THE BOOTH EVIDENCE

Q22. What areas of the Booth Evidence do you address here?

A22. In his initial summary, Dr. Booth states,

---

28 Please note that Dr. Carpenter’s reply evidence addresses additional aspects of the issue of prior risk compensation.
Finally I don’t like ATWACC. ... Further the Mainline’s application is not even ATWACC, since it preserves the embedded cost of debt while maintaining a target 40% common equity ratio. Consequently it is simply a means of leveraging up direct equity cost estimates of about 8.4% into unreasonable ROE recommendations ... . Rather than refight the issue of ATWACC, I have a short appendix that deals with some critical implications. However, what is important is the overall ROE result, rather than how it is derived and I regard an extensive discussion of ATWACC as an expensive detour.29

Here, I also attempt to avoid an “expensive detour” while still providing a complete record for the Board’s decision. To do so, this reply evidence follows an approach I used in the TQM proceeding, in which most of Dr. Booth’s comments on ATWACC and my responses to them were addressed in a series of appendices. The appendices provided a guide to evidence from previous proceedings in which Dr. Booth’s evidence had repeatedly raised the same issues without subsequently addressing my responses to them. In the present case, the Booth Evidence does drop a number of the objections made and answered in previous proceedings, but some remain. Appendix R to this reply evidence provides a copy of relevant parts of Dr. Booth’s and my evidence from previous proceedings and a page-number guide to the issues and responses.

This section focuses instead on the following topics:

- Whether the use of target debt ratios, whether by TransCanada Corporation or anyone else, demonstrates that there is a single, “optimal” capital structure;
- the implications of use of embedded interest rates with ATWACC in the present proceeding;
- the implications of depreciation for the Mainline’s risk;

29 Booth Evidence, pp. 5-6, references to other regulatory proceedings omitted via elipses.
• the Mainline’s cost of capital at this time;
• the Booth Evidence’s emphasis on book values and book rates of return, and
• the distinction between bearing a risk *ex ante* and having a bad outcome *ex post*.

As indicated at the start of Section III, above, the last two of these items also relate more generally to some of the intervenors’ statements regarding prior compensation for the risk of asymmetric losses now. The last part of this section addresses that link.

**A. DO TARGET DEBT RATIOS IMPLY AN “OPTIMAL” CAPITAL STRUCTURE?**

**Q23. What does the Booth Evidence say about the implications of target debt ratios?**

**A23.** At p. 16 and again at pp. 217-218, the Booth Evidence argues that the fact that many companies have target debt ratios (including TransCanada Corporation, in Dr. Booth’s view) means the ATWACC must have a narrow optimum range, rather than being essentially constant over a broad middle range.

**Q24. Is this correct?**

**A24.** No. Dr. Vilbert’s evidence contains a summary of more than 50 years of scholarly research into the effects of debt on the value of the firm and on the cost of capital. That literature is the basis for the finding that capital structure does not have a first-order effect on the value of the firm. As long as a firm operates somewhere with a middle range of

---

30 The Booth Evidence in this case, to an even greater extent than in past cases, does not refer to or take advantage of this extensive body of economic research, but instead relies on regulatory decisions by other regulatory bodies.
capital structures that is appropriate for the industry in question, the firm cannot change its value appreciably by fine-tuning its capital structure.

It has not escaped the profession’s notice that firms may often target a particular capital structure, for a variety of reasons. The question is, does this fact alone imply that there is a narrowly defined, “optimal” capital structure? To the contrary, the research does not support the view that firms are constantly trying to adjust their capital structures to optimal levels. In the words of one study, “[i]f our sample companies did have well-defined optimal debt ratios, it seems that their managers were not much interested in getting there.”

More generally, a substantial body of research, some of it by Dr. Booth himself, shows that firms within the same industry exhibit a wide range of capital structures and that the most profitable firms in an industry tend to have the least debt. Yet those are the firms that have the most to gain by using more debt if the tax advantage of debt really does add material value to the firm. In short, the mere existence of target debt ratios does not imply that there is a single optimal capital structure for the firm.

---


32 Laurence Booth *et al.*., “Capital Structures in Developing Countries,” *The Journal of Finance* Vol. LVI (February 2001), pp. 87-130, finds at p. 105 that “[o]verall, the strongest result is that profitable firms use less total debt. The strength of this result is striking . . .”
B. IS THE USE OF EMBEDDED INTEREST RATES A REPUDIATION OF ATWACC?

Q25. What does the Booth Evidence say about the use of embedded interest rates in this proceeding?

A25. One statement is quoted at the outset of this section, to the effect that the use of embedded interest rates make the use of ATWACC just a way to obtain a higher return on equity. Starting at p. 219, the Booth Evidence makes this point again. There he recommends that the Board either adopt the ATWACC without an adjustment for embedded interest expense in this proceeding or abandon ATWACC entirely.

Dr. Booth elaborates on his views in the responses to NEB IRs to CAPP. For example, the response to NEB 1.1(b) to CAPP states in part,

The implication of a high embedded debt cost on the ROE simply highlights one of the basic flaws in using ATWACC. Taken to an extreme, for example, two identical utilities with the same ATWACC would have dramatically different implied ROEs if they have dramatically different embedded debt costs. That is, ATWACC directly holds the shareholder responsible for debt costs in the same way that a competitive firm is. However, if the ATWACC is adjusted for a high embedded debt to make sure the equity holders are treated “fairly,” it is then not an ATWACC. Instead, it is simply a means of levering up the ROE. That is, the ROE is increased if the market debt cost is lower than the embedded debt cost, but not reduced when it is higher. This is clearly unfair and the solution is simply to ignore ATWACC and go directly to the ROE and treat the shareholders fairly as is done under the traditional regulatory framework in Canada.

Q26. Do you agree with Dr. Booth’s views?

A26. No. The use of ATWACC in cost of equity estimation is just a way of accurately taking into account the level of financial risk associated with the sample company’s market-
value capital structure. Ignoring differences in financial risk leads to inaccurate estimates of the cost of equity, which the use of ATWACC, with or without embedded debt expense, avoids. The question of whether to use market or embedded interest rates with the resulting cost of equity estimate is entirely distinct.

Q27. **On the “entirely distinct” question of whether to use embedded or market interest rates, is the Booth Evidence correct that market interest rates should be used in this proceeding?**

A27. No. As the Booth Evidence notes, embedded interest rates are well above market rates at present, but the debt underlying these rates was incurred under a regulatory regime in which embedded interest expense was treated as a part of the cost of service. No one knows what today’s embedded interest expense would be if the Mainline had been operating under a full ATWACC regime, with current rather than embedded interest expense, all along. TransCanada cannot retroactively act to manage its debt differently than it has under the traditional approach, so there are no positive incentives to be created by an uncompensated switch to a new approach. Moreover, such a switch would be unfair to the regulated company’s investors.34

Dr. Booth is right that after a transition to a pure ATWACC regime, should the Board decide on this route, regulated companies’ shareholders would bear the same risks

---

33 As discussed below, the Booth Evidence wrongly argues that it is book-value rather than market-value capital structure that determines financial risk.

34 Of course, the converse would also be true: a switch to a pure ATWACC methodology when embedded interest rates were well below market rates would be unfair to customers, who under the rules in place when the debt was issued would have been expecting to enjoy the benefits of cheaper embedded rates.
that competitive companies’ shareholders do for the difference between market and embedded debt costs.\footnote{See Section IV of the Kolbe Written Evidence for a review of the pros and cons of a transition to use of market rather than embedded interest rates.} This was possible in the case of TQM without material windfall gains and losses because the remaining life of the existing debt was so short, and because there was not a major difference between the market and embedded rate at that time. That is not true for the Mainline.

C. **Is a More Depreciated Pipeline Obviously Less Risky than a Less Depreciated Pipeline?**

Q28. What does the Booth Evidence say about what the impact of depreciation on Mainline’s risk?

A28. At p. 24, the Booth Evidence states, “[a]lmost by definition an 80% depreciated pipeline is less risky than a newer pipeline with less depreciated plant.” CAPP’s responses to NEB Information Requests 1.5 and 1.7 elaborate on this point:

... Very high free cash flow indicates a declining rate base utility, since depreciation is not being reinvested through new capital expenditures. As such the duration of the future cash flow stream is shorter than for an expanding rate base utility and the risk is lower both for bond holders and equity holders. Another way of saying this is that for high free cash flow utilities, the long run risk is lower than for lower free cash flow utilities...\footnote{CAPP response to NEB IR 1.5(a).}

... To the extent that a declining rate base utility has more free cash flow in the earlier years, this combined with the discounting process in valuing those cash flows means that for the same $100 market value, there is less weight placed on far off cash flows, that is, the duration of the expected cash flow is shorter. Consequently, the balance between short run versus
long run risk factors would place a greater weight on short run. On the
other hand, a growing utility that reinvests most of its free cash flow
would have a greater weight placed on long run risk factors, because more
of its value is at risk at more distant points in time. ...  

Q29. Do you agree?

A29. No, the conclusions do not logically follow from the premise. There can be new, barely
deprecated pipelines with quite low risk, if their tolls track costs closely and are
underwritten by long-term contracts with financially strong counterparties. Conversely,
there can be old, heavily depreciated pipelines with quite high risk, if the markets they
have traditionally served are in flux and they lack long-term contracts.

Nor does a declining-rate base utility automatically have less “long-run” risk than
an increasing-rate base utility, relative weights on the present value of future cash flows
notwithstanding. The increasing-rate base utility has the option to stop increasing its rate
base if its “long-run” risk increases. The declining-rate base utility may have no such
option, forcing its investors to bear more of an increase in “long-run” risk.  

The statements in the CAPP IR responses thus illustrate one of the possible confusions that can arise from
using the term “long-run” rather than “fundamental” risk.

37 CAPP response to NEB IR 1.7(a).

38 The Booth Evidence’s statement and the CAPP responses are simply not true as a general matter.

Instead, one needs to examine the actual risks of the pipeline in question.
D. IS THE MAINLINE’S COST OF CAPITAL LOW AT THIS TIME?

Q30. How does the Booth Evidence arrive at a recommendation for the Mainline’s rate of return?

A30. It discussed the Mainline’s risks at pp. 9-45 to arrive at relative risk premia on p. 45. It then calculates the base return on equity to which these risk premia are applied at pp. 71-72.

Q31. How do you assess these analyses?

A31. Dr. Carpenter’s reply assesses the Booth Evidence’s comments on relative risk. Dr. Vilbert’s reply assesses the Booth Evidence’s cost of capital estimation procedures. Based on those comments and my own review, I continue to rely on Dr. Vilbert’s cost of capital estimation procedures rather than accepting the process by which the Booth Evidence arrives at its result. I also continue to rely on Dr. Carpenter’s assessment of relative risk. Therefore, the Booth Evidence’s cost of equity values are materially too low at the capital structures he associates with them.\(^39\) This problem is compounded by his failure to grant a full return on CAPP’s TSA account despite the risks TransCanada would bear if it were established.\(^40\)

\(^{39}\) In this regard, IGUA witness Newton should not find the Mainline’s requested rate of return “vexing,” to use the word from the earlier quotation. That request, like those in past proceedings in which I have participated, just represents the cost of capital for the market-correlated risks the Mainline’s owners bear today, without including an asymmetry risk premium.

\(^{40}\) As noted earlier, the CAPP response to TransCanada-CAPP 1.15(b) indicates that Dr. Booth went to 9.5 percent on equity because he recommended only 2.5 percent on the TSA. Quite apart from the end result’s being far too low, this is not an analytically sound approach. Since the TSA amount changes year to year and is highly uncertain, the appropriate premium on equity to make up for the under-compensation on the TSA itself would be highly uncertain and would change year to year, also. CAPP should instead have recognized the TSA’s risk by providing an appropriate risk-adjusted rate of return (continued...).
E. DO BOOK OR MARKET VALUES GOVERN THE COST OF CAPITAL?

Q32. In his risk discussions, does the Booth Evidence focus on book or market quantities?

A32. The Booth Evidence focuses overwhelmingly on book quantities. For example, at pp. 11-12, it states that the accounting rate of return on equity, captures the business, financial and regulatory risk, which together we term income risk, whereas all the other factors are reflected in investment risk, which is the way in which investors react to the income risk and other macroeconomic variables.

On pp. 12-13, the Booth Evidence defines financial risk in terms of the book return on equity, and then states,

The common stockholders in valuing the firm are concerned about the total “income” risk they have to bear, which is the variability in the accounting ROE. This reflects both the underlying business risk as well as the added financial risk.

On pp. 216-217, the Booth Evidence states,

It is important to remember that the financial leverage risk premium stems from the imposition of fixed interest charges. That is, prior to receiving their equity return the firm has to pay these interest charges. This risk does not change as the market value of the firm changes; it only changes when book values change.

Q33. Do you agree with these statements?

A33. Dr. Booth is of course free to define terms in whatever way he wishes, for example, to state that by definition financial risk only is measured in terms of the book return on

40 (...continued)
on its balances.
equity. However, his particular definition of financial risk does not correspond to that Dr. Vilbert and I use, which stems from the standard usage in financial economics. Nor do the Booth Evidence’s definitions correspond to the usual approach in NEB proceedings.\footnote{See Dr. Carpenter’s reply evidence in this regard.}

Q34. Please explain.

A34. Companies report earnings quarterly, and sometimes give “guidance” on what they anticipate in between formal reports. But the stock market fluctuates moment to moment. Stockholders bear far more variability than that stemming just from changes in the accounting return on equity. Moreover, anticipated variability in the accounting return on equity is likely to have little effect on the stock’s price, while surprises can cause major price changes even if the absolute level of earnings is unchanged (which is the “surprise,” in the latter case).

Nor do homeowners worry about the “book” value of their houses relative to the size of their mortgage. Homeowners who have refinanced to 90 percent of the current market value of their homes bear a lot more financial risk than those whose mortgage is 50 percent of the home’s current market value, regardless of the price originally paid for the home. Also, a refinanced mortgage may be a multiple of the original purchase price, if the home has gone up in value substantially.

In short, market values drive the risk and return that matters to equity, not book values. Book values are intrinsically backward looking, while market values look ahead.
The Booth Evidence’s focus on book returns and book-based definitions of risk does not reflect economic reality.  

F. DOES A HAPPY OUTCOME PROVE THERE WAS NO RISK?

Q35. What does the Booth Evidence say about what the Mainline’s historical returns say about its risk in the past?

A35. On p. 24, the Booth Evidence states,

... from 1994 until 2010 none of these risks have actually materialised in the sense of hurting the Mainline, since over this whole period the

42 Additionally, the Booth Evidence at pp. 17-18 notes that the requested rates of return on equity for the Mainline in this proceeding exceed the book returns on equity for TransCanada including its unregulated businesses and concludes on p. 18,

From this there is the obvious implication that TransCanada views a declining rate base Mainline that is generating free cash flow of over $500 million a year, as being riskier than its average asset.

This conclusion incorrectly assumes that (1) book rates of return on unregulated businesses may validly be compared to book rates of return on regulated businesses, and (2) that book rates of return correspond to true economic rates of return. Neither assumption is correct. Book rates of return have very different time patterns under competition and regulation, as discussed in Section II.B of my written evidence, particularly in connection with Figure 1 at p. 15 (PDF p. 18). They may not validly be compared. Moreover, it has long been known within the economics profession that book rates of return do not validly signal the true economic rates of return a company earns. For example, one paper on the subject concludes,

Hence, only by accident will accounting rates of return be in one-to-one correspondence with economic rates of return. We show by example below that the effects involved cannot be assumed to be small -- indeed, they can be large enough to account for the entire interfirm variation in accounting rates of return among the largest firms in the United States. ...

Thus ... there is no reason to believe that differences in the accounting rate of return correspond to differences in economic rates of return. Our computer examples show the effects can be very large; the belief that they are small enough in practice to make accounting rates useful for analytic purposes rests on nothing but wishful thinking.

Mainline has continued to over earn its allowed ROE. Further whether the Mainline is actually “hurt” by the risks that it currently faces very much depends on the outcome of this hearing and future developments. The historic evidence is of the Mainline over-earning its allowed ROE, while constantly crying wolf.

Also, the response to TransCanada’s Information Request 1.47(b) states,

The Mainline’s shareholders have earned a risk premium since inception. If it never ever incurs any losses then by definition the Board’s allowed ROE has been unfair, since it has earned a risk premium for not bearing risk.

Q36. Does the fact that the Mainline has not experienced bad outcomes demonstrate that it has not borne the risk of bad outcomes?

A36. Of course not. The pejorative “crying wolf” comment in the Booth Evidence is not supported by the evidence cited. Dr. Booth does offer a further explanation of his comments in this regard in his response to TransCanada IR 1.47 to CAPP, but the response to TransCanada IR 1.55(e) to CAPP states what appears to be a different view, “[i]t is similar to the problem with the Mainline, in that decades of earning a risk premium, but never incurring losses, does not imply that it is not risky.” I agree with this latter view.

I would just add that a focus on past book returns to assess whether the Mainline has been “crying wolf” is another example of the Booth Evidence’s incorrect focus on book rather than market returns. TransCanada’s shareholders bore the long-run risk regardless of how the individual years turned out, because the share is a claim on all future returns. Even if there was no impact on current accounting returns, bad news about fundamental risk would hurt the share price and good news would help it.
G. IMPLICATIONS FOR STATEMENTS REGARDING PRIOR COMPENSATION

Q37. Earlier you indicated that the last two of the above points were relevant for some of the statements regarding whether the Mainline had already been compensated for the risk of the Board’s choosing not to establish tolls that provided a fair return of and on capital when it had the power to do so. What sort of statements did you have in mind?

A37. I was referring to statements that indicated there had been plenty of prior compensation in the Mainline’s equity risk premiums to justify imposing major losses now. In addition to those quoted earlier, and without attempting to be comprehensive, such statements include:

... Regardless of these qualifications [regarding the elements going into the Mainline's past equity risk premia], the suggested contributions by TransCanada and that proposed by various parties is small, in some cases trivially small, compared to the earned risk premium.43

As Dr. Booth states in his evidence, risk means the probability of incurring harm and so far the Mainline’s shareholders have earned a risk premium without suffering any material harm, while now that problems have emerged the Mainline is trying to transfer the effect of those problems to other parties.44

and

The Mainline’s shareholders have earned a risk premium since inception. If it never ever incurs any losses then by definition the Board’s allowed ROE has been unfair, since it has earned a risk premium for not bearing risk. The Board has specifically said it cannot protect the Mainline from long run risks and that it does not regard short run forecasting errors to be material. This is because it allowed the full cost of service pipelines, like Foothills, the same 30% common equity ratio as the forward test year

---

43 CAPP's response to APPrO Question 2(b).

44 CAPP response to TransCanada-CAPP 1.47(a)
pipelines like the Mainline in RH-2-94. Ipso facto the only risk the Mainline has been compensated for is the long run risk that may now be materialising. This is the only way to justify allowing a risk premium, at least since 1994, in the absence of any material earning shortfalls.\textsuperscript{45}

Q38. How do the two points addressed just above relate to such statements?

A38. The risk shareholders bear arises in the market, not on the books, and looks forward into the indefinite future. Bad news about fundamental risk reduces the price of the stock and good news increases it, minute by minute, day by day and year by year. TransCanada’s shareholders did bear risks in each past trading minute of each past year, and the fact that no major loss happened to affect book returns in the meantime has nothing to do with whether shareholders bore a particular risk at the time. Those who sold right after adverse news about the Mainline’s fundamental risk hit the market got less for their TransCanada stock, even if the likely realization of that risk was well in the future and it has not to this day affected a dime on the Mainline’s books.\textsuperscript{46}

Additionally, I would note for completeness that TransCanada was not compensated for the risk of an asymmetric loss such as those the intervenors propose here, as discussed at length in Section III, above.

Lastly, claims such as “past returns to pipeline shareholders should have been lower [so that the] TCPL contribution is essentially an offset to this past over-recovery

\textsuperscript{45} CAPP response to TransCanada-CAPP 1.47(b).

\textsuperscript{46} One part of the CAPP response to TransCanada’s IR 1.47 argues that the failure to realize an accounting loss since 1994 should be seen as akin to tossing a coin 15 times in a row and only observing heads. This analogy fails in two ways. First, the Board must have been aware of what had happened each time it reviewed the Mainline’s risk and return, and if it felt the past experience merited an adjustment to the Mainline’s returns, presumably it took that into account in each fresh decision. Second, and more fundamentally, the forward-looking risk is borne by shareholders day by day regardless of whether it shows up on the Mainline’s backward-looking books.
of investment return used to justify a loss now amount to a particularly acute form of retroactive ratemaking. They imply that investors cannot be secure in the returns a regulated company earns for years or even decades after the fact. It is hard to imagine a policy better designed to discourage future investments in rate-regulated industries.

Q39. Does this complete your reply evidence?

A39. Yes, except for the table below, which summarizes the points addressed in Appendix R to this reply.

---

47 Safir Evidence at p. 20.
### Table 1. Guide to Points Discussed in Appendix R

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i) INADEQUATE REVIEW OF CAPITAL STRUCTURE LITERATURE</td>
<td>Evidence of Dr. Booth (pp. 81-87)</td>
<td>Written Reply of Dr. Kolbe (Appendix D)</td>
<td>Evidence of Dr. Booth (pp. 89-95)</td>
<td>Written Reply of Dr. Kolbe (pp. 12-16)</td>
</tr>
<tr>
<td>ii) RELIANCE ON SELECTED REGULATORY DECISIONS RATHER THAN CAPITAL STRUCTURE LITERATURE</td>
<td>pp. 3, 74-76, 78-80</td>
<td>pp. 17-19</td>
<td>pp. ii, 2, 82, 88, 97, 100, 104</td>
<td>pp. 16-17</td>
</tr>
<tr>
<td>v) INCORRECT IMPLICATION THAT KOLBE PROCEDURES IGNORE NON-TAX COSTS TO DEBT</td>
<td>pp. 16-17</td>
<td>pp. 22-24</td>
<td>p. 23</td>
<td>pp. 21-22</td>
</tr>
<tr>
<td>vi) FINANCIAL RISK DEPENDENT ON MARKET VALUES, NOT BOOK VALUES</td>
<td>pp. 15-17, 81</td>
<td>pp. 26-30</td>
<td>pp. 21-23, 87-89</td>
<td>pp. 24-30</td>
</tr>
</tbody>
</table>
APPENDIX R TO WRITTEN REPLY EVIDENCE

OF

A. LAWRENCE KOLBE

FOR

TRANSCANADA PIPELINES LIMITED
## Table of Contents

**GUIDE TO LOCATIONS OF POINTS ALREADY ADDRESSED IN PREVIOUS PROCEEDINGS**

Tab R-Booth 1: Booth Evidence in RH-2-2004, Phase II ........................................ 46

Tab R-Kolbe 1: Kolbe Reply Evidence in RH-2-2004, Phase II ............................ 68

Tab R-Booth 2: Booth Evidence in EB-2005-0520 ............................................. 89

Tab R-Kolbe 2: Kolbe Reply Evidence in EB-2005-0520 .................................... 111

Tab R-Booth 3: Booth Evidence in RH-1-2008 ..................................................... 132

*Note: The higher of the two page numbers on each page within the Booth Evidence or the Kolbe Reply Evidence within each tab are those from the original documents, which correspond to the page numbers in the Guide on page 45, below. The above page numbers refer to cover pages in the present document that match the lower page number on each page, which correspond to the page numbers within this PDF file.*
### Guide to Points Addressed in Previous Proceedings

<table>
<thead>
<tr>
<th>Topic of Kolbe Reply Evidence</th>
<th>Evidence of Dr. Booth</th>
<th>Written Reply of Dr. Kolbe (Appendix D)</th>
<th>Evidence of Dr. Booth</th>
<th>Written Reply of Dr. Kolbe (Appendix B)</th>
<th>Evidence of Dr. Booth , IR Responses from CAPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii) RELIANCE ON SELECTED REGULATORY DECISIONS RATHER THAN CAPITAL STRUCTURE LITERATURE</td>
<td>pp. 3, 74-76, 78-80</td>
<td>pp. 17-19</td>
<td>pp. ii, 2, 82, 88, 97, 100, 104</td>
<td>pp. 16-17</td>
<td>pp. 1, 15, 20, 28</td>
</tr>
<tr>
<td>v) INCORRECT IMPLICATION THAT KOLBE PROCEDURES IGNORE NON-TAX COSTS TO DEBT</td>
<td>pp. 16-17</td>
<td>pp. 22-24</td>
<td>p. 23</td>
<td>pp. 21-22</td>
<td>p. 25</td>
</tr>
<tr>
<td>vi) FINANCIAL RISK DEPENDENT ON MARKET VALUES, NOT BOOK VALUES</td>
<td>pp. 15-17, 81</td>
<td>pp. 26-30</td>
<td>pp. 21-23, 87-89</td>
<td>pp. 24-30</td>
<td>p. 19</td>
</tr>
</tbody>
</table>
TRANSCANADA MAINLINE RH 2-2004

PHASE II
BUSINESS RISK AND CAPITAL STRUCTURE FOR THE TRANSCANADA MAINLINE

Evidence of

Laurence D. Booth

BEFORE THE

National Energy Board

October 19 2004
# TABLE OF CONTENTS

1. EXECUTIVE SUMMARY .......................................................................................................................2

2. 1.0 INTRODUCTION ..........................................................................................................................5

3. 2.0 REGULATORY TOOLS...............................................................................................................7

4. 3.0 BUSINESS RISK .....................................................................................................................19

5. 4.0 FINANCIAL RISK.....................................................................................................................39

6. 5.0 LEVERAGE ADJUSTMENTS....................................................................................................77
• I would judge the Mainline to have a good investment grade bond rating with its current allowed ROE and common equity ratio. Over the last two years there has been concern expressed over “increasing” credit standards motivated by the introduction into Canada of S&P’s US credit standards and their experience with US utilities and pipelines like Enron and Aquilla. However, there is no indication that the Canadian capital markets have reflected these US concerns. Spreads on utility and pipeline debt over the last five years have reflected normal cyclical concerns and do not indicate that the market has re-evaluated the regulatory protection accorded utility and pipeline debt.

• Overall conditions in the bond market indicate that spreads are tighter now than they were at the time of RH-4-2001, so that utilities can access debt markets more easily. Further the dramatic increase in the income trust market over the last five years has opened up another source of financing. In my judgment the Mainline has just as much, if not more, financial flexibility than at the time of RH-4-2001 and there is no need to make capital structure changes to improve its access to capital, particularly since the rate base is declining.

• My own judgement is that the Mainline’s currently allowed ROE formula, combined with a 33% common equity ratio, is generous. However, like the Board I believe that common equity ratios should only be revisited after a fundamental shift in business risk and I see no signs of such a shift in the last three years. I therefore would recommend that the Board continue with its current allowed common equity ratio.

• In terms of the ATWACC approach advocated and used implicitly in the company’s filed testimony I would point out the fundamental contradiction in its use in regulatory filings in that it is the mirror image of shareholder value maximisation. That is, earning more than the WACC is synonymous with the creation of shareholder value, whereas the Board’s responsibility is not to create or maintain shareholder value, but to ensure that rates are fair and reasonable. The Alberta EUB felt it would be “derelict” in its responsibilities to recognise market
my judgment would be that the cost of capital estimates used by Drs. Kolbe and Vilbert, as the base for their deemed common equity ratio recommendation, continue to be significantly higher than those I would arrive at.

Q. IF YOU DO NOT AGREE WITH THE APPROACH OF DRS. KOLBE AND VILBERT, HOW DO YOU RECOMMEND THE BOARD SET COMMON EQUITY RATIOS?

A. I would recommend that the Board continue to use its existing policy. In RH-2-94 the Board stated (Decision page 24)

“The Board is of the view that the determination of a pipeline’s capital structure starts with an analysis of its business risk. This approach takes root in financial theory and has been supported by the expert witnesses in this hearing. Other factors such as financing requirements, the pipeline’s size and its ability to access various financial markets are also given some weight in order to portray, as accurately as possible, a complete picture of the risks facing a pipeline.”

I agree 100% with this assessment, since it follows the prior discussion of the impact of financial leverage. To repeat the previous financial leverage equation

\[ ROE = ROI + [ROI - R_d (1 - T)] \frac{D}{S} \quad (2) \]

If this equation is rearranged we can express the variability of the ROE as a function of the variability in the operating income or

\[ STDEV(ROE) = STDEV(ROI) * (1 + \frac{D}{S}) \quad (3) \]

where the standard deviation of the actual ROE is that on the ROI times one plus the debt equity ratio. So if the Board wants to equalise the risk to equity holders (STDEV(ROE)) investing in different pipelines with different business risk (STDEV(ROI)) in principle it can alter the deemed debt equity ratio.

At this point it is important to point out that the above equation is based on the firm’s financial statements. It is an accounting relationship that has nothing to do with how the stock market
reacts to the firm’s use of financial leverage. As far as I know no-one has ever disputed the above equations, as they are simply a rearrangement of the flow of income through a firm’s financial statements. That is, the ROE is not that required by investors (the cost of equity capital) it is simply the actual ROE earned by the firm on the book value of its equity. Using these relationships is consistent with the fact that the Board can only control these accounting values. The Board can alter business risk through the use of deferral accounts and the financial risk through changes in the deemed equity ratio, but it can not change stock market risk, as the market, not the Board, determines market values.

This last point should be emphasised: the financial leverage equation is not equivalent to the formulae used by Dr. Kolbe. Dr. Kolbe’s equity cost adjustment formulae are based on assumptions about how the stock market values the use of financial leverage. All of the work of Drs. Kolbe and Vilbert is based on market values and their equations are based on assumptions about how the stock market values the effects of financial leverage. Unlike the financial leverage equation which indicates how the Board can alter financial risk to offset business risk, the equations used by Dr. Kolbe attempt to answer the question of how the rate of return required by an investor changes as the financial leverage based on market values changes. This adjustment requires a theory of how the market values financial leverage, which is not required for the Board to change deemed equity ratios in response to changes in business risk.

To illustrate in RH-2-94 several experts submitted testimony on how the allowed ROE should change as the capital structure changes along the lines of the current testimony of Drs. Kolbe and Vilbert. Dr. Sherwin and Ms. McShane, who provided testimony on behalf of the companies, concluded (page 24)

“The finance models, even when adapted to the real world of Canadian utility regulation, cannot provide the basis for determining a pipeline’s optimal capital structure.”

More importantly Dr. Berkowitz and I used models similar to those used by Dr. Kolbe, but expressed little support for them. As the Board noted in its Reasons for Decision (page 24)

“Dr. Booth and Berkowitz concluded that these estimates are approximately the increases in ROE required by investors. However, they noted the estimates are subject to error since they are based on valuation formulas, which are as yet unproven. Moreover, they
noted that these formulas ignored the non-tax advantages of debt financing and the effects of financial distress.”

Finally, the Board also noted Dr. Waters’ testimony (a frequent witness before the Board at that time) where he indicated that “To date empirical testing to more clearly describe the relationship (between capital structure and the investors required return) has not been done successfully.

The Board’s summary from ten years ago is an accurate assessment of my views today and it is my judgment that the misgivings expressed by experts ten years ago continue, since the issues have still not been resolved. I would therefore recommend that the Board continue its practise of making capital structure changes based on its qualitative assessment of a pipeline’s business risk.

**Q. IS BUSINESS RISK THE ONLY FACTOR IN SETTING CAPITAL STRUCTURES?**

**A.** No. Ultimately the litmus test of whether the Board has “got it right” is whether the pipeline can access capital on reasonable terms. If, for example, the Board has not sufficiently increased the common equity ratio in response to an increase in business risk then the stock market will discount the pipeline’s stock price and make it difficult for the regulated firm to access capital on reasonable terms. In *Federal Power Commission et al v. Hope Natural Gas Co.* [320 US 591, 1944], the United States Supreme Court decided that a fair return "should be sufficient to assure confidence in the financial integrity of the enterprise so as to maintain its credit and to attract capital."

Although the Hope “financial integrity” criteria flows from considering a fair return it applies equally to the deemed common equity ratio. In my judgment an appropriate common equity ratio is one which, in conjunction with the allowed return, allows a pipeline to maintain its credit and attract capital.

The Hope criterion would therefore support the view that after examining business risk, the Board consider factors such as size, financing requirements and market access, since all of these are important for financial integrity. However, note that “maintaining credit” is not the same as maintaining a particular credit rating. Credit standards constantly change as does the market’s appetite for certain types of credits. This means that there is no need to target a particular credit
should be able to net out the equity book value per share and avoid any dilution of the existing shareholder’s interests. However, apart from this minor deviation from book values, the essential point is that the correct financing weights for a regulated firm should be the regulated capital structure weights, not the market value weights. To incorporate into the regulatory process a regulated firm’s market value is to rubberstamp investor expectations, however unrealistic, and delay the adjustment to a fair and reasonable value for the allowed ROE.

The Alberta EUB has directly addressed this question on a number of occasions. For example, in connection with comparable earnings testimony the EUB stated (Generic Cost of Capital Decision U-200452, page 24)

“The Board considers that the application of a market required return (i.e. required earnings on market value) to a book value rate base is appropriate in the context of regulated utilities.”

That is, you estimate a market opportunity cost, such as that from the CAPM, and apply it to book values, not market values as is the assumption in WACC.

In explicitly considering the usefulness of ATWACC the EUB stated (Decision U-99099, page 300)

“The Board observes that the intrinsic long-run value of a pure play regulated entity is best represented by book value. In other words, the present worth of future regulated earnings, discounted at the allowed return, is by definition equal to book value assuming achieved regulated earnings on average equal allowed regulated earnings. Accordingly, the Board considers that book capitalization represents the best indicator of the long-run market capitalization for a pure play regulated firm.”

It is difficult to see how a regulator could say anything other than what the EUB stated above, since to accept a market to book much above 1.0 is in effect to rubberstamp unrealistic investor expectations or to admit that allowed ROEs are too high. The EUB further recognised this when it went on to say (U99099, page 303)

“The Board would be derelict in its statutory responsibilities to recognize market capitalization ratios that are derived from a market value capitalization that deviates from the intrinsic long-run value of the regulated firm.”

This is the clearest possible statement by a regulator of the fundamental grounds for rejecting ATWACC and its emphasis on market values.
Further the EUB went on to say

“In essence, a regulated company’s earnings are driven by the portion of the original cost rate base deemed to be financed by common equity. This fact results in a fundamental disconnect to the theory that market capitalization ratios, which have deviated significantly from book capitalization ratios, reflect the appropriate financial risk necessary to determine a fair composite return to be applied to the original cost rate base of a pure play regulated utility. This is because the earnings of a pure play regulated utility are governed by and driven by the regulated return allowed on book equity. In other words, it is the book equity that reflects the appropriate financial risk necessary to determine a fair composite return for a pure play regulated utility.”

This means that the correct financial risk measure is that which I discussed earlier under financial leverage. It is also the approach pioneered by this Board, where financial risk adjustments using the deemed common equity ratio are made for differences in business risk.

The EUB went on to calculate an ATWACC using regulated book value capital structure weights and the embedded debt costs. In this case (Decision U-99099, page 303)

An ATWACC$_{BV}$ would be suitable for a regulated utility whose profit, by legislation, is limited to a fair return on the book value (i.e. original cost) of its assets. The Board notes that an ATWACC$_{BV}$ is consistent with the logic of the traditional method of determining fair return.

In our example, the ATWACC$_{BV}$ is the 5% debt and 11% equity cost weighted with the 50% regulated capital structure weights. In this case the ATWACC$_{BV}$ is 8.0% and awarding this 8% cost of capital means that the value of the equity is

\[ V = \frac{.08 \times \$10 - .25}{.11} \]

or $5mm. This is the exact same result that would arise if the firm were simply given its 11% lower ROE.

The EUB ATWACC$_{BV}$ correctly recognised that apart from any estimation error attached to the equity cost, the WACC approach is inconsistent with allowing a fair return to a regulated firm. The only approach consistent with allowing “fair and reasonable” rates is to estimate the regulated, “comparable,” sample of firm’s ATWACC using book value weights and embedded debt costs. In this case the exercise comes down to the normal problem of whether or not the
estimated equity cost is accurate or not. I will not enter testimony on this question, since it is not part of the hearing, but suffice it to say that I judge the estimates of Dr. Vilbert as being high.

The final step is to adjust for differences in the financial leverage between the calculated WACC estimates and the firm in question. That is, given the use of market value weights in the calculated WACC, which in my example were 57.7% common equity and 42.3% debt, are leverage adjustments need to apply the estimates to the regulated book equity, which in our example was 50%?
judgment that no leverage adjustments were needed going from a telco sample with 55% common equity, that is, 45% debt to an energy distribution sample with much greater financial leverage.

By and large this continues to be my judgment: that the actions of regulators, like this Board, to equalise risk obviates the need for leverage adjustments. In fact, in the recent Alberta generic hearing the EUB specifically followed the lead of this Board and set common equity ratios for a large sample of ROE regulated companies such that they could all earn the same formula allowed ROE.

Q. **WHAT IF THERE ARE SIGNIFICANT LEVERAGE DIFFERENCES?**

A. The first question the Board has to ask is: are these leverage differences real, that is, were they set to equalize overall risk or not? The second question the Board has to ask is: are the leverage differences based on market or regulated book weights? If the answer to the first question is that the leverage differences just offset business risk differences, then no action is needed. If the answer to the second is the differences are only due to “temporary” market value differences then they should also be ignored.

To continue with the previous example where the equity cost dropped from 15% to 11% and as a result the equity market value increased and the equity ratio at market values increased to 57.7% from the regulated 50%. Suppose this were the sample average from say twenty companies and the results had to be applied to a non-traded regulated firm with 50% common equity and the same business risk as the sample. Dr. Kolbe would seem to argue that the sample average has less financial risk and that to apply the estimated equity cost, assuming it is accurate, to the regulated firm in question underestimates its fair ROE, since it has a 50% debt not 42.3%. As a result, he would increase the recommended ROE from the 11% estimated from the sample or conversely recommend a higher common equity ratio. I will show later that their leverage adjustment gives the highest plausible leverage adjustment. However, the approach itself is wrong for two reasons.

First, if the regulated firm is earning approximately the same allowed ROE and has the same capital structure, there is no reason to believe that its implicit market valued equity ratio is any
different from that of the sample. That is, the non-traded regulated firm in all likelihood has an
implicit market valued debt ratio the same as those of the sample firms, so there is no leverage
difference that needs to be adjusted for. Further allowing a higher ROE just increases the market
value of the equity, causing the market valued debt ratio to drop further, creating an even bigger
internal contradiction.

Second it is important to remember that in the example the market valued debt ratio fell not
because the firm substituted equity for debt and reduced the amount of fixed interest payments
and financial risk, but because the equity cost fell. This is the reality of the declining interest rate
scenario we have lived with since 1981 and the effect of a persistent decline in equity costs
coupled with regulatory lag. However, there is a big difference between the impact of
substituting equity for debt in a regulated capital structure and an increase in equity value as a
cause of the fall in the market valued debt ratio.

In the example, the equity is obviously riskier at $6.818mm and a market to book of 1.36X than
it is at $5mm and a market to book of 1.0X. This is because it is highly unlikely that the regulator
will cut the allowed ROE when the stock is trading at book value. In contrast, the higher the
market to book ratio the more likely the regulator will cut the allowed ROE and thus the riskier
the stock. In contrast, Drs Kobe and Vilbert would have us believe that the equity in a regulated
firm is less risky when it is trading at a market to book well above 1.0, since the debt ratio is
lower. I don’t accept this.

Second and more significant, the financial leverage risk premium stems from the imposition of
fixed interest charges. That is, prior to receiving their equity return the firm has to pay these
interest charges. This risk does not change as the market value of the firm changes; it only
changes as the book debt equity ratio changes. For example, if the Mainline moved to a 60-40
debt equity ratio in terms of book amounts, then there would be less interest expense.
Consequently, the financial risk, both to the bond-holder and the stock-holder, would decline and
with them the both the debt and equity costs. In this case, a leverage adjustment would indicate a
lower equity cost, since the financial risk has declined. As Standard and Poors have stated,

“Similarly ratios using market value of a company’s equity in calculations of leverage are
given limited weight as analytical tools. The stock market emphasises growth prospects
and has a short time horizon; it is influenced by changes in alternative investment opportunities and can be very volatile. *A company’s ability to service its debt is not affected directly by such factors* (italics added)."

That is, S&P is basically saying book value leverage is important, when it is assessing the default or credit risk in debt, whereas market values don’t count, or at least don’t count as much. If it is book values and interest payments that affect credit risk and the cost of debt then this is the risk that also affects utility equity investors.

Following on from the Alberta EUB’s decision that to accept market value weights would be a “dereliction” of duty, the obvious implication is that the weights in the sample WACC should also be book value weights. In my example this means that the regulated book value of 50%, rather than the market value debt ratio of 42.3% is what matters. Hence in comparing this 50% regulated debt ratio with the firm in hand that also has 50% debt ratio means that no adjustment is necessary. Making an adjustment based on market values is then inappropriate for a regulated firm. As the EUB again noted (Decision U99099, page 301)

> “the Board considers that beta and the cost of equity do not change to the extent necessary for an ATWACC, determined from market capitalization weights, to remain constant when applied to the book capitalization for a pure play regulated utility. The increase required to the cost of equity to achieve a constant ATWACC would be excessive and violate the fair return standard.”

In my judgment that the only time that a leverage adjustment is needed for a regulated firm is either, when its overall risk differs from that of a sample of regulated firms from which an ROE estimate is derived, or when its business risk changes and the Board wants offset this change so it can continue to award a formula allowed ROE. In these cases, as I indicated earlier, in my judgment the literature has not reached “closure” on how to make leverage adjustments and the Board is best advised to base its decision on the business risk of the pipeline and its access to financial markets. These are the factors discussed in Section 2.0, which the Board has used in the past.

Note that in CAPP 32(c) TCPL indicated that its requested fair return is equivalent to 13.3% on the same 30% common equity allowed Foothills. It is difficult to see how the Mainline deserves almost 4.0% more as a risk premium than another pipeline accessing the WCSB.
Q. SUPPOSE THE BOARD FEELS THAT A LEVERAGE ADJUSTMENT BASED ON MARKET VALUES IS NECESSARY ANYWAY, DO YOU AGREE WITH DR. KOLBE’S ADJUSTMENT METHOD?

A. No. Again, it is well accepted that financial risk magnifies business risk. The basic financial leverage equation indicates that the accounting return to the stockholder is determined as follows

\[
ROE = ROI + (ROI - R_d) \frac{D}{S}
\]

where these are all book values, that is, \( D \) and \( S \) are the book values of debt and equity and \( R_d \) is the embedded cost of debt. The equation simply comes from manipulating the firm’s financial statements. It means, for example, that with a fixed stock of assets, as revenues and the ROI changes, then the greater the amount of debt the greater is the variation in the accounting return to the stockholders. However, the above equation says absolutely nothing about how the stock market reacts to this financial risk, that is, how market values change, or how the cost of equity changes as the firm uses debt.

To understand how the investor’s required rate of return or equity cost varies with the use of debt we need a valuation model. The first valuation attempt was by Franco Modigliani and Merton Miller (M&M) who in 1958 developed an arbitrage model to show that the total enterprise value was independent of the use of debt. This was their famous “no magic in debt argument.” If individuals can borrow on the same terms as the firm, then investors will not pay a premium for firms that use debt, since the firm is not adding value. Consequently, they derived the following formula

\[
K_e = K_0 + (K_0 - K_b) \frac{B}{E}
\]

where the \( K \)’s indicate the cost of equity and debt, not accounting returns, and \( B \) and \( E \) represent the market values of debt and equity respectively. The subscript 0 then indicates what the equity cost would be if the firm had no debt outstanding, which is often referred to as the unlevered equity cost.
Note two things about this equation. First, apart from redefining returns and debt ratios, in form it is the same as the leverage equation I used earlier. This is because in the accounting model total assets are fixed, whereas in this valuation model M&M “proved” that the value of the firm was fixed. As a result, changes in the book and market debt ratios have the same impact. Second M&M “proved” that as the market value was constant the weighted average cost of capital was also constant, which in this case means that it is equal to the unlevered equity cost. However, note that I italicised “proved,” since this was a mathematical proof that followed from their assumptions, not a description of reality.

In the M&M equation changes in the market valued debt equity ratio \((B/E)\) are multiplied by the spread between the \(WACC\) and the cost of debt. It is this coefficient that determines how much changes in the debt equity ratio affect the equity cost since it is this coefficient that determines the risk. This is the important point: people who believe that changes in the debt equity ratio have a big impact on the equity cost believe that the coefficient on the market valued debt equity ratio is high and vice versa.

However, the overall market value in the M&M model is only fixed by their assumptions. To emphasise, remember that from equation (9)

\[
V = \frac{\text{After-tax operating income}}{WACC}
\]

The total firm value is after tax operating income divided by the after tax WACC. Given that M&M were discussing capital structure not operating changes, the after tax operating income, the numerator above, is by definition constant. What M&M “proved” was that with firm value constant the WACC must also be constant. In this case, given that the WACC is a weighted average of the debt and equity costs, the equity cost has to increase with more debt to offset the impact of more “cheaper” debt. This is what equation (10) indicates.

However, if the market value increases with more debt then from equation (9) the cost of capital will decrease and vice versa. In this case, the equity cost may then increase or possibly even decrease with the use of debt, it all depends on the valuation model and the assumptions that are made. The critical question is how the use of debt affects the overall firm value; the impact on
the WACC and the equity cost then follow directly.

M&M’s “no magic in debt” result was controversial in 1958 and remains so today. This is because of the assumptions required to “prove” their result. The most important are that:

- there are no taxes of any kind;
- there are no transactions costs;
- there are no information asymmetries between borrowers and lenders;
- everyone can borrow on the same terms, that is., if the company can issue 25 year bonds or access the swap market, then so too can other individuals;
- all firms are perpetuities that pay out 100% dividends;
- there are no bankruptcy or financial distress costs;
- there are two or more identical firms with different levels of debt that can be arbitragged.

All of these assumptions have been disputed to a greater or lesser extent and if any of them are incorrect then the total value of the firm is affected by the use of debt. Hence, so too is the cost of capital.

M&M’s result is a classic in corporate finance and they won the Noble prize in economics for it. However, its great strength lies not in its result, which few accepted then or now, but the fact they focused corporate finance on the implications of their assumptions. For example, in 1963 they recognised that they made a mistake in their treatment of corporate income taxes and corrected their original paper. They then showed that, all else constant, the value of the firm increases due to the tax shield generated by the tax deductibility of interest payments. The reason is simply that what we term value is the private value and by reducing corporate income taxes the private value of the firm increases at the expense of the government. Hence from equation (9), if the private market value increases the WACC of necessity must decline.

In fact in the M&M (1963) model the WACC declines continuously since the corporation can issue risk free debt and the average and marginal tax advantage to debt are the same. In this case, the equity cost changes in the following way with the use of debt,

$$ K_e = K_b + (1-T)(K_b-K_d)B/E $$

(11)
There is still a financial leverage risk premium but it is now smaller, since the use of debt also generates a valuable tax shield. Note that in M&M (1963) changes in the market valued debt equity ratio are now multiplied by \((1-T)\), so are smaller than in M&M (1958). Thus assuming a 40% corporate tax rate, people who believe in M&M (1963) would estimate a leverage impact only 60% the size of those who believe in M&M (1958).

Since 1963 all the other assumptions of M&M have been relaxed and every time an assumption has been relaxed there is another leverage equation similar to equations (10) and (11) and another estimate of the leverage effect. However, two main theories of capital structure have emerged: the static trade off (STO) model and the pecking order hypothesis (POH). The STO is a static model that assumes that firms trade off the tax advantages of using debt against the loss of financial flexibility that arises due to excessive leverage. It is this model that develops the familiar “U” shaped WACC function below as the firm increases its debt ratio.

Initially the WACC declines due to the tax advantages of debt. In the M&M (1963) model, for example each dollar of debt increases the firm’s market value by the value of the corporate tax
rate, the WACC then starts to increase as the loss of financial flexibility sets in. Obviously there has to be some offset to the tax deductibility of interest, otherwise all firms would try to finance with 100% debt. The offset comes as the debt becomes riskier and has to be sold on higher and higher yields and the firm loses its financial flexibility.

In contrast, the POH, developed in 1963 by Gordon Donaldson at Harvard, is a dynamic model of financing based on the fact that firms are controlled by managers. In this case, firms raise capital by issuing securities that impose the least restrictions on management. Consequently, firms primarily rely on internal funds and only after these are exhausted do they go outside for capital, where then they initially rely on bank debt and bonds, rather than new equity.

I have reviewed these basic ideas on capital structure since the flat ATWACC approach of Drs. Kolbe and Vilbert is essentially the 1958 M&M model as extended to include corporate and personal taxes by Miller [1977]. This is a very important model and for the last 26 years I have taught corporate financing to second year MBAs with the first five weeks devoted almost exclusively to these ideas, as well as to the implication that if this model holds there is no value to the activities of investment bankers and they should all study marketing! I then spend the balance of my course explaining how companies add value by adopting different financing decisions. The fact is that financial theory has come a long way since 1958 and is now better harmonised with practise: no one believes the flat WACC model fits reality; it is simply a good starting point to discuss how investment bankers, like Mr Lackenbauer, can create value for firms.

However, a flat ATWACC does have the advantage that it gives the largest possible leverage

---

40 This simple model has been dubbed adjusted present value (APV) by Professor Myers. In Principles of Corporate Finance (2nd Canadian edition, 1991 pages 490-493 they work an example and the base case NPV of $170,000 is then increased by $592,000 by the tax advantages to debt. In this case, Professor Myers, who Dr. Kolbe references throughout his testimony, clearly believes in the tax advantages of debt.

41 This is MGT2300. A course outline can be downloaded from my web page at http://www.rotman.utoronto.ca/~booth

42 It would be interesting to ask why investment bankers are so well paid if corporate financing decisions as represented by a flat ATWACC have no value and firms can do whatever they want.
effect, that is, the coefficient on the market valued debt equity ratio in the equity cost equation is as large as possible. I showed earlier that the M&M 1958 flat WACC model gives a bigger equity cost adjustment (equation (10)) than if the WACC declines with leverage in the conventional way (equation (11)). However, Dr. Kolbe goes further by assuming a flat ATWACC in the presence of corporate taxes, which gives an even bigger coefficient on the market valued debt equity ratio.

To illustrate Drs. Kolbe gets his leverage adjustment by assuming a flat, that is, constant WACC. Dr. Vilbert first calculates the WACC using market value weights from his sample:

\[ \frac{K_e}{V} E + K_b (1-T) \frac{B}{V} = WACC = K_A \]

Dr. Kolbe then assumes that the WACC (\(K_A\)) is constant and then either alters the equity ratio to get a new equity cost or alters the equity cost to get a new equity ratio, holding everything else constant. In terms of the equity cost, implicitly Dr. Kolbe is rearranging this WACC equation to solve for the equity cost (\(K_e\)) at any leverage ratio,

\[ K_e = K_A + (K_A - (1-T)K_b) \frac{B}{E} \]  

(12)

Since the WACC is assumed constant, it has the same no leverage equity cost (\(K_0\)) as before, the only difference is that it is this cost minus the after tax cost of debt that determines the leverage coefficient. With a constant WACC this coefficient is larger than either the M&M (1958) no tax case or the M&M (1963) tax case as a simple comparison with equations (10) and (11) indicates. In fact, as far as I am aware it is the largest coefficient possible, since I have not seen an equity cost equation with a larger coefficient.

The reason for the very large leverage adjustment in equation (12) is that the model is internally inconsistent. Equation (12) and the flat WACC assumes the tax deductibility of interest which

\[ \text{Note that a flat ATWACC requires in part that personal taxation offsets the corporate tax shield, yet in CAPP 85(b) TCPL indicated that it has never commissioned any study of its marginal investor’s tax rate and only considers corporate taxes in its capital budgeting procedures.} \]

\[ \text{Note that as explained earlier the use of market values is not appropriate for regulated firms, either directly or indirectly through WACC estimates from samples of regulated firms.} \]
causes the WACC to fall, but there is no explicit account of the offsetting costs that negate this to keep the WACC constant. For example, if the WACC is constant it could be that as the market valued debt equity ratio increases the debt cost also increases due to the higher risk of insolvency and the costs of financial distress and bankruptcy. This would be particularly true as the firm goes to very high debt equity ratios. In this case, what is keeping the WACC constant is an increasing $K_b$ as creditors protect themselves from the insolvency risk attached to highly debt financed firms. From the spread date in Schedule 16, we know this happens. Moreover, it is obvious from equation (12) that if the debt cost, $K_b$, increases with the debt equity ratio then the equity cost does not increase so fast, which is what Solomon showed in the *Journal of Finance* in 1963. The intuition is simply that “debt” in highly debt financed firms has some of the same characteristics as equity.

To show these principles backtrack to the previous example, where the equity cost was assumed to decrease from 15% to 11% due to a reduction in risk and consequently the equity market value increases from $5mm to $6.818mm. As a result, the market valued debt ratio decreases from 50% to 42.3%, simply because the equity value has increased due to regulatory lag. Suppose that the equity cost is then accurately estimated at 11.0%, but that someone believes that a leverage adjustment is needed to apply this to a firm with 50% debt; how could this be done?

One way is to estimate an unlevered equity cost from equation (10) by inserting the debt cost of 5% the debt equity ratio of .423/.577 and the equity cost of 11%. In this case, the unlevered equity cost is 8.46% and the use of debt financing has increased the equity cost from the debt free 8.46% to the observed 11.0%, so 2.54% is the financial leverage risk premium. The coefficient on the market valued debt equity ratio in this example is 3.46% (8.46-5.0). The relevered equity cost at the 50:50 debt equity ratio would then be 11.92%. So someone believing

45 The only reason for the cost of debt to increase is the risk of financial distress or bankruptcy, which M&M ignored in their 1958 paper. Therefore, Solomon’s result is inconsistent with the M&M assumptions. However, it is consistent with a model of bankruptcy and financial distress.

46 Note that the Mainline is claiming that its JSDs are really 30% equity and 70% debt.
step is to argue for a leverage adjustment. Then the assumption of a flat ATWACC generates the
biggest coefficient on the debt equity ratio and the largest financial leverage risk premium. This
in turn provides the biggest “bump” when a sample estimate is applied to the regulated common
equity ratio. In my example it would give an equity cost of 12.31%, 131 basis points higher than
the true equity cost and higher than using any other equity cost model that I am aware of. As the
example shows these assumed leverage adjustments can be very large and they are totally
unnecessary.

Q. DRS. KOLBE AND VILBERT ARE NOT MAKING ROE ADJUSTMENTS BUT
EQUITY RATIO ADJUSTMENTS, DO THESE CONCLUSIONS STILL APPLY?

A. Yes. Both the equity cost and equity ratio results both flow from a rearrangement of the
same equations; it is simply easier to “see” them using the equity cost approach since that is what
most people are interested in. Note that Dr. Kolbe’s critical equation is B-4 in his appendix B-19,
which is the equation he recommends in the main body of his evidence. This equation is derived
from his equations B-3a,b,c on page B-10, as he points out in his footnote 66. It is useful to go
through how this is derived.

First equation B-3a indicates that the WACC, which he denotes as $r^*_3$ is equal to the all equity
cost of capital for the firm, which he denotes $r_a$ and is more commonly referred to as the
unlevered equity cost (my $K_0$) minus the tax advantages to debt, which he sets equal to zero. So
in equation B-3a, Dr. Kolbe is specifically assuming that the WACC is constant, regardless of
how much debt the firm uses. Note that this assumption is not that the WACC is constant around
a small optimal range, but that it is constant throughout the whole range of debt ratios.\(^{48}\)
Equation B-3b is then the normal WACC which Dr. Vilbert estimates.

Second Dr. Kolbe \textit{assumes} that this WACC is equal to the WACC for the regulated firm using
both book value weights and the allowed ROE on book equity. He thus gets

\(^{48}\) Dr. Kolbe states that the flat ATWACC doesn’t hold at extremes but mathematically his equation B-3a
states the opposite.
Tab R-Kolbe 1: Kolbe Reply Evidence in RH-2-2004, Phase II
IN THE MATTER OF the National Energy Board Act, R.S.C. 1985, c. N-7, as amended, (Act) and the Regulations made under it; and

IN THE MATTER OF an Application by TransCanada PipeLines Limited (TransCanada) pursuant for orders pursuant to Part IV of the National Energy Board Act for approval of tolls for 2004.

WRITTEN REPLY EVIDENCE

OF

A. LAWRENCE KOLBE

FOR

TRANSCANADA PIPELINES LIMITED

The Brattle Group
44 Brattle Street
Cambridge, Massachusetts 02138
617.864.7900

November 2004
Table of Contents

I. INTRODUCTION AND SUMMARY .................................................. 1

II. UNFOUNDED RELIANCE ON MARKET-TO-BOOK RATIO .................... 6
   A. MUTUALLY CONTRADICTORY STATEMENTS ON STOCK MARKET
      VALUES ........................................................................ 7
   B. INVALIDITY OF MARKET-TO-BOOK RATIO AS A TEST OF FAIR
      RETURN ....................................................................... 8
      1. Implied Cost of Equity Values Far Too Low, Often Less Than the
         Board’s Benchmark Interest Rate ............................. 9
      2. Market-to-Book Ratio Test Inconsistent with the Way the Market
         Behaves .......................................................... 15

III. FLAWED COMMENTS ON THE MAINLINE’S RISK ........................ 19
   A. INCORRECT RETURN ADEQUACY STANDARD ..................... 20
   B. WRONGLY FOCUSED NUMERICAL EXAMPLES THAT ACTUALLY
      SUPPORT A MARKED INCREASE IN DEEMED EQUITY RATIO .... 23
   C. OTHER PROBLEMS IN RISK-RETURN STATEMENTS ............. 39
      1. Depreciation Adjustments No Substitute for Equity Return
         Adjustments ..................................................... 39
      2. Declining Rate Base Not the Same as Declining Risk .......... 41
      3. No Double-Counting if Recognize Impact of Future Risk Increases
         Both Now and When They Occur .............................. 42
      4. Past Not Necessarily Prologue .................................. 43
      5. “Soft” Capital Constraints Relevant in Practice ................ 45

IV. FLAWED STATEMENTS ON CAPITAL STRUCTURE PRINCIPLES ....... 47

V. CONCLUSION .......................................................................... 51

Appendix D: DETAILED RESPONSE ON CAPITAL STRUCTURE PRINCIPLES ..... D-1
   A. THE USE OF ATWACC FOR ONE PURPOSE NOT INCONSISTENT
      WITH ITS USE FOR OTHER PURPOSES ....................... D-2
   B. BOOTH EVIDENCE NUMERICAL EXAMPLE INTERNALLY
      INCONSISTENT, INCONSISTENT WITH THE WAY CAPITAL
      MARKETS WORK, AND MISINTERPRETS MY
      RECOMMENDATIONS ................................................ D-4
   C. BOOTH EVIDENCE’S INADEQUATE AND INACCURATE REVIEW OF
      THE CAPITAL STRUCTURE LITERATURE ....................... D-13
   D. BOOTH EVIDENCE RELIANCE ON SELECTED REGULATORY
      DECISIONS RATHER THAN THE CAPITAL STRUCTURE
      LITERATURE .......................................................... D-17
   E. INCORRECT CLAIM THAT MY EVIDENCE RELIES ON THE 1977
      MILLER MODEL .................................................. D-19
F. INCORRECT CLAIM THAT MY EQUATION FOR THE INTERACTION BETWEEN THE COST OF EQUITY AND CAPITAL STRUCTURE PRODUCES THE HIGHEST POSSIBLE CHANGES................. D-21
G. INCORRECT IMPLICATION THAT MY PROCEDURES IGNORE NON-TAX COSTS TO DEBT ........................................ D-22
H. BOOTH EVIDENCE CHARACTERIZATION OF THE WAY REGULATION WORKS INCONSISTENT WITH THE EVIDENCE .... D-24
I. FINANCIAL RISK DEPENDENT ON MARKET VALUES, NOT BOOK VALUES .................................................. D-26
J. MY PROCEDURES TO CALCULATE APPROPRIATE DEEMED EQUITY RATIOS REASONABLE ............................... D-30
C. BOOTH EVIDENCE’S INADEQUATE AND INACCURATE REVIEW OF THE CAPITAL STRUCTURE LITERATURE

Q12. What support for its views does the Booth Evidence draw on from the financial literature?

A12. Very little. The discussion covers parts of pp. 81-87. It starts with an apparent claim that book rather than market values cover financial risk, which echoes statements made early in the Booth Evidence. This claim is not sourced to the economic literature, despite an explicit invitation for CAPP to do so. I address this part of the discussion in Section I, below.

Q13. Please summarize the Booth Evidence’s review of the capital structure literature.

A13. The financial literature the Booth Evidence cites is sparse. It mentions the 1958 and 1963 papers by Modigliani and Miller, the 1977 paper by Miller, a 1963 article by Ezra Solomon, and a 1963 publication Gordon Donaldson. It identifies no study of capital structure that has been published in the last quarter-century, despite the fact that this has been and remains a very active field of research.

---

42 See the Booth Response to TCPL Information Request No. 9.

43 Actually, the passage does not include formal citations for any of the publications. The first three papers are among many that are cited in my own Appendix B. I am unaware of a relevant 1963 citation to Donaldson, although perhaps it is a version of Gordon Donaldson, Corporate Debt Capacity, Boston: Division of Research, Graduate School of Business Administration, Harvard University (1961). The Solomon paper is Ezra Solomon, “Leverage and the Cost of Capital,” The Journal of Finance 18:273-79 (May 1963).

The literature summary itself consists of a brief overview of the tax-based theories of Modigliani and Miller and Miller, a mention of the static tradeoff model (referring to calculations using APV), a mention of the pecking order hypothesis (attributing it to Prof. Donaldson), and a mention that the Solomon paper showed that the cost of equity does not increase as fast if the cost of debt increases when firms add debt.

Q14. Why do you label this review “inadequate”?

A14. The last paper it mentions was published twenty-six years ago. It reviews none of the more recent literature explicitly, despite the fact that Prof. Booth himself has published a relevant paper that I cite in my own Appendix B. It does not address any of the empirical studies I cite as support for my conclusions on the actual effects of capital structure. Rather than directly addressing the findings of the research I report, it states Prof. Booth’s personal views and appeals to regulatory decisions rather than the economic literature.

Q15. Why do you label the review of the financial literature in the Booth Evidence “inaccurate”?

A15. At p. 87 it cites the Solomon paper as establishing that “if the debt cost, $K_b$, increases with the debt equity ratio then the equity cost does not increase so fast...”. In fact, the Solomon paper purported to show that the Modigliani-Miller theory is wrong because the cost of equity could actually fall as the debt ratio rose (because the cost of debt was going
up so fast) in a no-tax, pure Modigliani-Miller world. However, the paper was shown to be in error in this regard two years after it was published. 45

Even though the paper has long been known to be erroneous, the Booth Evidence not only cites it, it appears to continue to rely on it at pp. 86-87:

The reason for the very large leverage adjustment in equation (12) is that the model is internally inconsistent. [The equation that shows how the cost of equity changes with the debt ratio in the Miller (1977) model] and the flat WACC assumes the tax deductibility of interest which causes the WACC to fall, but there is no explicit account of the offsetting costs that negate this to keep the WACC constant. For example, if the WACC is constant it could be that as the market valued debt equity ratio increases the debt cost also increases due to the higher risk of insolvency and the costs of financial distress and bankruptcy. This would be particularly true as the firm goes to very high debt equity ratios. In this case, what is keeping the WACC constant is an increasing $K_b$ as creditors protect themselves from the insolvency risk attached to highly debt financed firms. From the spread date in Schedule 16, we know this happens. Moreover, it is obvious from equation (12) that if the debt cost, $K_b$, increases with the debt equity ratio then the equity cost does not increase so fast, which is what Solomon showed in the Journal of Finance in 1963. 45 The intuition is simply that “debt” in highly debt financed firms has some of the same characteristics as equity.

45 The only reason for the cost of debt to increase is the risk of financial distress or bankruptcy, which M&M ignored in their 1958 paper. Therefore, Solomon’s result is inconsistent with the M&M assumptions. However, it is consistent with a model of bankruptcy and financial distress.

This passage errs in several ways. First, it relies on an incorrect paper. Second, it appears to copy that paper’s error in attributing maintenance of a flat ATWACC to an increase in the cost of debt rather than to an increase in both the cost of debt and the cost

---

of equity. The cost of debt may well increase as the market-value debt ratio increases, but the cost of equity increases as well, even without taxes and with a flat ATWACC over the whole range of capital structures. Third, the Solomon result does not address a model of overall financial distress (which would increase the overall cost of capital), it focuses on whether the overall cost of capital will truly remain flat in a no-tax Modigliani-Miller world if the cost of debt increases as the debt ratio increases. Finally, its conclusion that the Miller model is “internally inconsistent” is not adequately explained. If it means the Miller model would not hold with risky debt at high debt ratios, that is true but in no way contradicts my evidence. (See Sections E and F, below.) If it means that Prof. Miller somehow made a major mistake in one of the papers that won him a Nobel Prize, the Booth Evidence needs to provide more detail to support such a claim than it has in this short passage.

The Booth Evidence’s statement that “the equity cost does not increase so fast” is somewhat ambiguous and might mean that the cost of equity increases faster than the cost of debt, but not as fast as it would if the cost of debt were constant. Yet if the Booth Evidence did not mean the statement in the sense of the Solomon paper, in which WACC stays flat as the cost of debt increases because the cost of equity eventually decreases, why juxtapose the comment with the Solomon article?

This is what Robichek and Myers, op. cit., showed.

For completeness, I would note that the facts that the risk of financial distress looms and the cost of debt increases as the debt ratio increases are in no way inconsistent with my evidence. My Appendix B goes well beyond the early models addressed in the Booth Evidence, to include explicit consideration of the costs of excessive debt. Additionally, Dr. Vilbert and I explicitly considered the effect of changes in the cost of debt as capital structure changes and concluded that it would be a mistake to reflect such changes in this context. The current cost of debt is the correct input to our calculations, not that which would exist under different conditions.

In addition to its reliance on the disproved Solomon paper and its unexplained criticism of the Miller (1977) paper, the Booth Evidence cites an illustration of the APV method in the above-cited Brealey and Myers textbook as evidence that “In this case, Professor Myers, who Dr. Kolbe references throughout his testimony, clearly believes in the tax advantages of debt.” One can only assume that Prof. Booth’s tongue is firmly in his cheek in this quotation, since textbooks routinely use simplified numerical examples to teach a technique without holding that the results of the example are perfectly general. For
D. BOOTH EVIDENCE RELIANCE ON SELECTED REGULATORY DECISIONS RATHER THAN THE CAPITAL STRUCTURE LITERATURE

Q16. On what regulatory decisions does the Booth Evidence rely?

A16. It has numerous citations in this area to the Alberta Energy and Utilities Board ("AEUB"), as well as some to this Board. It appears to be particularly fond of a citation from AEUB decision U99099, which it says on p. 74 states that the AEUB concluded it would be "derelict in its statutory responsibilities to recognize market capitalization ratios that are derived from a market value capitalization that deviates from the intrinsic long-run value of the regulated firm."

Q17. What is your reaction to these citations?

A17. I have four comments. First, I would submit that if the Booth Evidence could refute my conclusions by citing scholarly research performed by financial economists, it should have done so. My evidence includes an extensive discussion of the financial literature, which I believe solidly supports my procedures. The Booth Evidence does not challenge that evidence on its own terms.

Second, Section IV of my Appendix B, which runs from p. B-24 to B-32, explicitly discusses the issues that arose in the U99099 decision, which appears to have been based in part on what amounted to expert evidence introduced for the first time in the record, I explicitly asked Prof. Myers about the above quotation from the Booth Evidence, and he indicated that it was not his view that debt conveyed significant tax advantages and he did not see how such a claim [if made seriously] could be squared with his publications.
post-hearing argument. The Booth Evidence does not mention that discussion at all. I believe that that discussion addresses the principal concerns raised by the AEUB.

Third, I would note that the “intrinsic long-run value” cited in the above quotation is book value, as indicated by another quotation to the U99099 decision on p. 74 of the Booth Evidence:

“The Board observes that the intrinsic long-run value of a pure play regulated entity is best represented by book value. In other words, the present worth of future regulated earnings, discounted at the allowed return, is by definition equal to book value assuming achieved regulated earnings on average equal allowed regulated earnings. Accordingly, the Board considers that book capitalization represents the best indicator of the long-run market capitalization for a pure play regulated firm.”

Section II of this reply evidence shows that the market-to-book ratio test of the adequacy of a utility’s returns is inconsistent with any reasonable value for its cost of equity and has been disproved by actual market behavior.

Finally, I would note that if regulatory decisions by other bodies rather than the findings of the economic literature are to be the arbiter of this Board’s decisions about capital structure principles, there are plenty of examples that contradict those the Booth Evidence cites.\(^{50}\) Other countries learned late that private ownership with public
oversight is more efficient than public ownership. As a result, they were able to design regulatory procedures from scratch, with the full benefit of access to the modern financial research and the experience of other countries in mind.\(^{51}\)

E. INCORRECT CLAIM THAT MY EVIDENCE RELIES ON THE 1977 MILLER MODEL

Q18. What does the Booth Evidence claim to be the basis of your capital structure procedures?

A18. At p. 85, the Booth Evidence claims that “the flat ATWACC approach of Drs. Kolbe and Vilbert is essentially the 1958 M&M model as extended to include corporate and personal taxes by Miller (1977).”

Q19. Is this claim correct?

A19. No, and it is hard to see how my evidence could be so badly misread. The 1977 Miller model is a purely tax-based model in which the personal tax disadvantage of debt fully

50 (...)continued
Decision on the Proposed Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline, Independent Gas Pipelines Access Regulator Western Australia, 23 May 2003. In New Zealand, the Commerce Commission has recognized the necessity to use market value weights quite explicitly for many years. For example, the Treasury’s handbook, “Estimating the Cost of Capital for Crown Entities and State-Owned Enterprises” (October 1997) recognizes the need for market weights. Recent regulatory reports confirm that the Commerce Commission continues to use and advocate the use of market weights for determining the WACC. See, for example, Final Report Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, 6 August 2002, Gas Control Inquiry, Draft Framework Paper, July 16, 2003; and Regulation of Electricity Lines Businesses, Targeted Control Regime, Draft Assessment and Inquiry Guidelines (Process and Analytical Framework), 7 August 2003.

51 Please note that I am not recommending that the Board adopt the regulatory frameworks these other boards use, merely that it take notice of the fact that there are numerous regulatory decisions that reach different conclusions regarding capital structure principles from those in the decisions that the Booth Evidence cites.
Q22. Why does Dr. Booth characterize the equation as having the “advantage” of the largest possible leverage effect?

A22. He doesn’t say.

Q23. In any case, is the statement that the flat ATWACC equation provides the maximum possible leverage effect correct?

A23. No, unless one considers only the papers mentioned in the Booth Evidence’s inadequate review of the capital structure literature (see part D of this section, above). It is clearly not true given the overall findings of the literature. In particular, if the ATWACC has any sort of “U” shape (e.g., Dr. Booth’s graph on p. 93, which imputes far more tax advantage to debt than could ever occur in reality, or the more realistic Figure B-3 on p. B-12 in my written evidence), the cost of equity will increase faster than it would if the ATWACC were flat, at every capital structure to the right of the bottom of the “U.”

This topic is addressed in detail in the response to interrogatories in Exhibit J2.08 in this proceeding, particularly in part (f).

---

19 Nor is it possible that the ATWACC increases only because the cost of debt increases. This was the mistake in the Solomon paper that Dr. Booth cites.

20 I will not repeat that discussion here, since it is already part of the record in this proceeding. But for completeness, I will incorporate that discussion herein by reference. It, like the appendices to this reply evidence, should be considered to be part of my reply in this proceeding.
F. INCORRECT CLAIM THAT MY EQUATION FOR THE INTERACTION BETWEEN THE COST OF EQUITY AND CAPITAL STRUCTURE PRODUCES THE HIGHEST POSSIBLE CHANGES

Q20. How does the Booth Evidence characterize the equation you use to quantify the way the cost of equity changes with debt?

A20. It claims at pp. 85-86 that:

However, a flat ATWACC does have the advantage that it gives the largest possible leverage effect, that is, the coefficient on the market valued debt equity ratio in the equity cost equation is as large as possible.

A similar claim is made at p. 89.

Q21. Why does the Booth Evidence characterize the equation as having the “advantage” of the largest possible leverage effect?

A21. It doesn’t say.

Q22. In any case, is the statement that the flat ATWACC equation provides the maximum possible leverage effect correct?

A22. No, unless one considers only the papers mentioned in the Booth Evidence’s inadequate review of the capital structure literature (see Section C above). It is clearly not true given the overall findings of the literature.

Q23. Please explain.
A23. The last paper the Booth Evidence mentions is Prof. Miller’s 1977 Presidential Address to the American Finance Association. Of the purely tax-based theories of capital structure, the model implied by that paper does have the fastest changes in the cost of equity as capital structure changes.

However, Figure 9 on p. 45 of my direct evidence and the associated discussion on pp. 43-44 make clear that in reality, the cost of equity will sometimes increase faster than the flat ATWACC model implies. This will happen whenever additional debt decreases the value of the firm, i.e., anywhere to the right of the absolute minimum value for the ATWACC curve. The Booth Evidence’s assertion to the contrary is simply incorrect.

G. INCORRECT IMPLICATION THAT MY PROCEDURES IGNORE NON-TAX COSTS TO DEBT

Q24. What does the Booth Evidence say regarding non-tax costs of debt and the flat ATWACC equation?

A24. At pp. 16-17, it notes that the Board in RH-2-94 discussed the formal tax-based models of capital structure and held that they ignored the non-tax costs of debt. It also states that the cost of equity equation derived from the flat ATWACC equation gives the highest possible leverage adjustment (a claim rebutted in the previous section) “because the debt cost is after tax and there are no explicit offsetting costs in the model, yet the WACC is somehow held constant.”

53 Booth Evidence, p. 88.
Q25. What is your reaction to these statements?

A25. First, as noted above in Section E, my procedures do not rely on any of the purely tax-based models. Detailed discussions of the non-tax costs of debt in my direct evidence and Appendix B underlie the findings on which I rely. Therefore, the Board’s quoted comment from RH-2-94 does not apply to my evidence.

The second statement is puzzling. If it refers to the 1977 Miller paper, Prof. Miller’s insight was that if personal and corporate tax rates had the right values, the personal tax disadvantage to debt could fully offset its corporate tax advantage. The Miller (1977) version of the flat ATWACC equation is intrinsically a model of no net tax advantage. The ATWACC is held constant precisely because debt has no net tax advantage. There is no need for risky debt to achieve this outcome, only for the tax rate conditions described at pp. B-7 to B-11 of my Appendix B (right before my discussion of the non-tax effects of debt). The Booth Evidence’s statement seems to say that the Miller model could not achieve this result without the assumption that debt is risky. If so, that plainly is wrong.

Q26. Do your procedures imply that you assume no “offsetting costs” to the tax advantage to debt?

A26. No, not at all. As discussed above, much of my Appendix B directly addresses the fact that the costs of excessive debt eventually offset the tax advantage to debt. As also noted, part of that appendix calculates the maximum tax advantage debt could have in Canada given actual corporate and personal tax rates. That net advantage remains positive, although it is quite modest. If I were ignore the offsets to the tax advantage to debt, I
would use a different equation to relate the cost of equity and capital structure, not the one about which this passage complains.

Q27. Are you aware of any possible explanation for the Booth Evidence’s statements in this passage?

A27. It may have a procedure in mind that is different from the one we actually use. The very next part of this discussion, in the same paragraph, returns to its mistaken numerical example, which, as shown above, misinterprets both our procedure and the way capital markets reflect financial risk in the cost of equity. It again (wrongly) suggests that the procedures I recommend would produce a higher overall return than hypothesized as correct in its example. But regardless of the reason, this passage remains puzzling. Read literally as a statement about the Miller (1977) model, it is plainly incorrect.

H. BOOTH EVIDENCE CHARACTERIZATION OF THE WAY REGULATION WORKS INCONSISTENT WITH THE EVIDENCE

Q28. What does the Booth Evidence say about regulatory risk in the context of capital structure principles?

A28. At p. 79, it asserts,

In the example, the equity is obviously riskier at ... a market to book of 1.36X than it is at ... a market to book of 1.0X. This is because it is highly unlikely that the regulator will cut the allowed ROE when the stock is trading at book value. In contrast, the higher the market to book ratio the more likely the regulator will cut the allowed ROE and thus the riskier the stock. In contrast, Drs Ko[ll]be and Vilbert would have us believe that the equity in a regulated firm is less risky when it is trading at a market to book well above 1.0, since the debt ratio is lower. I don’t accept this.
First, that is not what I say. I (and a great deal of financial research) say that for the same business risk, the firm will be more risky at a lower market-value equity ratio. It is the Booth Evidence that links this statement to the market-to-book ratio, not me. Second, even if the Booth Evidence’s characterization of the way rate regulation works were right, and even if investors were too blind to see the cut coming, the reason the utility’s risk would be higher in such circumstances would have nothing to do with financial leverage, it would be based on regulatory risk. That says nothing about the impact of market-value capital structure on the level of financial risk. The Booth Evidence’s conclusion is a complete non sequitur.

I. FINANCIAL RISK DEPENDENT ON MARKET VALUES, NOT BOOK VALUES

Apart from the market-to-book ratio passage, on what does the Booth Evidence’s discussion say financial risk depends?

The Booth Evidence addresses this issue in several places. Specifically, the Booth Evidence at pp. 15-17 argues that the accounting relationships between book capital structure and either book net income or the variability of book net income provide all the information the Board needs to set capital structure. It makes a related statement on p. 81, where it says that the accounting relationship among the return on equity, the cost of debt and capital structure says “nothing about how the stock market reacts to financial risk, that is, how market values change, or how the cost of equity changes as the firm uses debt.” (Italicized, boldface emphasis in the original.)
Q32. What is your reaction to these statements?

A32. It is hard to see how the accounting relationship among net income and interest expense can have no impact at all on the stock market, since future equity cash flows will be influenced by that interaction in future years. For example, is the Booth Evidence claiming that the market will take no notice if a company has so much debt that it will regularly have trouble making its interest payments out of operating income (i.e., will have regularly have negative net income)? The lack of a one-to-one correspondence between accounting values and market values does not mean quantities measured by accounting values have no relationship at all with quantities measured by market values.

Nor is a view that financial risk is solely a function of book income statements and balance sheets consistent with either the financial literature or everyday experience. The cost of equity depends on the risks equityholders bear. Financial risk is the extra risk that equityholders bear when firms issue debt. The cost of equity is measured in the market, not on the books. Therefore, a proper analysis of the impact of financial risk on the returns equityholders require must measure that risk in the market, using market values. The contrary view, that financial risk is a book phenomenon, is plainly contrary to standard financial theory and practice.

Q33. What other comments does the Booth Evidence make on this topic?

A33. It says immediately after the quotation on risk and the market-to-book ratio, still on p. 79, 85

---

56 Recall the example in Section III of my amended direct evidence of how the variability of the market value of the equity in a condo varied with the size of the mortgage.

57 Among other problems, book relationships cannot contain enough information properly to assess required returns in the market, since the market looks ahead, not merely at current and past book relationships.
Second and more significant, the financial leverage risk premium stems from the imposition of fixed interest charges. That is, prior to receiving their equity return the firm has to pay these interest charges. This risk does not change as the market value of the firm changes; it only changes as the book debt equity ratio changes.

Q34. Is this correct?

A34. No, it is flatly wrong. The passage appears to forget that equityholders’ return comes in the form of capital gains as well as current dividends.

Changes in market values are a major source of the realized risks equityholders face. If a company has a market value of $10 million in equity and $10 million in debt, or $20 million total, and if the value of the enterprise falls 10 percent to $18 million, equity absorbs the (vast majority of) $2 million loss. The rate of return on equity is -20 percent ($-2 million/$10 million). However, suppose another, otherwise identical company has a market value of equity of $15 million and of debt of $5 million, for the same total enterprise value of $20 million. Suppose the same forces make the value of that enterprise decline by 10 percent to $18 million, also. In this case, equity “only” must absorb a 13.3 percent loss ($-2 million/$15 million), not 20 percent. Note also that the impact on the equityholders of the two firms is unaffected by the firms’ book capital structures, which we could assume to be identical without changing the example at all.

---

58 As the market-value equity ratio declines, decreases in the value of the enterprise begin to be absorbed in part by debt, since there is less equity left to provide a cushion. However, the majority of the risk falls on equity, and adding an adjustment for the impact on debt would complicate the example without changing the conclusion.
In short, changes in the market-value capital structure directly affect the sensitivity of the equity return to changes in the value of the enterprise. The level of the financial risk equityholders bear therefore depends directly on market values.  

Q35. Why didn’t you point this out in your direct evidence, so the Booth Evidence could respond directly to it?  

A35. I did discuss this effect in my direct evidence, at pp. 30-33, particularly as illustrated in Figure 6 on p. 32. The Booth Evidence does not address this discussion at all, it merely asserts the contrary.  

Q36. Does the Booth Evidence make an offer of proof for its contrary assertion?  

A36. It offers a quotation from Standard and Poor’s at p. 79-80:  

Similarly ratios using market value of a company's equity in calculations of leverage are given limited weight as analytical tools. The stock market emphasises growth prospects and has a short time horizon; it is influenced by changes in alternative investment opportunities and can be very volatile. *A company's ability to service its debt is not affected directly by such factors* [Emphasis added by the Booth Evidence.]  

The Booth Evidence interprets this passage to imply,  

That is, S&P is basically saying book value leverage is important, when it is assessing the default or credit risk in debt, whereas market values don't count, or at least don't count as much. If it is book values and interest

---

59 Note that this conclusion holds true regardless of the “true” model or models of stock prices. Whatever the reason the market value of a firm’s assets might decline, the impact of that decline will fall (primarily) on equity, not debt. The greater the proportion of debt in the market value of the assets, the bigger the proportionate fall in the market value of the equity.
payments that affect credit risk and the cost of debt then this is the risk that also affects utility equity investors.

Q37. Is this a reasonable interpretation in the context of whether market values affect the amount of financial risk equityholders bear?

A37. No, the quotation could hardly be less relevant. First, the quoted passage does not say anything at all about book-value leverage. That is the Booth Evidence’s addition (or at the very least, it is based on material it does not quote with the rest of the passage).

Second, and more fundamentally, S&P in the part of this passage that the Booth Evidence emphasizes is focusing on whether bondholders can count on the company to service debt, not on the financial risk equityholders bear. The market-value volatility of which the passage speaks definitely will affect equityholders, whether or not the company can service its debt. The passage expresses no opinion at all about whether the amount that equity would be affected would be different if the market debt-equity ratio were different. That topic never comes up.

Therefore, the passage has no meaning at all for the issue of whether market value capital structures affect the degree of financial risk equityholders bear.

J. MY PROCEDURES TO CALCULATE APPROPRIATE DEEMED EQUITY RATIOS REASONABLE

Q38. What does the Booth Evidence say about the fact that your procedures focus on the deemed equity ratio, not the ATWACC and cost of equity it spends most of its time discussing?
Tab R-Booth 2: Booth Evidence in EB-2005-0520
UNION GAS

EB-2005-0520
BUSINESS RISK AND CAPITAL STRUCTURE

FOR UNION GAS LIMITED

Evidence of Laurence D. Booth
on behalf of
the Consumers Council of Canada, the Industrial Gas Users’ Association and the
Vulnerable Energy Consumers Coalition

Before the

Ontario Energy Board

April 2006
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>i</td>
</tr>
<tr>
<td>1.0 Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2.0 Regulatory Tools</td>
<td>5</td>
</tr>
<tr>
<td>3.0 Business Risk</td>
<td>26</td>
</tr>
<tr>
<td>4.0 Financial Risk</td>
<td>45</td>
</tr>
<tr>
<td>5.0 Weighted Average Cost of Capital</td>
<td>70</td>
</tr>
<tr>
<td>6.0 Financial Leverage Adjustments</td>
<td>85</td>
</tr>
</tbody>
</table>
than BBB credit. Spreads on Canadian utility and pipeline debt over the last several years reflect normal cyclical concerns and do not indicate that the market has re-evaluated the regulatory protection accorded utility and pipeline debt in Canada.

- Notwithstanding the above, there is no guarantee that in the future Union’s debt costs may not reflect its ownership structure and S&P BBB bond rating. In my judgement the BCUC has taken the right steps in ensuring that Terasen Gas (BC Gas Utility) be ring fenced on its indirect acquisition by Kinder Morgan Inc (KMI). Ring fencing, or structural insulation as S&P refers to it, allows an operating subsidiary to have a bond rating that reflects its risk rather than that of its parent. If this is not done there is always the possibility that the company’s cost of debt includes an “unfair and unreasonable” charge due to its risky parent.

- In my judgement the most significant change in Union’s risk since 2004 has occurred due to its ownership rather than its business risk. When the Board agreed to Union’s requested 35% common equity ratio in its 2004 decision Union had an A- S&P bond rating, now it is BBB. It is unfair and unreasonable to ratepayers that Union’s common equity ratio be increased because of its ownership structure.

- In terms of the ATWACC approach used by the company’s witnesses I would point out the fundamental contradiction in its use in regulatory filings in that it is the mirror image of shareholder value maximisation. That is, earning more than the WACC is synonymous with the creation of shareholder value, whereas the Board’s responsibility is not to create or maintain shareholder value, but to ensure that rates are fair and reasonable. The Alberta EUB felt it would be “derelict” in its responsibilities to recognise market capitalisation ratios, an assessment I agree with. In my judgment setting the equity ratio or ROE implicitly by using the (AT)WACC approach can “rubberstamp” existing market values that may in turn reflect unfair and unreasonable rates. I therefore see absolutely no value to its introduction into a regulatory setting.

- Leverage adjustments should be made when a Board sets both the allowed ROE and the common equity ratio. In this way the Board makes sure that it does not “double count” the impact of changes in business risk. For example, Union has traditionally been regarded as riskier than Enbridge Gas Distribution Inc (Consumers) with a premium over EGDI’s ROE of 15-25 basis points. Allowing Union an additional 5% on its common equity ratio effectively increases this premium ROE over EGDI.

- My recommendation is to ignore the ATWACC approach entirely and continue with best regulatory practise in Canada and set Union’s common equity ratio based on its business risk and an assessment of its financial flexibility and capital market access.
The procedure is essentially that Dr. Vilbert estimates this ATWACC using market value weights and costs for the sources of financing and Dr. Kolbe then implies a deemed common equity ratio, which when combined with the allowed ROE gives the same ATWACC as that estimated by Dr. Vilbert.

In my judgment this approach has no merit for determining either the allowed ROE or common equity ratio for a regulated utility. Further this was also the judgment of the Alberta Energy and Utilities Board (U99099, Vol 1, page 303) when it commented on similar ATWACC testimony presented by Drs. Kolbe and Vilbert on behalf of TransAlta Utilities. The Alberta EUB stated

“The Board would be derelict in its statutory responsibilities to recognize market capitalization ratios that are derived from a market value capitalization that deviates from the intrinsic long-run value of the regulated firm. For example, if the Board has traditionally set an allowed equity return based on book equity and this has resulted in a equity market capitalization which is considerably above a ratio of one, an ATWACC based on market capitalization ratios would call for a higher composite return. Circularity could then develop in the process. To the extent that the higher return was granted, the equity market capitalization would in all probability rise even further which, if it went outside the narrow middle range, would again call for a higher ATWACC. The Board must ensure that this potential circularity is avoided.

For all of the above reasons, the Board rejects the concept that an ATWACC determined using market capitalization ratios of sample regulated firms is directly transferable to the book assets of a regulated firm when the common equity market to book ratio significantly exceeds the debt market to book ratio. In these situations, the direct transfer of an ATWACC weighted with market capitalization results in a higher return than a return determined using book capitalization weightings. The danger is that the higher ATWACC return does not meet the regulatory and legislative test of fairness.

Accordingly, the Board finds it necessary to reject TransAlta’s version of the ATWACC model which proposes the use of market capitalization ratios. Accordingly, the Board considers that it should place primary weight on the traditional method in the development of a fair return for these proceedings.”

In the Alberta EUB generic cost of capital hearing four years later, NGTL sponsored similar ATWACC testimony by Drs Kolbe and Vilbert, but this time NGTL backed off from the ATWACC approach. In its decision (U2004052, page 16) the Alberta EUB noted the following exchange with Mr. Brett (of NGTL)
“The Board is of the view that the determination of a pipeline’s capital structure starts with an analysis of its business risk. This approach takes root in financial theory and has been supported by the expert witnesses in this hearing. Other factors such as financing requirements, the pipeline’s size and its ability to access various financial markets are also given some weight in order to portray, as accurately as possible, a complete picture of the risks facing a pipeline.”

I agree with this assessment, since it follows the prior discussion of the impact of financial leverage. To repeat the previous financial leverage equation

\[ \text{ROE} = \text{ROI} + [\text{ROI} - R_d(1 - T)] \frac{D}{S} \]  

(2)

If this equation is rearranged we can express the variability of the ROE as a function of the variability in the operating income or

\[ \text{STDEV(ROE)} = \text{STDEV(ROI)} * (1 + \frac{D}{S}) \]  

(3)

where the standard deviation of the realised ROE is that of the realised ROI times one plus the debt equity ratio. Consistent with the previous discussion, if business risk is the variation in the ROI, then financial leverage as measured by the debt-equity ratio magnifies this risk.

The National Energy Board then took the next step of equalising the risk to the equity holders \((\text{STDEV(ROE)})\) by offsetting business risk differences \((\text{STDEV(ROI)})\) with different capital structures (debt equity ratios). After doing this they then allowed every pipeline the same formula allowed ROE. Further, this is also why they recently increased the TransCanada Mainline’s deemed common equity ratio from 30% to successively 33% and 36%. In both cases it was in response to a perception of increased business risk due to supply concerns in the Western Canadian Sedimentary basin (WCSB) and the entry into service of the Alliance pipeline, both of which have caused the load on the Mainline to drop below 100%. The important point is that once this perception of increased risk had been adjusted for by reducing the Mainline’s financial risk, the Mainline could continue to be allowed the NEB formula ROE.
It is important to note that the above equation is based on the firm’s financial statements. It is an accounting relationship that has *nothing* to do with how the stock market reacts to the firm’s use of financial leverage. As far as I know no-one has ever disputed the above equations, as they are simply a rearrangement of the flow of income through a firm’s financial statements. That is, the ROE is *not* the investors cost of equity capital or required rate of return. It is simply the ROE earned on the book value of the shareholder’s equity. Using these relationships is consistent with the fact that the Board can only control these accounting values. The Board can alter business risk through the use of deferral accounts and the financial risk through changes in the deemed equity ratio, but it can not change stock market risk, as the market, not the Board, determines market values.

This last point should be emphasised: the financial leverage equation is *not* equivalent to the formulae used by Dr. Kolbe. Dr. Kolbe’s equity cost adjustment formulae are based on assumptions about how the stock market values the use of financial leverage. Unlike the financial leverage equation, the equations used by Dr. Kolbe attempt to answer the question how does the investor’s required rate of return or cost of equity capital change with a change in the use of debt? It is not necessary for the Board to answer this question or even consider it when changing the deemed common equity ratio in response to a change in business risk.

To illustrate when the NEB set up its regulatory system in RH-2-94 several experts submitted testimony on how the allowed ROE should change as the capital structure changes along the lines of the current testimony of Drs. Kolbe and Vilbert. Dr. Sherwin and Ms. McShane, who provided testimony on behalf of the companies, and who have testified before this Board many times concluded (page 24)

> “The finance models, even when adapted to the real world of Canadian utility regulation, cannot provide the basis for determining a pipeline’s optimal capital structure.”

Dr. Berkowitz and I also used models similar to those used by Dr. Kolbe, but expressed little support for them. As the NEB noted in its Reasons for Decision (page 24):
“Dr. Booth and Berkowitz concluded that these estimates are approximately the increases in ROE required by investors. However, they noted the estimates are subject to error since they are based on valuation formulas, which are as yet unproven. Moreover, they noted that these formulas ignored the non-tax advantages of debt financing and the effects of financial distress.”

Finally, the NEB also noted Dr. Waters’ testimony (a frequent witness before the NEB at that time) where he indicated that “To date empirical testing to more clearly describe the relationship (between capital structure and the investors required return) has not been done successfully.”

The NEB’s summary from over ten years ago is an accurate assessment of my views today and it is still my judgment that the misgivings expressed by expert witnesses over ten years ago continue. Despite the seeming precision of the estimates provided by Drs. Kolbe and Vilbert no other expert witnesses have based their testimony on this approach, since the views of most experts is that it can not be done accurately. In its Decision on EBRO 493/4 (page 198) the Board stated that

“The Board finds Union’s capital structure, which recognises changes in preference share capital, tax accounting, and includes a 34% common equity component as recommended by the ADR settlement agreement to be appropriate for the 1997 test year. Should the LGIC approve the companies’ merger application, the Board expects Union and Centra to fully justify from first principles, in the 1998 rates case, the proposed capital structures of the amalgamated companies.”

Professor Berkowitz and I provided testimony in the subsequent case, along with Dr. Cannon and Ms. McShane. This was done largely on the basis of business risk assessments and I would recommend that the Board continue to make its capital structure decision changes based on changes in business risk.
earnings, discounted at the allowed return, is by definition equal to book value
assuming achieved regulated earnings on average equal allowed regulated earnings.
Accordingly, the Board considers that book capitalization represents the best indicator
of the long-run market capitalization for a pure play regulated firm.”

It is difficult to see how a regulator could say anything other than what the EUB stated above,
since to accept a market to book much above 1.0 is in effect to rubberstamp unrealistic investor
expectations or to admit that allowed ROEs are too high. The EUB further recognised this
when it went on to say (U99099, page 303)

“The Board would be derelict in its statutory responsibilities to recognize market
capitalization ratios that are derived from a market value capitalization that deviates
from the intrinsic long-run value of the regulated firm.”

This is the clearest possible statement by a regulator of the fundamental grounds for rejecting
ATWACC and its emphasis on market values.

Further the EUB went on to say

“In essence, a regulated company’s earnings are driven by the portion of the original
cost rate base deemed to be financed by common equity. This fact results in a
fundamental disconnect to the theory that market capitalization ratios, which have
deviated significantly from book capitalization ratios, reflect the appropriate financial
risk necessary to determine a fair composite return to be applied to the original cost rate
base of a pure play regulated utility. This is because the earnings of a pure play
regulated utility are governed by and driven by the regulated return allowed on book
equity. In other words, it is the book equity that reflects the appropriate financial risk
necessary to determine a fair composite return for a pure play regulated utility.”

This means that the correct financial risk measure is that which I discussed earlier under
financial leverage. It is also the approach pioneered by the National Energy Board, where
financial risk adjustments using the deemed common equity ratio are made for differences in
business risk.

The EUB went on to calculate an ATWACC using regulated book value capital structure
weights and the embedded debt costs. In this case (Decision U-99099, page 303)
itself is wrong for two reasons.

First, if the regulated firm is earning approximately the same allowed ROE and has the same capital structure, there is no reason to believe that its implicit market valued equity ratio is any different from that of the sample. That is, the non-traded regulated firm in all likelihood has an implicit market valued debt ratio the same as those of the sample firms, so there is no leverage difference that needs to be adjusted for. Further allowing a higher ROE just increases the market value of the equity, causing the market valued debt ratio to drop further, creating an even bigger internal contradiction.

Second it is important to remember that in the example the market valued debt ratio fell not because the firm substituted equity for debt and reduced the amount of fixed interest payments and financial risk, but because the equity cost fell. This is the reality of the declining interest rate scenario we have lived with since 1981 and the effect of a persistent decline in equity costs coupled with regulatory lag. However, there is a big difference between the impact of substituting equity for debt in a regulated capital structure and an increase in equity value as a cause of the fall in the market valued debt ratio.

In the example, the equity is obviously riskier at $6.818mm and a market to book of 1.36X than it is at $5mm and a market to book of 1.0X. This is because it is highly unlikely that the regulator will cut the allowed \textit{ROE} when the stock is trading at book value. In contrast, the higher the market to book ratio the more likely the regulator will cut the allowed ROE and thus the riskier the stock. As a result when equity costs are estimated from a sample of firms with higher market to book ratios the estimates should be reduced when applied to the regulated firm to remove this “capital gains” risk premium. However, in stark contrast Drs Kobe and Vilbert would have us believe that the equity in a regulated firm is \textit{less} risky when it is trading at a market to book well above 1.0, since the debt ratio is lower. As a result they would increase the equity cost when applied to the regulated firm. I don’t accept this since it defies common sense.

Second and more significant, the financial leverage risk premium stems from the imposition of
fixed interest charges. That is, prior to receiving their equity return the firm has to pay these interest charges. This risk does not change as the market value of the firm changes; it only changes as the book debt equity ratio changes. For example, if Union Gas moved to a 60-40 debt equity ratio in terms of book amounts, then there would be less interest expense. Consequently, the financial risk, both to the bond-holder and the stock-holder, would decline and with them both the debt and equity costs. In this case, a leverage adjustment would indicate a lower equity cost, since the financial risk has declined. As Standard and Poors have stated,

“Similarly ratios using market value of a company’s equity in calculations of leverage are given limited weight as analytical tools. The stock market emphasises growth prospects and has a short time horizon; it is influenced by changes in alternative investment opportunities and can be very volatile. A company’s ability to service its debt is not affected directly by such factors (italics added).”

That is, S&P is basically saying book value leverage is important, when it is assessing the default or credit risk in debt, whereas market values don’t count, or at least don’t count as much. If it is book values and interest payments that affect credit risk and the cost of debt then this is the risk that also affects utility equity investors.

Following on from the Alberta EUB’s decision that to accept market value weights would be a “dereliction” of duty, the obvious implication is that the weights in the sample WACC should also be book value weights. In my example this means that the regulated book value of 50%, rather than the market value debt ratio of 42.3% is what matters. Hence in comparing this 50% regulated debt ratio with the firm in hand that also has 50% debt ratio means that no adjustment is necessary. Making an adjustment based on market values is then inappropriate for a regulated firm. As the EUB again noted (Decision U99099, page 301)

“the Board considers that beta and the cost of equity do not change to the extent necessary for an ATWACC, determined from market capitalization weights, to remain constant when applied to the book capitalization for a pure play regulated utility. The increase required to the cost of equity to achieve a constant ATWACC would be excessive and violate the fair return standard.”

It is my judgment that the only time a leverage adjustment is needed is either when a firm’s risk differs from that of a sample of regulated firms from which an ROE estimate is derived, or
when its business risk has changed and the Board wants offset this change so it can continue to
award a formula allowed ROE. In these cases, as I indicated earlier, in my judgment the
literature has not reached “closure” on how to make leverage adjustments and the Board is best
advised to base its decision on the business risk of the firm and its access to financial markets.
These are the factors discussed in Sections 2.0, 3.0 and 4.0..

Q. SUPPOSE THE BOARD FEELS THAT A LEVERAGE ADJUSTMENT BASED
ON MARKET VALUES IS NECESSARY DO YOU AGREE WITH
DR.KOLBE’S ADJUSTMENT METHOD?

A. No. Again, it is well accepted that financial risk magnifies business risk. The basic
financial leverage equation indicates that the accounting return to the stockholder is determined
as follows

\[ ROE = ROI + (ROI - R_d) \frac{D}{S} \]

(2)

where these are all book values, that is, \(D\) and \(S\) are the book values of debt and equity and \(R_d\)
is the embedded cost of debt. The equation simply comes from manipulating the firm’s
financial statements. It means, for example, that with a fixed stock of assets, as revenues and
the \(ROI\) changes, then the greater the amount of debt the greater is the variation in the
accounting return to the stock holders. However, the above equation says absolutely nothing
about how the stock market reacts to this financial risk, that is, how market values change, or
how the cost of equity changes as the firm uses debt.

To understand how the investor’s required rate of return or equity cost varies with the use of
debt we need a valuation model. The first valuation attempt was by Franco Modigliani and
Merton Miller (M&M) who in 1958 developed an arbitrage model to show that the total
enterprise value was independent of the use of debt. This was their famous “no magic in debt
argument.” If individuals can borrow on the same terms as the firm, then investors will not pay
a premium for firms that use debt, since the firm is not adding value. Consequently, they
derived the following formula
\[
K_e = K_0 + (K_0 - K_b) \frac{B}{E}
\]  
(10)

where the \(K\)'s indicate the cost of equity and debt, not accounting returns, and \(B\) and \(E\) represent the market values of debt and equity respectively. The subscript 0 then indicates what the equity cost would be if the firm had no debt outstanding, which is often referred to as the unlevered equity cost.

Note two things about this equation. First, apart from redefining returns and debt ratios, in form it is the same as the leverage equation I used earlier. This is because in the accounting model total assets are fixed, whereas in this valuation model M&M “proved” that the value of the firm was fixed. As a result, changes in the book and market debt ratios have the same impact. Second M&M “proved” that as the market value was constant the weighted average cost of capital was also constant, which in this case means that it is equal to the unlevered equity cost. However, note that I italicised “proved,” since this was a mathematical proof that followed from their assumptions, not a description of reality.

In the M&M equation changes in the market valued debt equity ratio \((B/E)\) are multiplied by the spread between the WACC and the cost of debt. It is this coefficient that determines how much changes in the debt equity ratio affect the equity cost since it is this coefficient that determines the risk. This is the important point: people who believe that changes in the debt equity ratio have a big impact on the equity cost believe that the coefficient on the market valued debt equity ratio is high and vice versa.

However, the overall market value in the M&M model is only fixed by their assumptions. To emphasise, remember that from equation (9)

\[
V = \frac{\text{After-tax operating income}}{WACC}
\]

The total firm value is after tax operating income divided by the after tax WACC. Given that M&M were discussing capital structure not operating changes, the after tax operating income, the numerator above, is by definition constant. What M&M “proved” was that with firm value
constant the WACC must also be constant. In this case, given that the WACC is a weighted average of the debt and equity costs, the equity cost has to increase with more debt to offset the impact of more “cheaper” debt. This is what equation (10) indicates.

However, if the market value increases with more debt then from equation (9) the cost of capital will decrease and vice versa. In this case, the equity cost may then increase or possibly even decrease with the use of debt, it all depends on the valuation model and the assumptions that are made. The critical question is how the use of debt affects the overall firm value; the impact on the WACC and the equity cost then follow directly.

M&M’s “no magic in debt” result was controversial in 1958 and remains so today. This is because of the assumptions required to “prove” their result. The most important are that:

- there are no taxes of any kind;
- there are no transactions costs;
- there are no information asymmetries between borrowers and lenders;
- everyone can borrow on the same terms, that is, if the company can issue 25 year bonds or access the swap market, then so too can other individuals;
- all firms are perpetuities that pay out 100% dividends;
- there are no bankruptcy or financial distress costs;
- there are two or more identical firms with different levels of debt that can be arbitrag ed.

All of these assumptions have been disputed to a greater or lesser extent and if any of them are incorrect then the total value of the firm is affected by the use of debt. Hence, so too is the cost of capital.

M&M’s result is a classic in corporate finance and they won the Noble prize in economics for it. However, its great strength lies not in its result, which few accepted then or now, but the fact they focused corporate finance on the implications of their assumptions. For example, in 1963 they recognised that they made a mistake in their treatment of corporate income taxes and corrected their original paper. They then showed that, all else constant, the value of the firm increases due to the tax shield generated by the tax deductibility of interest payments. The
reason is simply that what we term value is the private value and by reducing corporate income
taxes the private value of the firm increases at the expense of the government. Hence from
equation (9), if the private market value increases the \( WACC \) of necessity must decline.

In fact in the M&M (1963) model the \( WACC \) declines continuously since the corporation can
issue risk free debt and the average and marginal tax advantage to debt are the same. In this
case, the equity cost changes in the following way with the use of debt,

\[
K_e = K_o + (1-T)(K_o - K_b) \frac{B}{E} 
\]  

There is still a financial leverage risk premium but it is now smaller, since the use of debt also
generates a valuable tax shield. Note that in M&M (1963) changes in the market valued debt
equity ratio are now multiplied by \((1-T)\), so are smaller than in M&M (1958). Thus assuming a
40% corporate tax rate, people who believe in M&M (1963) would estimate a leverage impact
only 60% the size of those who believe in M&M (1958).

Since 1963 all the other assumptions of M&M have been relaxed and every time an assumption
has been relaxed there is another leverage equation similar to equations (10) and (11) and
another estimate of the leverage effect. However, two main theories of capital structure have
emerged: the static trade off (STO) model and the pecking order hypothesis (POH). The STO is
a static model that assumes that firms trade off the tax advantages of using debt against the loss
of financial flexibility that arises due to excessive leverage. It is this model that develops the
familiar “U” shaped \( WACC \) function below as the firm increases its debt ratio.
Initially the $WACC$ declines due to the tax advantages of debt. In the M&M (1963) model, for example each dollar of debt increases the firm’s market value by the value of the corporate tax rate, 25 the WACC then starts to increase as the loss of financial flexibility sets in. Obviously there has to be some offset to the tax deductibility of interest, otherwise all firms would try to finance with 100% debt. The offset comes as the debt becomes riskier and has to be sold on higher and higher yields and the firm loses its financial flexibility.

In contrast, the $POH$, developed in 1963 by Gordon Donaldson at Harvard, is a dynamic model of financing based on the fact that firms are controlled by managers. In this case, firms raise capital by issuing securities that impose the least restrictions on management. Consequently, firms primarily rely on internal funds and only after these are exhausted do they go outside for capital, where then they initially rely on bank debt and bonds, rather than new equity.

I have reviewed these basic ideas on capital structure since the flat ATWACC approach of Drs, Kolbe and Vilbert is essentially the 1958 M&M model as extended to include corporate and

\[\text{The U shaped WACC}\]

\[\begin{array}{c}
\text{Significant tax advantages} \\
\text{Loss of financial flexibility severe risk of distress}
\end{array}\]

25 This simple model has been dubbed adjusted present value (APV) by Professor Myers. In Principles of Corporate Finance (2nd Canadian edition, 1991 pages 490-493 they work an example and the base case NPV of $170,000 is then increased by $592,000 by the tax advantages to debt. In this case, Professor Myers, who Dr. Kolbe references throughout his testimony, clearly believes in the tax advantages of debt.
personal taxes by Miller (1977). This is a very important model and for the last 26 years I have taught corporate financing to second year MBAs with the first five weeks devoted almost exclusively to these ideas, as well as to the implication that if this model holds there is no value to the activities of investment bankers and they should all study marketing! I then spend the balance of my course explaining how companies add value by adopting different financing decisions. The fact is that financial theory has come a long way since 1958 and is now better harmonised with practise: no one believes the flat WACC model fits reality; it is simply a good starting point to discuss how investment bankers can create value for firms.

However, a flat ATWACC does have the advantage that it gives the largest possible leverage effect, that is, the coefficient on the market valued debt equity ratio in the equity cost equation is as large as possible. I showed earlier that the M&M 1958 flat WACC model gives a bigger equity cost adjustment (equation (10)) than if the WACC declines with leverage in the conventional way (equation 11). However, assuming a flat ATWACC in the presence of corporate taxes gives an even bigger coefficient on the market valued debt equity ratio.

To illustrate assume a flat, that is, constant ATWACC. Dr. Vilbert first calculates the WACC using market value weights from his sample:

\[ \frac{K_e E}{V} + K_b (1-T) \frac{B}{V} = WACC = K_A \]

Dr. Kolbe then assumes that the WACC \((K_A)\) is constant and then either alters the equity ratio to get a new equity cost or alters the equity cost to get a new equity ratio, holding everything else

---

26 This is MGT2300. A course outline can be downloaded from my web page at http://www.rotman.utoronto.ca/~booth
27 It would be interesting to ask why investment bankers are so well paid if corporate financing decisions as represented by a flat ATWACC have no value and firms can do whatever they want.
28 Note that a flat ATWACC requires in part that personal taxation offsets the corporate tax shield, yet in J2-07 Union Gas indicated that it has never commissioned a study of its marginal investor’s tax rate and uses the conventional after tax WACC in capital budgeting. It also believes its marginal investor is Canadian even though its parent is American?
29 Note that as explained earlier the use of market values is not appropriate for regulated firms, either directly or indirectly through WACC estimates from samples of regulated firms.
constant. In terms of the equity cost, implicitly Dr. Kolbe is rearranging this \( WACC \) equation to solve for the equity cost \( (K_e) \) at any leverage ratio,
\[
K_e = K_d + (K_d - (1-T)K_b) \frac{B}{E}
\]  

(12)

If the \( WACC \) is assumed constant it has the same no leverage equity cost \( (K_0) \) as before, the only difference is that it is this cost minus the after tax cost of debt that determines the leverage coefficient. With a constant \( WACC \) this coefficient is larger than either the M&M (1958) no tax case or the M&M (1963) tax case as a simple comparison with equations (10) and (11) indicates.

The reason for the very large leverage adjustment in equation (12) is that the model is internally \textit{inconsistent}. Equation (12) and the flat \( WACC \) assumes the tax deductibility of interest which causes the \( WACC \) to fall, but there is no explicit account of the offsetting costs that negate this to keep the \( WACC \) constant. For example, if the \( WACC \) is constant it could be that as the market valued debt equity ratio increases the debt cost also increases due to the higher risk of insolvency and the costs of financial distress and bankruptcy. This would be particularly true as the firm goes to very high debt equity ratios. In this case, what is keeping the \( WACC \) constant is an increasing \( K_b \) as creditors protect themselves from the insolvency risk attached to highly debt financed firms. From the spread date in Schedule 19, we know this happens. Moreover, it is obvious from equation (12) that if the debt cost, \( K_b \), increases with the debt equity ratio then the equity cost does not increase so fast. In this case even with a flat ATWACC the equity cost increase with leverage is lower than by assuming a constant debt cost. Solomon showed this in the \textit{Journal of Finance} in 1963\textsuperscript{30} and it is also graphed on page 433 of Dr. Myers textbook. The intuition is simply that “debt” in highly debt financed firms has some of the same characteristics as equity.

\textsuperscript{30} The only reason for the cost of debt to increase is the risk of financial distress or bankruptcy, which M&M ignored in their 1958 paper. Therefore, Solomon’s result is inconsistent with the M&M assumptions. However, it is consistent with a model of bankruptcy and financial distress. Note the
Believing in a flat WACC gives a WACC and unlevered equity cost of a constant 7.4%.\textsuperscript{31} Hence the market valued debt equity ratio is multiplied by (7.4-2.5) or approximately 5.0%. This is higher than either M&M (1958) no tax or M&M (1963) with tax and gives the highest leverage adjustment. This is because the debt cost is after tax and there are no explicit offsetting costs in the model, yet the WACC is somehow held constant. Using this model the leverage adjustment would not be 36 or 92 basis points but 131 basis points to move the equity cost at the regulated debt ratio to 12.31%. If the debt cost has also increased due to the higher financial risk consistent with a constant ATWACC then this 1.31% over-estimate of the equity cost is also too high even under the constant ATWACC assumptions.

Let me make the importance of this example clear. The chain of events is that the risk of the utility has declined causing its equity cost to drop from 15% to 11%. The obvious thing that the regulator should do is cut the allowed ROE from 15% to 11%. This is also what would happen if the regulator used the EUB’s ATWACC\textsubscript{BV} approach and recognised that it would be “derelict” in using market values to rubber stamp this increase in market value. However, using the “(AT)WACC approach” avoids this drop in the ROE in two ways. The first is to go directly to the WACC with market values, which seals in the higher equity ratio and delays the drop in the allowed ROE. However, if this fails, as it has before the EUB, the second step is to argue for a leverage adjustment. Then the assumption of a flat ATWACC generates the biggest coefficient on the debt equity ratio and the largest financial leverage risk premium. This in turn provides the biggest “bump” when a sample estimate is applied to the regulated common equity ratio. In my example it would give an equity cost of 12.31%, 131 basis points higher than the true equity cost and higher than the other equity cost models as well as an internally consistent flat ATWACC model. As the example shows these assumed leverage adjustments can be very large and they are totally unnecessary.

\textsuperscript{31} 7.4\% = 11\% \times 0.577 + 5\%(1-.5) \times 0.423
Of even more importance is that the deemed common equity ratio is derived from the same assumption of a flat ATWACC that I used to derive the equity cost equation with the highest leverage effect. That is, it is the same assumption of a constant WACC that Dr. Kolbe uses to make his equity ratio recommendation that also produces the very high equity cost leverage adjustment. Note that in the example it produced an extra 131 basis points above the assumed fair 11.0% ROE. Further it is the same assumption that the EUB criticized in Decision U99099 (page 301)

“the Board considers that beta and the cost of equity do not change to the extent necessary for an ATWACC, determined from market capitalization weights, to remain constant when applied to the book capitalization for a pure play regulated utility. The increase required to the cost of equity to achieve a constant ATWACC would be excessive and violate the fair return standard.”

Consequently since Dr. Kolbe’s common equity ratio recommendation is derived from the same assumption and equations as his equity cost recommendations the comments of the Alberta EUB also apply here. To accept this approach would in the words of the Alberta EUB be a “dereliction” of duty on the part of the regulator.

Q. HAVE YOU ANY OTHER COMMENTS ON THE USE OF MARKET VALUES?

A. As I have stressed in the financial flexibility discussion, in the final analysis “fair” is determined in the stock market by the reaction of investors. If Board policies were not “fair” we would see several things. First of all I would expect to see holding companies “ring fencing” their regulated operations and selling parts to the stock market. For example, if Duke Energy believes that the Union Gas common equity ratio produced results that were not fair, I would recommend that it sell say 20% to the stock market to establish a public float. If the stock market agreed with this unfair assessment we would then see a market to book ratio below 1.0 and that would provide powerful ammunition to support a higher financial parameters. However, I have seen very few ROE regulated utilities establishing public floats in fact the reverse has happened as Consumers Gas, Island Tel, Maritime Electric etc have all ceased to exist as public entities. The elimination of publicly traded pure regulated utilities is a
Union. Spreads on Union’s publicly traded debt indicate that it trades as a better than BBB credit. Spreads on Canadian utility and pipeline debt over the last several years reflect normal cyclical concerns and do not indicate that the market has re-evaluated the regulatory protection accorded utility and pipeline debt in Canada.

- Notwithstanding the above, there is no guarantee that in the future Union’s debt costs may not reflect its ownership structure and S&P BBB bond rating. In my judgement the BCUC has taken the right steps in ensuring that Terasen Gas (BC Gas Utility) be ring fenced on its indirect acquisition by Kinder Morgan Inc (KMI). Ring fencing, or structural insulation as S&P refers to it, allows an operating subsidiary to have a bond rating that reflects its risk rather than that of its parent. If this is not done there is always the possibility that the company’s cost of debt includes an “unfair and unreasonable” charge due to its risky parent.

- In my judgement the most significant change in Union’s risk since 2004 has occurred due to its ownership rather than its business risk. When the Board agreed to Union’s requested 35% common equity ratio in its 2004 decision Union had an A- S&P bond rating, now it is BBB. It is unfair and unreasonable to ratepayers that Union’s common equity ratio be increased because of its ownership structure.

- In terms of the ATWACC approach used by the company’s witnesses I would point out the fundamental contradiction in its use in regulatory filings in that it is the mirror image of shareholder value maximisation. That is, earning more than the WACC is synonymous with the creation of shareholder value, whereas the Board’s responsibility is not to create or maintain shareholder value, but to ensure that rates are fair and reasonable. The Alberta EUB felt it would be “derelict” in its responsibilities to recognise market capitalisation ratios, an assessment I agree with. In my judgment setting the equity ratio or ROE implicitly by using the (AT)WACC approach can “rubberstamp” existing
Tab R-Kolbe 2: Kolbe Reply Evidence in EB-2005-0520
WRITTEN REPLY EVIDENCE
OF
A. LAWRENCE KOLBE
FOR
UNION GAS LIMITED

The Brattle Group
44 Brattle Street
Cambridge, Massachusetts 02138
617.864.7900

May 2006
I. INTRODUCTION AND SUMMARY .................................................. 1

II. CAPITAL STRUCTURE TOPICS .................................................. 6
   A. NET TAX ADVANTAGES TO DEBT DO REDUCE COMPETITIVE PRICES .......... 6
   B. ATWACC IS A TOOL, NOT AN OUTCOME ........................................ 9
   C. FLAWED NUMERICAL EXAMPLE .................................................. 11
   D. INADEQUATE REVIEW OF THE CAPITAL STRUCTURE LITERATURE .......... 12
   E. RELIANCE ON SELECTED REGULATORY DECISIONS RATHER THAN THE CAPITAL STRUCTURE LITERATURE ........................................ 16
   F. INCORRECT CLAIMS AND CHARACTERIZATIONS ................................ 18
      1. Not Relying on the Miller 1977 Model ....................................... 18
      2. Not the Highest Possible Level of Change .................................... 19
      3. Not Ignoring Non-Tax Costs of Debt .......................................... 21
      4. Regulation Does Not and Should Not Work as Claimed ..................... 22
   G. FINANCIAL RISK DEPENDS ON MARKET VALUES, NOT BOOK VALUES .......... 24
   H. PRINCIPLES DO WORK FOR DEEMED EQUITY RATIO ANALYSIS ............... 30

III. MARKET-TO-BOOK TEST .......................................................... 31

IV. OTHER TOPICS ........................................................................ 33
   A. ECONOMICALLY INCORRECT RETURN ADEQUACY STANDARD .................. 33
   B. MISTAKEN COMMENTS ON DR. VILBERT’S EVIDENCE ......................... 35
      1. Risk Implications of Holding Companies in Sample Groups ............... 36
      2. Unique Theory of Financial Risk ............................................... 37

APPENDIX R-A: DETAILED DISCUSSION OF DR. BOOTH’S EXAMPLE ............... R-A-1

APPENDIX R-B: ISSUES RAISED IN AEUB DECISION U99099 ................ R-B-1
   A. MEASURED ATWACC VS. THE DEBT RATIO ...................................... R-B-1
      1. Factors that Distort the Comparison ......................................... R-B-2
      2. Factors Left Out of the Measured ATWACC .................................. R-B-3
   B. MARKET VS. BOOK CAPITAL STRUCTURE WEIGHTS .......................... R-B-5
flawed example, the system would work without the problems Dr. Booth claims would arise. In reality, a WACC-based system does not generate excess compensation to investors (which evidently is also a conclusion reached by the regulatory bodies that have adopted WACC-based regulation in other Commonwealth countries).

In short, Dr. Booth’s example is internally inconsistent, inconsistent with the way capital markets work, and misinterprets my recommendations. Appendix R-A should be consulted before relying on conclusions from Dr. Booth’s example for any purpose.

D. Inadequate Review of the Capital Structure Literature

Q15. What support for his views does Dr. Booth draw from the financial literature?

A15. Very little. The discussion covers parts of pp. 89-95. The financial literature this section cites is sparse. It mentions the 1958 and 1963 papers by Modigliani and Miller, the 1977 paper by Miller, a 1963 article by Ezra Solomon, and a 1963 publication Gordon Donaldson. It identifies no study of capital structure that has been published in the last quarter-century, despite the fact that this has been and remains a very active field of research.

---

10 Actually, the passage does not include formal citations for any of the publications. The first three papers are among many that are cited in my own Appendix B. I am unaware of a relevant 1963 citation to Donaldson, although perhaps it is a version of Gordon Donaldson, Corporate Debt Capacity, Boston: Division of Research, Graduate School of Business Administration, Harvard University (1961). The Solomon paper is Ezra Solomon, “Leverage and the Cost of Capital,” The Journal of Finance 18:273-79 (May 1963).

11 An apparent but not real exception: it cites the 1991 Canadian edition of Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance, regarding the Adjusted Present Value (“APV”) approach to calculation of the value of the tax advantage to debt. However, Prof. Myers developed the APV approach in 1974: S. C. Myers, “Interactions of Corporate Financing and Investment Decisions,” The Journal of Finance 29:1-25 (March 1974). Dr. Booth also cites the third edition of the undergraduate version of the text, Fundamentals of Corporate Finance by Brealey, Myers and Marcus, (continued...
The literature summary itself consists of a brief overview of the tax-based theories of Modigliani and Miller and Miller, a mention of the static tradeoff model (referring to calculations using APV), a mention of the pecking order hypothesis (attributing it to Prof. Donaldson), and a mention that the Solomon paper showed that the cost of equity does not increase as fast if the cost of debt increases when firms add debt.

**Q16. Why do you label this review “inadequate”?**

A16. The last paper it mentions was published nearly three decades ago. It reviews none of the more recent literature explicitly, despite the fact that Prof. Booth himself has published a relevant paper that I cite in my own Appendix B. It does not address any of the empirical studies I cite as support for my conclusions on the actual effects of capital structure. Rather than directly addressing the findings of the research I report, it states Prof. Booth’s personal views and appeals to regulatory decisions rather than to the economic literature."}

(...continued)

11 published in 2001, but not as a claimed source of original research on capital structure.

12 I would also note that the Solomon paper Dr. Booth cites was shown to be erroneous shortly after it was published. (See Alexander A. Robichek and Stewart C. Myers, *Optimal Financing Decisions*, Englewood Cliffs, NJ: Prentice Hall, Inc. (1965), pp. 34-36 and 48-49; the Solomon paper wrongly claimed the cost of equity could actually decrease as the debt ratio increased.) Dr. Booth appears to say he is citing the paper not for its original, erroneous finding, but merely for the observation that if the cost of debt increases with the debt ratio, the cost of equity does not increase as fast as it would if the cost of debt stayed constant. To the best of my knowledge, this point has never been in dispute, but it still is not the point the Solomon paper attempted to make. For completeness, I would note that the facts that the risk of financial distress looms and the cost of debt increases as the debt ratio increases are in no way inconsistent with my evidence. My Appendix B goes well beyond the early models addressed in the Booth Evidence, to include explicit consideration of the costs of excessive debt. Additionally, Dr. Vilbert and I explicitly considered the effect of changes in the cost of debt as capital structure changes and concluded that it would be a mistake to reflect such changes in this context. The current cost of debt is the correct input to our calculations, not that which would exist under different conditions.
One point in this discussion that merits some emphasis is Dr. Booth’s use of the textbooks of which Prof. Myers is a co-author. Dr. Booth in footnote 25 on p. 93 cites an illustration of the APV method in the above-cited Brealey and Myers textbook as evidence that “In this case, Professor Myers, who Dr. Kolbe references throughout his testimony, clearly believes in the tax advantages of debt.” Of course, textbooks routinely use simplified numerical examples to teach a technique without holding that the results of the example are perfectly general. The view that Prof. Myers “clearly believes in the tax advantages of debt” is plainly inconsistent with Prof. Myers’s body of published research.\(^1\)

Moreover, at pp. 16-17 Dr. Booth has lengthy quotations from and discussion of the Brealey, Myers and Marcus textbook, culminating with the allegation that

> It is obvious that academics associated with the Brattle group when writing textbooks for the academic audience have no problem noting the tax advantages of debt and expounding on standard ideas in finance. Further on page 437 the Myers et al text also has the standard graph showing that the weighted average cost of capital (ATWACC in this hearing) declines as the firm uses more debt, that is, the ATWACC is not constant as assumed by Dr. Kolbe.

However, had Dr. Booth turned the page on which “the standard graph” [Figure 15.6] appears, he would have found that the very next thing the authors did, having taught the various techniques that the students needed to master, was to provide context to the models and an overview of the current state of knowledge. That summary, under the heading, 

“The Implications of Corporate Taxes for Capital Structure,” is completely consistent with
the views in my written evidence at pp. 17, B-7, and B-19 to B-29:

If borrowing provides an interest tax shield, the implied optimal
debt policy appears to be embarrassingly extreme: all firms should borrow
to the hilt. This maximizes firm value and minimizes the weighted-average
cost of capital.
[Modigliani and Miller] were not that fanatical about it. No one
would expect the gains to apply at extreme debt ratios. For example, if a
firm borrows heavily, all its operating income may go to pay interest and
therefore there are no corporate taxes to be paid. There is no point in such
firms borrowing any more.
There may also be some tax disadvantages to borrowing, for
bondholders have to pay personal income tax on any interest they receive.
Stockholders, on the other hand, can get a tax break, because some of their
returns come as capital gains. Capital gains are not taxed until the stock is
sold and then are taxed at a lower rate. [Footnote omitted.]
All this suggests that there may come a point at which the tax
savings from debt level off and may even decline. But it doesn’t explain
why highly profitable companies with large tax bills often thrive with little
or no debt. There are clearly factors beyond tax to consider.14

Two pages after the page with his cited Figure 15.6, on p. 439, Dr. Booth would
have found Figure 15.7, which plots a graph of firm value against capital structure that has
the same basic shape and import as Figure B-2 on p. B-10 in Appendix B of my written
evidence, and which does not imply a steadily declining ATWACC as the firm adds more
debt (as is demonstrated in turn by my Figure B-3).

14 Richard A. Brealey, Stewart C. Myers and Alan J. Marcus, Fundamentals of Corporate Finance, 3rd
In short, a comparison of the full discussion in the Brealey, Myers and Marcus text shows that it and I agree that while the ATWACC does decline initially (in most industries) as firms add debt, it levels out and eventually rises as the debt ratio increases.\(^{15}\)

E. RELIANCE ON SELECTED REGULATORY DECISIONS RATHER THAN THE CAPITAL STRUCTURE LITERATURE

Q17. On what regulatory decisions does Dr. Booth rely?

A17. His evidence has numerous citations in this area to the Alberta Energy and Utilities Board ("AEUB"), among others. Dr. Booth appears to be particularly fond of a citation from AEUB decision U99099, referring seven times (pp. ii, 2, 82, 88, 97, 100 and 104) to a statement that the AEUB concluded it would be "derelict in its statutory responsibilities to recognize market capitalization ratios that are derived from a market value capitalization that deviates from the intrinsic long-run value of the regulated firm."

Of course, if Dr. Booth could refute my conclusions by citing scholarly research performed by financial economists, he should have done so. My evidence includes an extensive discussion of the financial literature, which I believe solidly supports my procedures. Dr. Booth does not challenge that evidence on its own terms.

---

\(^{15}\) Dr. Booth makes a new error in his response to Union’s Question L2.32, in which he was asked to attach pages from the Brealey, Myers and Marcus text. He says, “Note this section includes a diagram on page 433 [Figure 15.4] that shows how the cost of equity increases at a decreasing rate as the debt becomes riskier, something that Drs Kolbe and Vilbert have denied in the past.” He apparently does not notice that the graph on p. 433 has the debt-to-equity ratio on the x-axis, not the debt-to-value ratio that appears in the graphs in my evidence. Since the debt-to-equity ratio goes up very fast at high debt ratios (e.g., it climbs from 3.0 to 4.0 as the debt-to-value ratio goes merely from 75 percent to 80 percent), a declining rate of change in response to increases in the debt-to-equity ratio does not imply a declining rate of change in response to increases in the debt-to-value ratio. The Brealey, Myers and Marcus text is again completely consistent with my evidence.
However, since Dr. Booth relies on this particular decision so heavily, it is probably worthwhile discussing explicitly the issues that arose in the U99099 decision, which appears to have been based in part on what amounted to expert evidence introduced for the first time in post-hearing argument. I do so in Appendix R-B to this reply evidence, which resolves the principal concerns raised by the AEUB.

Additionally, I would note that the “intrinsic long-run value” cited in the above quotation is book value, as indicated by another quotation to the U99099 decision on pp. 81-82 of the Booth Evidence. Exhibits J2.01, part (c), and J2.02 in this proceeding, particularly the former, show that the market-to-book ratio test of the adequacy of a utility’s returns is inconsistent with any reasonable value for its cost of equity and has been disproved by actual market behavior. I cover this topic in additional detail in Section III below.

Finally, I would note that if regulatory decisions by other bodies rather than the findings of the economic literature are to be the arbiter of decisions about capital structure principles, there are plenty of examples that contradict those that Dr. Booth cites, including the NEB’s Decision RH-2-2004.

In particular, Dr. Booth at p. 88 cites an AEUB statement that states as a basis of the AEUB’s decision a view on how fast beta changes as debt is added. At least part of the evidence on which that statement is based was an analysis supplied for the first time during post-hearing argument, without the opportunity for expert reply.

That is, it explains the reasons that the type of post-hearing analysis cited in the previous footnote does not rebut the capital structure principles on which I rely, and it explains why it is appropriate to use market value weights to calculate the WACC even for companies regulated on a book-value rate base.

See the answers to interrogatories in Exhibits J2.06, part (a), and J13.32, part (c), in this proceeding. Also, as explained in Exhibit J13.32, part (f), the NEB’s Decision RH-2-2004 itself does not adopt the position the AEUB took in 1999, despite Dr. Booth’s recommendation that it should. Instead, the NEB accepts the principle while expressing concern about the adequacy of the evidence in that proceeding.
WRITTEN REPLY EVIDENCE OF
A. LAWRENCE KOLBE

F. INCORRECT CLAIMS AND CHARACTERIZATIONS

1. Not Relying on the Miller 1977 Model

Q18. What does this part of your reply cover?

A18. Dr. Booth makes a number of incorrect claims or characterizations concerning my evidence. This part of my reply covers them in a group.

Q19. What does Dr. Booth claim to be the basis of your capital structure procedures?

A19. At pp. 93-94, Dr. Booth claims that “the flat ATWACC approach of Drs. Kolbe and Vilbert is essentially the 1958 M&M model as extended to include corporate and personal taxes by Miller (1977).”

Q20. Is this claim correct?

(...continued)
Exhibit J13.32, part (f), reviews these evidentiary concerns and how they have been addressed in our evidence in this proceeding.

Lastly, I am aware of additional regulatory decisions that take different positions from that Dr. Booth espouses. These include the following decisions of the Australian Competition and Consumer Commission (“ACCC”), the primary federal rate regulatory body. The ACCC uses procedures consistent with the capital structure principles I discuss, including the use of market-value weights to assess financial risk, in its: Final Decision on Central West Pipeline (June 2000), Draft Decision on the Moomba to Adelaide Pipeline (August 2000), Draft Decision on the Moomba to Sydney Pipeline (December 2000), and Draft Decision on the NT Gas Pipeline (May 2001). Other examples of which I am aware include the Electricity Distribution Price Determination 2001-05, Volume I, Statement of Purpose and Reasons, by the Office of the Regulator-General (now the Essential Services Commission), Victoria (September 2000) and the Final Decision on the Proposed Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline, Independent Gas Pipelines Access Regulator Western Australia, 23 May 2003. In New Zealand, the Commerce Commission has recognized the necessity to use market value weights quite explicitly for many years. For example, the Treasury’s handbook, “Estimating the Cost of Capital for Crown Entities and State-Owned Enterprises” (October 1997) recognizes the need for market weights. Recent regulatory reports confirm that the Commerce Commission continues to use and advocate the use of market weights for determining the WACC. See, for example, Final Report Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, 6 August 2002, Gas Control Inquiry, Draft Framework Paper, July 16, 2003; and Regulation of Electricity Lines Businesses, Targeted Control Regime, Draft Assessment and Inquiry Guidelines (Process and Analytical Framework), 7 August 2003.
No, as is plain from my direct evidence. The 1977 Miller model is a purely tax-based model in which the personal tax disadvantage of debt fully offsets the corporate tax advantage of debt, which is an important insight. However, my discussion of the capital structure literature (unlike that in the Booth Evidence -- see above) goes well beyond that insight. For example, see Figures B-2 and B-3, pp. B-10 and B-12. The Miller1977 model would plot straight lines for all four industries for both the values of the firm in Figure B-2 and the associated values for the ATWACC in Figure B-3. My figures do not do that. I would not say, for example, that if a firm in Industry 4 used no debt at all, its ATWACC would be equal to its value where the cost of equity is actually estimated. However, within a normal range of capital structures for an industry, the financial research consistently shows that debt does not affect value in any detectable way. That finding is consistent with the use of a flat ATWACC within the normal range of industry capital structures.

2. Not the Highest Possible Level of Change

Q21. How does the Dr. Booth characterize the equation you use to quantify the way the cost of equity changes with debt?

He claims at pp. 94 that: However, a flat ATWACC does have the advantage that it gives the largest possible leverage effect, that is, the coefficient on the market valued debt equity ratio in the equity cost equation is as large as possible.

A similar claim is made at pp. 86 and 97.
Q22. Why does Dr. Booth characterize the equation as having the “advantage” of the largest possible leverage effect?

A22. He doesn’t say.

Q23. In any case, is the statement that the flat ATWACC equation provides the maximum possible leverage effect correct?

A23. No, unless one considers only the papers mentioned in the Booth Evidence’s inadequate review of the capital structure literature (see part D of this section, above). It is clearly not true given the overall findings of the literature. In particular, if the ATWACC has any sort of “U” shape (e.g., Dr. Booth’s graph on p. 93, which imputes far more tax advantage to debt than could ever occur in reality, or the more realistic Figure B-3 on p. B-12 in my written evidence), the cost of equity will increase faster than it would if the ATWACC were flat, at every capital structure to the right of the bottom of the “U.”

This topic is addressed in detail in the response to interrogatories in Exhibit J2.08 in this proceeding, particularly in part (f).

---

19 Nor is it possible that the ATWACC increases only because the cost of debt increases. This was the mistake in the Solomon paper that Dr. Booth cites.

20 I will not repeat that discussion here, since it is already part of the record in this proceeding. But for completeness, I will incorporate that discussion herein by reference. It, like the appendices to this reply evidence, should be considered to be part of my reply in this proceeding.
3. Not Ignoring Non-Tax Costs of Debt

Q24. What does the Dr. Booth say regarding non-tax costs of debt and the flat ATWACC equation?

A24. At p. 23, he notes that the NEB in its RH-2-94 Decision discussed the formal tax-based models of capital structure and held that they ignored the non-tax costs of debt. He also states that the cost of equity equation derived from the flat ATWACC equation gives the highest possible leverage adjustment (a claim rebutted in the previous part of this section) “because the debt cost is after tax and there are no explicit offsetting costs in the model, yet the WACC is somehow held constant.”

Q25. What is your reaction to these statements?

A25. The most basic response is that, as noted above in part F.1 of this section, my procedures do not rely on any of the purely tax-based models. Detailed discussions of the non-tax costs of debt in my direct evidence (especially in Appendix B) underlie the findings on which I rely. Therefore, the Board’s quoted comment from RH-2-94 simply does not apply to my evidence.

I would add, however, that Dr. Booth’s discussion in this section does not demonstrate a clear understanding of the Miller model. Prof. Miller’s insight was that if personal and corporate tax rates had the right values, the personal tax disadvantage to debt could fully offset its corporate tax advantage. The Miller (1977) version of the flat ATWACC equation is intrinsically a model of no net tax advantage. The ATWACC is held constant precisely because debt has no net tax advantage. There is no need for risky

---

21 Booth Evidence, p. 97.
debt to achieve this outcome, only for the tax rate conditions described in my Appendix B, right before my discussion of the non-tax effects of debt. Dr. Booth’s statement seems to say that the Miller model could not achieve this result without the assumption that debt is risky. If so, that is plainly wrong.

This confusion arises again in footnote 28, p. 94, where Dr. Booth suggests that the fact that a flat ATWACC requires in part a personal tax offset to debt’s corporate tax advantage is somehow undercut by the fact that “Union Gas indicated that it has never commissioned a study of its marginal investor’s tax rate and uses the conventional after-tax WACC in capital budgeting.” As my Appendix B explains at p. B-23, citing Prof. Taggart’s paper, the WACC is always calculated with the corporate tax rate alone. The effect of personal taxes shows up in the way the market sets the costs of equity and debt. No textbook of which I’m aware teaches business students that they need to estimate the marginal personal tax rate in order to calculate the WACC.22

4. Regulation Does Not and Should Not Work as Claimed

Q26. What does Dr. Booth say about regulatory risk in the context of capital structure principles?
A26. At p. 87, he asserts,

In the example, the equity is obviously riskier at . . . a market to book of 1.36X than it is at . . . a market to book of 1.0X. This is because it is highly

22 Brealey, Myers and Allen, Principles of Corporate Finance, 8th edition, Irwin/McGraw-Hill (2006) makes this point explicitly at p. 527. As to whether this undercuts a flat WACC, on the very same page the book states, “most financial managers don’t fine-tune their companies’ debt ratios, and they don’t rebalance financing to keep debt ratios strictly constant. In effect they assume that a plot of the WACC for different debt ratios is ‘flat’ over a reasonable range of modest leverage.”
Q28. What about the part of the quotation that says you are incorrect to view the firm as more risky at lower market-to-book ratios?

A28. First, that is not what I say. I (and a great deal of financial research) say that for the same business risk, the firm’s equity will be less risky at a higher market-value equity ratio. The market-value capital structure is the cause of the risk difference, which need not correspond to differences the equity market-to-book ratio.\textsuperscript{25} It is Dr. Booth who turns this into a statement about the market-to-book ratio, not me. Second, even if Dr. Booth’s characterization of the way rate regulation works were right, and even if investors were too blind to see the cut coming, the \textit{reason} the utility’s risk would be higher in such circumstances would have nothing to do with financial leverage, it would be based on regulatory risk. That says nothing about the impact of market-value capital structure on the level of financial risk. Dr. Booth’s conclusion is simply a \textit{non sequitur}.

G. \textbf{Financial Risk Depends on Market Values, Not Book Values}

Q29. Apart from the market-to-book ratio passage cited above, on what does Dr. Booth’s discussion say financial risk depends?

A29. Dr. Booth addresses this issue in several places. Specifically, at pp. 21-23 he argues that the accounting relationships between book capital structure and either book net income or the variability of book net income provide all the information the Board needs to set capital structure. He makes a related statement on p. 89, where he says that the accounting relationship among the return on equity, the cost of debt and capital structure says

\begin{center}
\begin{footnotesize}
\begin{enumerate}
\item For example, a company with a market-to-book ratio of 1.0 and a 60 percent market equity-to-value ratio will have \textit{less} financial risk than a company with the same business risk, less book equity, a market-to-book ratio of 1.5, and a 50 percent market equity-to-value ratio.
\end{enumerate}
\end{footnotesize}
\end{center}
“absolutely nothing about how the stock market reacts to this financial risk, that is, how
market values change, or how the cost of equity changes as the firm uses debt.” (Italicized,
boldface emphasis in the original.)

Q30. What is your reaction to these statements?

A30. It is hard to see how the accounting relationship among net income and interest expense
can have no impact at all on the stock market, since future equity cash flows will be
influenced by that interaction in future years. For example, is Dr. Booth claiming that the
market will take no notice if a company has so much debt that it will regularly have trouble
making its interest payments out of operating income (i.e., will have regularly have
negative net income)? The lack of a one-to-one correspondence between accounting values
and market values does not mean quantities measured by accounting values have no
relationship at all with quantities measured by market values.

Nor is a view that financial risk is solely a function of book income statements and
balance sheets consistent with either the financial literature or everyday experience.26 The
cost of equity depends on the risks equityholders bear. Financial risk is the extra risk that
equityholders bear when firms issue debt. The cost of equity is measured in the market, not
on the books. Therefore, a proper analysis of the impact of financial risk on the returns
equityholders require must measure that risk in the market, using market values. The

26 Recall the example in Section II of my written evidence of how the variability of the market value of
the equity in a dwelling varied with the size of the mortgage.
Among other problems, book relationships cannot contain enough information properly to assess required returns in the market, since the market looks ahead, not merely at current and past book relationships. Brealey, Myers and Allen, op. cit., makes the same point in a particularly colourful way. At pp. 504-05, it provides market-value and book-value balance sheets for the “Sangria Corporation” and calculates the WACC using the market-value balance sheet. Then it says,

Why did we show the book balance sheet? Only so you could draw a big X through it. Do so now.

When estimating the weighted-average cost of capital, you are not interested in past investments but in current values and expectations for the future. Sangria’s true debt ratio is not 50 percent, the book ratio, but 40 percent [the market-value debt ratio], because its assets are worth $1.250 million [which is their market, not book, value].

---

Q31. What other comments does the Dr. Booth make on this topic?

A31. He says on pp. 87-88,

Second and more significant, the financial leverage risk premium stems from the imposition of fixed interest charges. That is, prior to receiving their equity return the firm has to pay these interest charges. This risk does not change as the market value of the firm changes; it only changes as the book debt equity ratio changes.

Q32. Is this correct?

A32. No, it is wrong. The passage appears to forget that equityholders’ return comes in the form of capital gains as well as current dividends.

Changes in market values are a major source of the realized risks equityholders face. If a company has a market value of $10 million in equity and $10 million in debt, or $20 million total, and if the value of the enterprise falls 10 percent to $18 million, equity

---

27 Among other problems, book relationships cannot contain enough information properly to assess required returns in the market, since the market looks ahead, not merely at current and past book relationships.

Brealey, Myers and Allen, op. cit., makes the same point in a particularly colourful way. At pp. 504-05, it provides market-value and book-value balance sheets for the “Sangria Corporation” and calculates the WACC using the market-value balance sheet. Then it says,

Why did we show the book balance sheet? Only so you could draw a big X through it. Do so now.

When estimating the weighted-average cost of capital, you are not interested in past investments but in current values and expectations for the future. Sangria’s true debt ratio is not 50 percent, the book ratio, but 40 percent [the market-value debt ratio], because its assets are worth $1.250 million [which is their market, not book, value].

---
absorbs the (vast majority of) 28 the $2 million loss. The rate of return on equity is -20 percent (-$2 million/$10 million). However, suppose another, otherwise identical company has a market value of equity of $15 million and of debt of $5 million, for the same total enterprise value of $20 million. Suppose the same forces make the value of that enterprise decline by 10 percent to $18 million, also. In this case, equity “only” must absorb a 13.3 percent loss (-$2 million/$15 million), not 20 percent. Note also that the impact on the equityholders of the two firms is unaffected by the firms’ book capital structures, which we could assume to be identical without changing the example at all.

In short, changes in the market-value capital structure directly affect the sensitivity of the equity return to changes in the value of the enterprise. The level of the financial risk equityholders bear therefore depends directly on market values. 29

Q33. Does Dr. Booth claim to offer any proof for his assertion?

A33. He offers a quotation from Standard & Poor’s at p. 88:

Similarly ratios using market value of a company's equity in calculations of leverage are given limited weight as analytical tools. The stock market emphasises growth prospects and has a short time horizon; it is influenced by changes in alternative investment opportunities and can be very volatile. A company's ability to service its debt is not affected directly by such factors [emphasis added in the Booth Evidence].

28 As the market-value equity ratio declines, decreases in the value of the enterprise begin to be absorbed in part by debt, since there is less equity left to provide a cushion. However, the majority of the risk falls on equity, and adding an adjustment for the impact on debt would complicate the example without changing the conclusion.

29 Note that this conclusion holds true regardless of the “true” model or models of stock prices. Whatever the reason the market value of a firm’s assets might decline, the impact of that decline will fall (primarily) on equity, not debt. The greater the proportion of debt in the market value of the assets, the bigger the proportionate fall in the market value of the equity.
His next paragraph interprets this passage to imply,

That is, S&P is basically saying book value leverage is important, when it is assessing the default or credit risk in debt, whereas market values don't count, or at least don't count as much. If it is book values and interest payments that affect credit risk and the cost of debt then this is the risk that also affects utility equity investors.

Q34. Is this a reasonable interpretation in the context of whether market values affect the amount of financial risk equityholders bear?

A34. No, the quotation could hardly be less relevant. First, the quoted passage does not say anything at all about book-value leverage. That is Dr. Booth’s addition (or at the very least, it is based on material he does not quote with the rest of the passage).

Second, and more fundamentally, S&P in the part of this passage that Dr. Booth emphasizes is focusing on whether bondholders can count on the company to service debt, not on the financial risk equityholders bear. The market-value volatility of which the passage speaks definitely will affect equityholders, whether or not the company can service its debt. The passage expresses no opinion at all about whether the amount that equity would be affected would be different if the market debt-equity ratio were different. That topic never comes up.

Therefore, the passage has no meaning at all for the issue of whether market value capital structures affect the degree of financial risk equityholders bear.

Q35. Does Dr. Booth offer any other support for his views on the basis of financial risk?

A35. He appears to try to rely again on the AEUB. In particular, at p. 81, he says
However . . . the essential point is that the correct financing weights for a regulated firm should be the regulated capital structure weights, not the market value weights. . . .

The Alberta EUB has directly addressed this question on a number of occasions. For example, in connection with comparable earnings testimony the EUB stated (Generic Cost of Capital Decision U-200452, page 24)

“The Board considers that the application of a market required return (i.e. required earnings on market value) to a book value rate base is appropriate in the context of regulated utilities.”

That is, you estimate a market opportunity cost, such as that from the CAPM, and apply it to book values, not market values as is the assumption in WACC.

Q36. Do you agree?

A36. No, Dr. Booth here treats two quite distinct concepts as though they were the same, and thereby misstates the import of the AEUB passage he quotes. One concept is how to estimate the cost of capital, by use of market data (as in the Capital Asset Pricing Model, the Empirical Capital Asset Pricing Model, or the Discounted Cash Flow approach) or by use of book data (as in the Comparable Earnings approach). The other concept is to what rate base the resulting rate of return should be applied, a market-value rate base or a book-value rate base.

Dr. Vilbert and I endorse the application of market-value-based estimates of the cost of capital to a book-value rate base. Nothing we do conflicts with this standard in any way. However, we do state that the market evidence on the cost of equity must be interpreted correctly. The level of financial risk inherent in any market-based estimate of the cost of equity depends on the market-value capital structure of the sample company, not the book-value capital structure of that company. That principle has been part of the

---

30 See also Appendix R-B to this reply evidence, part B.
literature on this topic from the beginning. The entire debate over the shape of the ATWACC curve is not about whether the level of financial risk in an estimate of the cost of equity depends on market-value capital structure, but only about how fast the cost of equity goes up as the market-value debt ratio goes down.\textsuperscript{31}

H. PRINCIPLES DO WORK FOR DEEMED EQUITY RATIO ANALYSIS

Q37. What does Dr. Booth say about the fact that your procedures focus on the deemed equity ratio, not the ATWACC and cost of equity on which he focuses?

A37. At pp. 98-100, he shows that the deemed equity ratio calculations on which my recommendations rely are consistent with the finding that debt does not have a material effect on the value of the firm within the normal range of capital structures for an industry. This point is not in dispute, nor, given the views stated in my evidence, should it be surprising to anyone.

He also demonstrates that the deemed equity ratio results change when the WACC inputs change, which again should be no surprise.\textsuperscript{32} He notes that if the WACC is flat, the allowed return on equity is inversely related to the market debt rate, which in part depends on the maturity of the company’s debt. But this is economically appropriate. Long-term bondholders shoulder the risk of future changes in interest rates, which is why long-term

\textsuperscript{31} See Appendix B to my direct evidence, including the discussion of the formal tax-based models (pp. B-13 to B-23) and the more general discussion at pp. B-6 to B-13.

\textsuperscript{32} He does characterize a change of ½ percentage point in the overall WACC as a “small” difference (p. 99). I would just note that at a ½ percentage point change in the WACC corresponds to nearly a 1½ percentage point change in the cost of equity at a 35 percent equity ratio, and to about a 1¼ percentage point change in the cost of equity at a 40 percent equity ratio. I would not characterize such changes as “small” in a regulatory setting.
TQM
APPENDIX B
THE WEIGHTED AVERAGE COST OF CAPITAL AND LEVERAGE ADJUSTMENTS

1. Motivation for this Appendix

The weighted average cost of capital (WACC) is a cornerstone of modern finance and figures prominently in the testimony of Drs. Kolbe and Vilbert. In Dr. Vilbert’s testimony he talks about how debt financing affects the investor’s required rate of return and can cause differences in the fair rate of return for a regulated utility versus a sample average and states (page10)

I avoid this problem by calculating each sample company’s overall after-tax weighted-average cost of capital using its market value capital structure. Using the sample’s average cost of capital, I then determine the return on equity that maintains the sample’s estimated average ATWACC at a 40 percent deemed equity ratio. In other words, if I know the cost of debt and TQM’s regulatory capital structure, I can calculate the return on equity that results in an ATWACC equal to the sample’s average ATWACC. This procedure ensures that the recommended cost of equity is consistent with information from the capital markets on the samples’ overall cost of capital and TQM’s deemed equity ratio. Similarly, the implied equity thickness given the NEB’s formula allowed ROE can also be determined so as to result in an ATWACC equal to the sample’s average ATWACC.

This statement is a clear articulation of how Drs. Kolbe and Vilbert arrive at their ROE and capital structure recommendations for TQM. However, it is important to realise that their evidence has two steps:

1) estimate a fair or required rate of return to the equity holder;
2) adjust this estimate assuming a constant WACC and making leverage adjustments that the Alberta EUB stated it would be derelict in its responsibilities to accept.
“The Board considers that the application of a market required return (i.e. required earnings on market value) to a book value rate base is appropriate in the context of regulated utilities.”

That is, you estimate a market opportunity cost, such as that from the CAPM, and apply it to book values, not market values as is the assumption in $WACC$.

In explicitly considering the usefulness of ATWACC the EUB stated (Decision U-99099, page 300)

“The Board observes that the intrinsic long-run value of a pure play regulated entity is best represented by book value. In other words, the present worth of future regulated earnings, discounted at the allowed return, is by definition equal to book value assuming achieved regulated earnings on average equal allowed regulated earnings. Accordingly, the Board considers that book capitalization represents the best indicator of the long-run market capitalization for a pure play regulated firm.”

It is difficult to see how a regulator could say anything other than what the EUB stated above, since to accept a market to book ratio much above 1.0 is in effect to rubberstamp unrealistic investor expectations or to admit that allowed ROEs are too high. The EUB further recognised this when it went on to say (U99099, page 303)

“The Board would be derelict in its statutory responsibilities to recognize market capitalization ratios that are derived from a market value capitalization that deviates from the intrinsic long-run value of the regulated firm.”

This is the clearest possible statement by a regulator of the fundamental grounds for rejecting ATWACC and its emphasis on market values.

Further the EUB went on to say

“In essence, a regulated company’s earnings are driven by the portion of the original cost rate base deemed to be financed by common equity. This fact results in a fundamental disconnect to the theory that market capitalization ratios, which have deviated significantly from book capitalization ratios, reflect the appropriate financial risk necessary to determine a fair composite return to be applied to the original cost rate base of a pure play regulated utility. This is because the earnings of a pure play regulated utility are governed by and driven by the regulated return allowed on book equity. In other words, it is the book equity that reflects the appropriate financial risk necessary to determine a fair composite return for a pure play regulated utility.”
increased business risk. Consequently at that time we judged the overall risk of the six Telco sample to be useful in comparisons with energy distribution companies despite the different capital structures. Explicitly it was our judgment that no leverage adjustments were needed going from a Telco sample with 55% common equity, that is, 45% debt to an energy distribution sample with much greater financial leverage.

By and large this continues to be my judgment: that the actions of regulators, like this Board, to equalise risk obviates the need for leverage adjustments. However, if there are substantially different capital structures between the sample of comparable firms and the regulated utility, the Board should answer the following questions:

1. Were these leverage differences set to equalize overall risk?
2. Are the leverage differences based on market or regulated book weights and persistent?

If the answer to the first question is that the leverage differences offset business risk differences, then no action is needed. If the answer to the second is the differences are only due to “temporary” market value differences then again they should be ignored.

To continue with the previous example where the utility has a regulated common equity ratio of 50% and the equity cost dropped from 15% to 11% and as a result the equity ratio increased to 57.7%. Suppose this were the sample average from say twenty companies and the results had to be applied to a non-traded regulated firm with 50% common equity with the same business risk as the sample. Dr. Kolbe would seem to believe that the sample of firms has less financial risk and that to apply the estimated equity cost to the regulated firm underestimates its fair ROE, since it has a 50% debt rather than the 42.3% market debt ratio of the sample. As a result, he would increase the recommended ROE from the 11% estimate of the sample by making a leverage adjustment or conversely recommend a higher common equity ratio. I will show later that Drs. Kolbe and Vilbert’s leverage adjustment gives the highest plausible value. However, the approach itself is wrong for two reasons.

1) If the regulated firm is earning approximately the same allowed ROE with the same capital structure as the sample, there is no reason to believe that its implicit market valued equity ratio is any different from that of the sample. Further allowing a higher ROE just increases the market value of
the equity, causing the market valued debt ratio to drop even further, creating an even bigger internal contradiction.

2) In the example the market valued debt ratio fell not because the firm substituted equity for debt and reduced the amount of fixed interest payments, but simply because the equity cost fell and without an increase in interest payments there is no increase in financial risk.

The fact is that there is a big difference between the impact of substituting equity for debt in a regulated firm’s capital structure and an increase in equity value caused by declining fair returns. In particular, the latter can not be construed as a decrease in risk. In the example the equity is obviously riskier at $6.818mm with a common equity ratio of 57%, after it has increased in value, than it was before at the regulated 50%. This is because it is highly unlikely that the regulator will cut the allowed ROE when the stock is trading at book value. In contrast, the higher the market to book ratio the more likely the regulator will cut the allowed ROE and thus the riskier the stock. In contrast, Drs Kobe and Vilbert would have us believe that the equity in a regulated firm is less risky when it is trading at a market to book well above 1.0, since the debt ratio is lower. This simply does not make any sense and I can’t accept this.

It is important to remember that the financial leverage risk premium stems from the imposition of fixed interest charges. That is, prior to receiving their equity return the firm has to pay these interest charges. This risk does not change as the market value of the firm changes; it only changes when book values change. For example, if TQM moved to a regulated (book) 60-40 debt equity ratio there would be less interest expense. Consequently, the financial risk, both to the bond-holder and the stock-holder, would decline and a leverage adjustment would indicate this. As Standard and Poors have stated,

“Similarly ratios using market value of a company’s equity in calculations of leverage are given limited weight as analytical tools. The stock market emphasises growth prospects and has a short time horizon; it is influenced by changes in alternative investment opportunities and can be very volatile. A company’s ability to service its debt is not affected directly by such factors.”

That is, S&P is basically saying book value leverage is important for assessing the default or credit risk, whereas market values don’t count, or at least don’t count as much. If it is book
values and interest payments that affect credit risk and the cost of debt, then this is the risk that also affects equity investors.

Following on from the Alberta EUB’s decision that to accept market value weights would be a “dereliction” of duty, the obvious implication is that the weights in the sample WACC should also be book value weights. In my example this means that the regulated book value of 50%, rather than the market value debt ratio of 42.3% is what matters. Hence in comparing this 50% regulated debt ratio with the firm in hand that also has 50% debt ratio means that no adjustment is necessary. Making an adjustment based on market values is then inappropriate for a regulated firm. As the EUB again noted (Decision U99099, page 301)

“the Board considers that beta and the cost of equity do not change to the extent necessary for an ATWACC, determined from market capitalization weights, to remain constant when applied to the book capitalization for a pure play regulated utility. The increase required to the cost of equity to achieve a constant ATWACC would be excessive and violate the fair return standard.”

It is my judgment that the only time a leverage adjustment is needed is either when the overall risk differs between the utility and the sample of regulated firms or when its business risk changes and the Board wants to offset this change so it can continue to award a formula allowed ROE. In these cases, the Board is best advised to base its decision on business risk and financial market access as it has done in the past.

5. The Size of Leverage Adjustments

It is well accepted that financial risk magnifies business risk. The basic financial leverage equation indicates that the accounting return to the stockholder is determined as follows

$$ROE = ROI + (ROI - R_d) \frac{D}{S}$$

(7)

where these are all book values, that is, $D$ and $S$ are the book values of debt and equity and $R_d$ is the embedded cost of debt. The equation simply comes from manipulating the firm’s financial statements. It means, for example, that with a fixed stock of assets, as revenues and the $ROI$ change, the greater the amount of debt the greater is the variation in the accounting return to the
stock holders. However, the above equation says absolutely nothing about how the stock market reacts to this financial risk, that is, how market values change, or how the cost of equity changes as the firm uses debt.

To understand how the investor’s required rate of return or equity cost varies with the use of debt we need a valuation model. The first valuation attempt was by Franco Modigliani and Merton Miller (M&M) who in 1958 developed an arbitrage model to show that the total enterprise value was independent of the use of debt. This was their famous “no magic in debt argument.” If individuals can borrow on the same terms as the firm, then investors will not pay a premium for firms that use debt, since the firm is not adding value. Consequently, they derived the following formula

\[ K_e = K_0 + (K_0 - K_b) \frac{B}{E} \]  

(8)

where the \( K \)'s indicate the cost of equity and debt, that is, fair or required returns and not accounting returns, and \( B \) and \( E \) then represent the market values of debt and equity respectively. The subscript 0 then indicates what the equity cost would be if the firm had no debt outstanding, this is often referred to as the unlevered equity or the asset cost.

Note two things about this equation. First, apart from redefining returns and debt ratios, in form it is the same as the financial leverage equation. This is because in the accounting model total assets are fixed, whereas in this valuation model M&M proved that the value of the firm was fixed and independent of leverage. As a result, changes in the book and market debt ratios have the same impact. Second M&M “proved” that as the market value was constant the weighted average cost of capital was also constant, which in this case means that it is equal to the unlevered equity cost. However, note that I italicised proved, since this was a mathematical proof that followed from their assumptions, not a description of reality.

In the M&M equation changes in the market valued debt equity ratio \( (B/E) \) are multiplied by the spread between the \( WACC \) and the cost of debt. It is this coefficient that determines how much changes in the debt equity ratio affect the equity cost since it is this coefficient that determines the risk. This is the important point: people who believe that changes in the debt equity ratio
have a big impact on the equity cost believe that the coefficient on the market valued debt equity ratio is high and vice versa.

However, the overall market value in the M&M model is only fixed by their assumptions. Remember from equation (6)

\[ V = \frac{\text{After-tax operating income}}{\text{WACC}} \]  

(9)

for a perpetuity, the total enterprise or firm value is after tax operating income divided by the after tax \( \text{WACC} \). Given that M&M were discussing capital structure not operating changes, they assumed that the after tax operating income, the numerator above, was constant. What M&M then “proved” was that with firm value constant the \( \text{WACC} \) must also be constant. In this case, given that the \( \text{WACC} \) is a weighted average of the debt and equity costs, the equity cost has to increase with more debt to offset the impact of more “cheaper” debt. This is what equation (8) indicates.

However, if the market value increases with more debt then from equation (9) the cost of capital must decrease and vice versa. In this case, the equity cost may then increase or possibly even decrease with the use of debt, it all depends on the valuation model and the assumptions that are made. The critical question is how the use of debt affects the overall firm value; the impact on the \( \text{WACC} \) and the equity cost then follow directly.

M&M’s “no magic in debt” result was controversial in 1958 and remains so today. This is because of the assumptions required to “prove” their result. The most important are that:

- there are no taxes of any kind;
- there are no transactions costs;
- there are no information asymmetries between borrowers and lenders;
- everyone can borrow on the same terms, that is, if the company can issue 25 year bonds or access the swap market, then so too can other individuals;
- all firms are perpetuities that pay out 100% dividends;
- there are no bankruptcy or financial distress costs;
- there are two or more identical firms with different levels of debt that can be arbitraged;
- the managers operate the firm to maximize enterprise value and not their own perqs
All of these assumptions have been disputed to a greater or lesser extent and if any of them are incorrect then the total value of the firm is affected by the use of debt and so too will its cost of capital (WACC).

M&M’s result is a classic in corporate finance and they won the Noble prize in economics for it. However, its great strength lies not in its result, which few accepted then or now, but the fact they focused corporate finance on the implications of their assumptions. For example, in 1963 they recognised that they made a mistake in their treatment of corporate income taxes and corrected their original paper. They then showed that, all else constant, the value of the firm increases due to the tax shield generated by the tax deductibility of interest payments. The reason is simply that what we term value is the private value and by reducing corporate income taxes the private value of the firm increases at the expense of the government. Hence from equation (9), if the private market value increases due to the tax shield value the WACC of necessity must decline.

In fact in the M&M (1963) model the WACC declines continuously, and the equity cost changes as follows,

\[ K_e = K_0 + (1 - T)(K_0 - K_b) \frac{B}{E} \]  

(10)

There is still a financial leverage risk premium but it is now smaller, since the use of debt also generates a valuable tax shield. Note that in equation (10) the debt equity ratio is now multiplied by (1-T), since part of the interest payments are paid for by the government through lower tax payments. Assuming a 40% corporate tax rate, people who believe in M&M (1963) would estimate a leverage impact only 60% the size of those who believe in M&M (1958). A different model produces a different leverage adjustment!

Since 1963 all the other assumptions of M&M have been relaxed and every time an assumption has been relaxed there is another leverage equation similar to equations (8) and (10) and another estimate of the leverage adjustment. However, two main theories of capital structure have emerged: the static trade off (STO) model and the pecking order hypothesis (POH). The STO is a static model that assumes that firms trade off the tax advantages of using debt against the loss of
financial flexibility that arises due to excessive leverage. It is this model that develops the familiar “U” shaped $WACC$ function below as the firm increases its debt ratio.

Initially the $WACC$ declines due to the tax advantages of debt. In the M&M (1963) model, for example each dollar of debt increases the firm’s market value by the value of the corporate tax rate;\textsuperscript{14} the $WACC$ then starts to increase as the loss of financial flexibility sets in. Obviously there has to be some offset to the tax deductibility of interest, otherwise all firms would try to finance with 100% debt. The offset comes as the debt becomes riskier and has to be sold on higher and higher yields and the firm loses its financial flexibility.

In contrast, the POH, developed in 1963 by Gordon Donaldson at Harvard, is a dynamic model of financing based on the fact that firms are controlled by managers. In this case, firms raise capital by issuing securities that impose the least restrictions on management. Consequently, firms primarily rely on internal funds and only after these are exhausted do they go outside for capital, where they initially rely on bank debt and bonds, rather than new equity.

\textsuperscript{14} This simple model has been dubbed adjusted present value (APV) by Professor Myers. In Principles of Corporate Finance (2nd Canadian edition, 1991 pages 490-493 they work an example and the base case NPV of $170,000 is then increased by $592,000 by the tax advantages to debt. In this case, Professor Myers, who Dr. Kolbe references throughout his testimony, clearly believes in the tax advantages of debt.
I have reviewed these basic ideas on capital structure since the flat ATWACC approach of Drs, Kolbe and Vilbert is essentially the 1958 M&M model extended to include corporate and personal taxes by Miller (1977). This is a very important model and for the last 26 years I have taught corporate financing to second year MBAs with the first five weeks devoted almost exclusively to these ideas, as well as to the implication that if this model holds there is no value to the activities of investment bankers and they should all study marketing! I then spend the balance of my course explaining how companies add value by adopting different financing decisions. The fact is that financial theory has come a long way since 1958 and is now better harmonised with practise: no one believes the flat WACC model fits reality; it is simply a good starting point to discuss how investment bankers can create value for firms.

However, a flat ATWACC does have the advantage that it gives the largest possible leverage effect, that is, the coefficient on the market valued debt equity ratio in the equity cost equation is as large as possible. I showed earlier that the M&M 1958 flat WACC model gives a bigger equity cost adjustment (equation (8)) than if the WACC declines with leverage in the conventional way (equation 10). However, Dr. Kolbe goes further by assuming a flat ATWACC in the presence of corporate taxes, which gives an even bigger coefficient on the market valued debt equity ratio.

To illustrate, Drs. Kolbe and Vilbert get their leverage adjustment by assuming a flat, that is, constant WACC. Dr. Vilbert first calculates the WACC using market value weights from his sample:

$$K_e \frac{E}{V} + K_d (1-T) \frac{B}{V} = WACC = K_A$$  

(11)

Drs. Kolbe and Vilbert then assume that the WACC ($K_A$) is constant and then either alter the equity ratio to get a new equity cost or the equity cost to get a new equity ratio to get the same

---

15 This is MGT2300. A course outline can be downloaded from my web page at http://www.rotman.utoronto.ca/~booth
16 It would be interesting to ask why investment bankers are so well paid if corporate financing decisions as represented by a flat ATWACC have no value.
17 As explained earlier the use of market values is not appropriate for regulated firms, either directly or indirectly through WACC estimates from samples of regulated firms.
WACC. In terms of the equity cost, implicitly Dr. Kolbe is rearranging this WACC equation to solve for the equity cost ($K_e$) at any leverage ratio,

\[ K_e = K_d + (K_d - (1 - T)K_b) \frac{B}{E} \]

Equation (12)

Since the WACC is assumed constant, it should equal $K_0$, so the main difference is that it is this cost minus the after tax cost of debt that determines the leverage coefficient. With a constant WACC this coefficient is larger than either the M&M (1958) no tax case or the M&M (1963) tax case as a simple comparison with equations (8) and (10) indicates. In fact, as far as I am aware it is the largest coefficient possible, since I have not seen an equity cost equation with a larger coefficient.

The reason for the very large leverage adjustment in equation (12) is that the model is internally inconsistent. Equation (12) and the flat WACC assumes the tax deductibility of interest, which causes the WACC to fall, but there is no explicit account of the offsetting costs that negate this to keep the WACC constant. For example, if the WACC is constant it could be that as the market valued debt equity ratio increases the debt cost also increases due to the higher risk of insolvency and the costs of financial distress and bankruptcy. In this case, what is keeping the WACC constant is an increasing $K_b$ as creditors protect themselves from the insolvency risk attached to highly debt financed firms. Moreover, it is obvious from equation (12) that if the debt cost, $K_b$, increases with the debt equity ratio then the equity cost does not increase as quickly, which is what Solomon showed in the Journal of Finance in 1963. The intuition is simply that “debt” in highly debt financed firms has some of the same characteristics as equity.

To show these principles backtrack to the previous example, where the equity cost was assumed to decrease from 15% to 11% due to a reduction in risk and consequently the equity market value increases from $5\text{mm}$ to $6.818\text{mm}$ and the market valued debt ratio decreases from 50% to 42.3%. Although there is NO need for a leverage adjustment as the equity cost is accurately estimated at 11.0%, how could one be made?

---

18 The only reason for the cost of debt to increase is the risk of financial distress or bankruptcy, which M&M ignored in their 1958 paper. Therefore, Solomon’s result is inconsistent with the M&M assumptions. However, it is consistent with a model of bankruptcy and financial distress.
One way is to estimate an unlevered equity cost from equation (8) by inserting the debt cost of 5%, the debt equity ratio of .423/.577 or 0.733, and the equity cost of 11%. In this case, the unlevered equity cost is 8.46% and the use of debt financing has increased the equity cost from the debt free 8.46% to the observed 11.0%, so 2.54% is the financial leverage risk premium. The coefficient on the market valued debt equity ratio in this example is 3.46% (8.46-5.0). The relevered equity cost at the 50:50 debt equity ratio would then be 11.92%. So someone believing in M&M (1958) would use a coefficient on the debt equity ratio of 3.46%. Further if they believed that the equity cost estimated from a sample of firms with lower market valued debt ratios underestimated the financial risk at the regulated firm’s debt ratio, they would increase the 11.0% by 92 basis points.

If instead the M&M (1963) with taxes equation (10) is used with a 50% tax rate, the unlevered equity cost is higher at 9.39% and the financial leverage risk premium is only 1.61%, since part of the interest costs are paid for through a reduction in taxes. As a result, the financial leverage risk premium is only half what it is with the flat WACC M&M 1958 model. In this case the coefficient on the market valued debt equity ratio is 2.20 ((9.39-5.0)*.5). Relevering to the 50% debt ratio increases the equity cost to 11.59 or 33 basis points less than by using the flat WACC M&M 1958 model. Believing in M&M (1963) gives a smaller bump to the ROE estimate by making leverage adjustments.

Believing in a constant WACC gives a WACC and unlevered equity cost of a constant 7.4%.19 Hence the market valued debt equity ratio is multiplied by (7.4-2.5) or approximately 5.0%. This is higher than either M&M (1958) no tax or M&M (1963) with tax and gives the highest possible leverage adjustment. This is because the debt cost is after tax and there are no explicit offsetting costs in the model, yet the WACC is somehow held constant. Using this model the leverage adjustment would not be 59 or 92 basis points but 131 basis points to move the equity cost at the regulated debt ratio to 12.31%.

Let me make the importance of this example clear. The chain of events is that the risk of the utility has declined causing its equity cost to drop from 15% to 11%. The obvious thing that the regulator should do is cut the allowed ROE from 15% to 11%. This is also what would happen if

---

19 \(7.4\% = 11\% \times 0.577 + 5\%(1-.5) \times 0.423\)
the regulator used the EUB’s ATWACCBV approach and recognised that it would be “derelict” in using market values to rubber stamp this increase in market value. However, using the “(AT)WACC approach” avoids this ROE drop in two ways. The first is to go directly to the WACC with market values, which seals in the higher equity ratio and delays the drop in the allowed ROE. However, if this fails, as it has before this Board, as well as the EUB, the second step is to argue for a leverage adjustment. Then the assumption of a flat ATWACC generates the biggest coefficient on the debt equity ratio and the largest financial leverage risk premium. This in turn provides the biggest “bump” when a sample estimate is applied to the regulated common equity ratio. In my example it would give an equity cost of 12.31%, 131 basis points higher than the true equity cost and higher than using any other equity cost model that I am aware of. As the example shows these assumed leverage adjustments can be very large and are unnecessary.

The results for Dr. Kolbe and Vilbert’s common equity ratio recommendations also follow from their constant WACC assumption. In this case if a lower cost of equity is inserted into the WACC, more weight has to be placed on the common equity to get the same WACC, as a result the debt ratio has to fall. We can see this from equation (11) where rearranging gives

\[
\frac{D}{V} = \frac{(K_e - K_d)}{(K_e - K_d (1 - T))}
\]

With a given equity cost we can find the debt ratio that keeps the WACC constant, assuming the cost of debt does not change. With the example data, if an equity return of 10% is used instead of the 11% fair return, the debt ratio has to drop to about 35% and the common equity ratio increase to 65% to keep the WACC constant at 7.40%. In this way Drs. Kolbe and Vilbert generate common equity ratios of 55-60% as being consistent with a fair return using the Board’s allowed formula ROE, which they regard as too low. Of course in practise a 60% common equity ratio for an extremely low risk pipeline like TQM, that always earns its allowed ROE, would be inefficient and the WACC would be higher than at the current 30% common equity ratio and result in rates that are unfair and unreasonable.