CONSULTATION REGARDING THE METHODOLOGY TO DETERMINE THE NET RAILWAY INVESTMENT AND CAPITAL STRUCTURE FOR THE CALCULATION OF COST OF CAPITAL RATES

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at the request of Canadian Pacific Railway

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I. Introduction

1. The Canadian Transportation Agency ("Agency") has initiated a consultative review of the treatment of general-purpose debt ("GP debt") for cost of capital purposes (the "Consultation").[1] We have been asked by Canadian Pacific Railway ("CP") to provide an economic analysis of the issues raised by the Agency's 2020 Cost of Capital Decision. In particular, we have been asked to opine on the methodology used by the Agency to allocate GP debt to the CP's regulated operations in that decision (the "2020 interim methodology"), in connection with question 3 of this consultation:[2]

[1] *Consultation on general purpose debt*. Canadian Transportation Agency. https://otc-cta.gc.ca/eng/consultation/consultation-general-purpose-debt.

[2] "In 2020, the CTA held a consultation with CN, CP and interested stakeholders to confirm a methodology with respect to the allocation of general purpose debt for rail purposes that is consistent for CN and CP. The CTA indicated that in the interim, general purpose debt would be allocated according to the RTM methodology." *Discussion paper: Whether general purpose debt should be included in the calculation of cost of capital rates*. Canadian Transportation Agency. https://otc-cta.gc.ca/eng/discussion-paper-general-purpose-debt. ("CTA Discussion Paper").

Q3: Should general purpose debt be treated differently between railway companies?

2. We evaluate this question in the context of the fair return standard, which requires that both railway companies be given an equal opportunity to earn a fair and reasonable return on regulated assets (on a standalone basis). If a particular approach for allocating GP debt leads to one or both companies not achieving a fair return – despite equal mechanical treatment – then the mechanical treatment of GP debt under that approach should be different between the railway companies*. We find that the 2020 interim methodology should treat GP debt differently* because it fails to produce outcomes consistent with the following economic properties:[3]

   i. **Comparable asset risks should be allowed to earn comparable returns.** To the extent that CP's regulated operations are comparable to its consolidated operations and/or to CN's regulated operations, it should be allowed to earn a comparable cost of capital allowance. However, under the 2020 interim methodology, CP's regulatory WACC was computed as 4.79%, while its consolidated WACC would have been 6.46% at the Agency's estimated costs.[4] Conversely, CN's regulatory WACC was determined to be 5.19%, while the consolidated WACC (at Agency costs) was relatively comparable, at 5.51%.[5]

   ii. **The methodology should produces a financially healthy capital structure as a standalone railway company.** A financially healthy capital structure ensures continued access to capital markets for the railway at competitive rates. The interim methodology already results in a regulatory capital structure for CP that one would associate with financial distress – and will likely lead to negative regulatory equity for CP in the coming years.[6] This is not an appropriate or economically credible capital structure for a railway when viewed on a standalone basis, and is out of line with the existing financial strength of CP on a consolidated basis.

[3] These are not necessary an exhaustive list of properties, but represents those that we view as most critical and relevant to this consultation.

[4] See CP's Response to the Submissions of Other Stakeholders, CTA Discussion Paper on Capital Structure and Cost of Capital, 2020, January 18, 2021 ("CP Response Submission"), page 8.

[5] CP Response Submission, page 8.

[6] CP Response Submission, pp. 10-11.

iii. **The methodology should provide a capital structure sufficiently comparable to the parent such that the parent's estimated cost of equity is a reliable estimate for the regulatory cost of equity.** Material differences between the regulatory capital structure and the parent capital structure produce differences in the financial risk (leverage) of equity between the two. Given the significant leverage created for CP's regulatory balance sheet ("RBS") under the 2020 interim methodology, CP's (parent) cost of equity will fail to reflect the financial risk of equity on the RBS. Consequently, CP's (parent) cost of equity cannot reliably be used (without adjustment) to compute its regulatory cost of capital. Yet, the 2020 interim methodology does utilize CP's parent cost of equity when computing the regulatory WACC, leading to an unreliable and unreasonably low cost of capital allowance.

3. In discussing the economic impacts of the interim methodology, this report expands upon the discussion of financial risk in the 2010 Brattle Group study provided to the CTA as part of their 2010 Consultation on the Cost of Capital a report (the "2010 Brattle report").[7] The 2010 Brattle report provided a theoretical and empirical foundation for cost of capital determinations for regulated railways, and provided a summary of how railroad cost of capital determinations were made in jurisdictions around the globe.

4. This report supplements the discussion of financial risk in that study by focusing more pointedly on the economic impacts of changes to the capital structure, and the economic implications for the corresponding costs of capital. In particular, we highlight the danger of "missing the forest for the trees" in allocation mechanisms like the 2020 interim methodology, which involve a series of mechanical accounting allocations and adjustments that may divorce the final rate results from their underlying economic substance.

5. Our bios and general disclaimers are provided at the back of this report.

[7] Section III.G in Vilbert, M. J., Bente Villadsen, and Matthew Aharonian, "Review of Regulatory Cost of Capital Methodologies", *The Brattle Group*, prepared for the CTA for its 2010 Cost of Capital Methodology Review, dated September 2010.

II. The Fair Return Standard

The 2020 interim methodology must be evaluated in the context of the (standalone) *fair return standard* that governs the cost of capital allowance. Both railways must be allowed to earn a fair return on capital invested in regulated service.

A GP debt allocation methodology must treat the railways equitably in terms of economic outcomes, not in terms of mechanical outcomes.

A GP debt allocation methodology should treat GP debt differently between the railways if *equal mechanical* application of the methodology results (or is likely to result) in differential economic treatment of the railways.

6. Railways are a particularly capital and resource intensive industry. As such, they demand significant revenues to cover high fixed operating costs and to attract the capital needed to sustain and expand services upon which both travellers and shippers rely. For this reason, government has long taken a strong interest in the expansion and maintenance of rail service (since the 1800s), and in regulating the rates charged by railways for both passenger and transport service to ensure they are not excessive.[8]

7. In principle, the regulators problem is to replicate a competitive outcome in an industry that, by its very nature, is not naturally competitive. This means establishing rates that are both fair to users and fair to the railways, providing them with sufficient returns to adequately compensate

[8] In particular, freight rates for grain transport in Western Canada have a long regulatory history that has seen fixed shipping rate (the "Crow Rate") from 1920s, periods of subsidization for imposed service obligations between the 1960s and 1990s, and revenue caps on service obligations enacted under the 1996 Canada Transportation Act before evolving to the present. See *i.e.,* Bennett, M. J. (2017). As the Crow Flies: Transportation Policy in Saskatchewan and the Crow's Nest Pass Agreement. Frontier Center for Public Policy, https://fcpp.org/wp-content/uploads/CrowsFly_F5.pdf.

them for the risk borne in providing the regulated services. This is the context in which we evaluate the 2020 interim methodology.

8. As we noted in our 2010 review, the federal principle underlying the determination of the cost of capital for a regulated entity is the "fair return standard", which has been articulated in several key decisions in Canada as well as in the U.S.[9] In *Northwestern Utilities Limited*, the Supreme Court described the fair return standard as follows:

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

9. The CTA uses a form of revenue cap regulation to meet this objective. Specifically, the CTA establishes the MRE, through which the railways recover an allowed rate of return on capital investment consistent with legal standards.[10, 11]

10. In the context of the fair return standard, the cost of capital allowance contemplated for the MRE is not the outcome of a formulaic calculation – i.e., it is not a tangible accounting cost. Rather, the fair return standard recognizes the cost of capital as an economic opportunity cost,

[9] *Northwestern Utilities Limited v. City of Edmonton* (1929) S.C.R. 186 (Northwestern Utilities) is the landmark Canadian decision.

[10] The 2010 Brattle report, page 3.

[11] This is the same principle that was applied in the design and implementation of the different government rail subsidy programs in Canada between the 1960's and the passing of the Canada Transportation Act in 1996 ("Act"). The Act ended the government's railway subsidization program and established the legal framework for the current MRE system, which determines the allowed recovery of costs of capital pertaining to certain Western grain transport service obligations. See At the Heart of Transportation: A Moving History." Canadian Transportation Agency, 12 June 2017, https://www.otc-cta.gc.ca/eng/publication/at-heart-transportation-a-moving-history, pp.76 87.

reflecting the expected return on economically comparable risk investments.[12, 13] This means that cost of capital is a forward-looking quantity that changes with risk exposure. The CTA Discussion paper in this consultation itself notes:[14]

> *Cost of capital is an estimate of the total return on net investment that is required by debt holders and shareholders, so that debt costs can be paid and equity investors can be provided with a return on investment consistent with the risks assumed for the period under consideration.*

11. The fact that the cost of capital allowance is treated as an opportunity cost when computing the MRE is important. It implies that any accounting changes that leave fundamental risk exposures unchanged will not change the cost of capital. Similarly, accounting changes that imply genuine changes for risk exposure will change the cost of capital. The 2020 interim methodology produces accounting changes that imply genuine changes in equity risk exposure, but unfortunately does not recognize the corresponding changes to the cost of equity capital.

12. In its 2020 Decision (i.e., under the 2020 interim methodology), the Agency has chosen to follow an implementation that allocates GP debt to the RBS by simply *displacing* existing equity, creating an inappropriately leveraged balance sheet for the RBS. [15] The 2020 interim methodology is essentially a mechanical *rule of thumb* approach to making this allocation. Like all mechanical approaches, it may work by chance, or perhaps even more often than not by

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[12] As we noted in the 2010 Brattle report: "It has become routine in rate regulation to accept the 'cost of capital' as the right rate of return to target. Setting and achieving a fair return helps ensure that the regulated company has access to capital for maintaining and expanding utility infrastructure, as needed, yet does not charge customers more than is needed. Thus, the regulated company is entitled to receive the return of its invested capital and to expect to earn a fair return on the invested capital." The 2010 Brattle report, page 3.

[13] Comparable, in this context, refers to comparability in terms of (priced) business risks. This interpretation is further recognized in the Canadian Railway Act pre-dating the Canada Transportation Act, as well as in the regulatory cost mechanisms developed by the CTA.

[14] CTA Discussion Paper.

[15] The *amount* of GP debt to be allocated under the 2020 interim methodology is determined as follows: "[t]he CTA has taken an interim approach to allocate certain debt, known as the revenue ton miles (RTM) approach, for the immediate term. The RTM approach allocates debt to Canadian operations and U.S. operations based on the proportion of traffic moved in each jurisdiction using reported revenue ton miles." *Discussion paper on the methodology to determine net rail investment and capital structure for the calculation of cost of capital rates*. Canadian Transportation Agency. https://otc-cta.gc.ca/eng/discussion-paper-methodology-determine-net-rail-investment-capital-structure-calculation-cost-capital-rates. General-purpose debt for U.S. operations is excluded from the allocation, while general-purpose debt for Canadian non-rail service is included. CTA Decision No. LET-R-29-2020.

design – but only when the design is calibrated to ensure that desirable *economic* outcomes prevail under existing conditions or reasonably expected conditions. As such, the 2020 interim methodology has potentially significant consequences for capital structures and the cost of capital allowance that must be considered in evaluating whether or not GP debt should be treated differently between the railways.

III. The WACC and the cost of capital allowance

Any method that allocates GP debt to the regulated entity must result in a cost of capital allowance that reflects the underlying business risks of the regulated entity.

The 2020 interim methodology allocates GP debt to CP's and CN's corresponding RBSs in ways that ignore basic economic principles:

- **To the extent that CP's regulated operations are similar to CP's overall operations, the cost of capital allowance (rate) should be comparable to the WACC of consolidated CP; the 2020 interim methodology implies a cost of capital for the regulated CP entity that is materially lower than for the overall company (CP).**
- **To the extent that CN and CP's regulated operations are of comparable risk, those operations will have comparable WACCs (i.e., asset costs of capital). The 2020 interim methodology results in cost of capital allowances that are materially different between the railways.**

13. It is useful to explicitly recognize an important conceptual, and perhaps nuanced, distinction between:
    a. the ***asset* Cost of Capital** (or required asset return), which is the return that the CTA is required to provide through the cost of capital allowance in the MRE (see above); and
    b. the ***Weighted Average* Cost of Capital ("WACC")** (see below), which is computed by the CTA as part of its MRE calculation.

14. While these costs are often treated interchangeably, the former is directly tied to the assets, or left side of the balance sheet, while the latter ties directly to the right side, the liabilities and equity claims (see Figure 1 below).

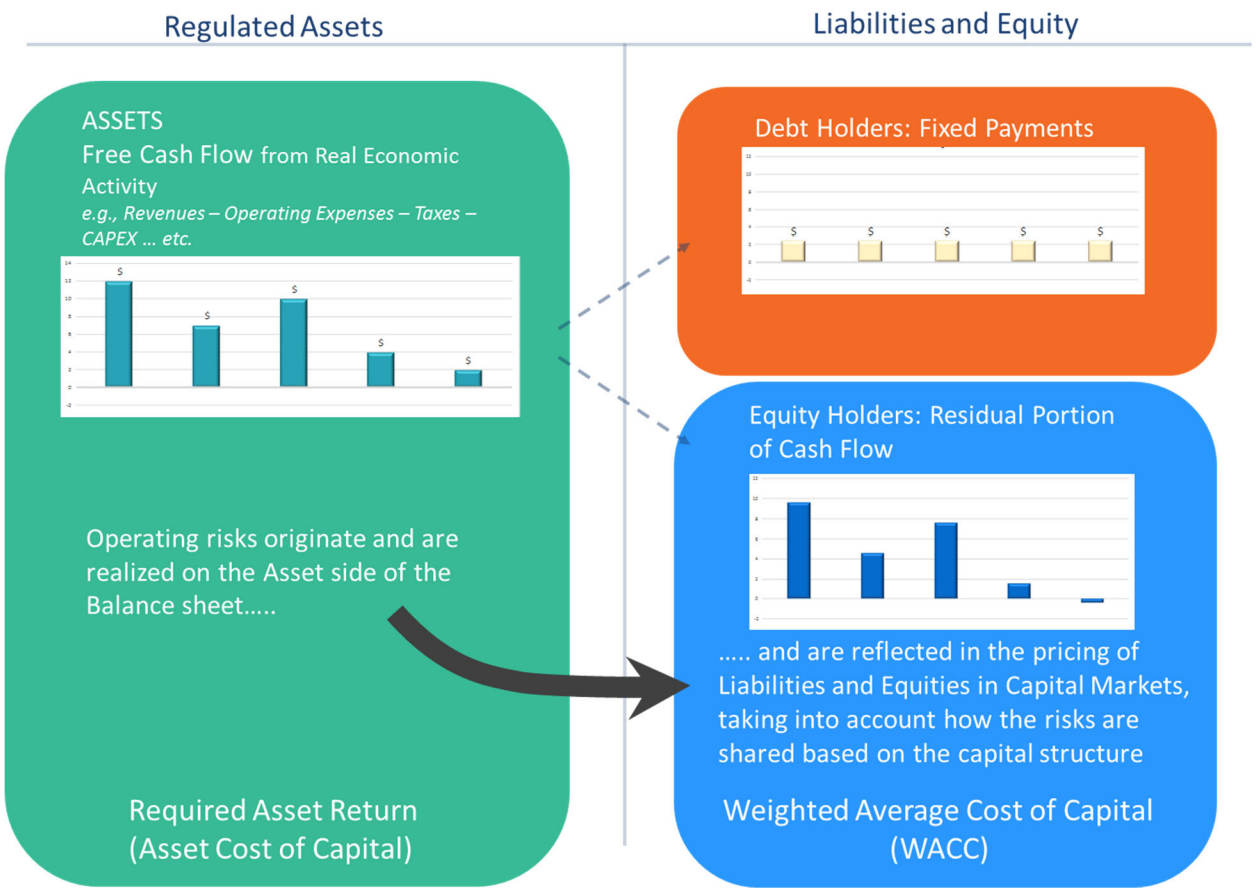

FIGURE 1 . REQUIRED ASSET RETURN VS WACC

15. As illustrated in the figure, asset cash flow risks are driven by real economic activity and originate on the left side of the balance sheet.[16] Equity and debt holders, on the right side of the balance sheet, hold claims to those cash flows.[17] Equity and debt holders therefore share the asset's risks and returns according to their ownership stake and the terms of their ownership claims.

16. As it relates to the regulatory problem, the regulator must determine the required fair return to capital invested in the regulated activity (the assets on right side of the RBS) when setting the MRE. In other words, the CTA needs to determine the fair (required) return – or cost of capital – to $1 of capital invested in the regulated assets – regardless of how that dollar is financed (i.e., the asset cost of capital).[18] This is a cost directly associated with the left side of the (regulatory) balance sheet. However, markets typically trade in *claims* against the assets, not the assets themselves (i.e., elements from the right side of the balance sheet). Therefore, one cannot typically estimate the asset cost of capital directly. Instead, the costs of debt and equity, which can be directly estimated, are used to indirectly estimate the asset cost of capital needed via the WACC.

17. Formally, the (after-tax) "WACC" is given by the formula:[19]

$$WACC \equiv \frac{\$D}{\$V}(1 - T_C) \times r_D + \frac{\$E}{\$V} \times r_E$$

where T_C is the corporate income tax, r_D is the pre-tax cost of debt (i.e., (1- T_C)x r_D = after-tax market cost of debt), r_E is the after-tax market cost of equity, $\$D$ is the market value of debt, $\$E$ is the market value of equity; and $\$V = (\$E + \$D)$ is the total market value of the assets (i.e., this follows from the economic balance sheet).[20] The proportion of debt and equity financing the assets is the capital structure.

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[16] This presumes the company is not in a position of financial distress. When a company is financially distressed, risks relating to default or potential bankruptcy may affect operations and asset returns.

[17] Note, other types of claims on the assets can exist on the right side of the balance sheet (e.g., preferred equity, deferred liabilities, etc.). The discussion here focuses on the primary claims relevant in this consultation, namely debt and equity.

[18] See, e.g., 2010 Brattle Report, Section II.A.

[19] Other claimants, such as preferred equity, can be added to the WACC formula if they exist.

[20] The above equilibrium is defined in terms of after-tax quantities, reflecting that this is the amount that investors ultimately receive and are therefore the basis of market forces driving the equilibrium.

18. When debt and equity are marketed securities, market forces will drive the prices of debt and equity to reflect the value and expected return of their corresponding share of the underlying asset risks.[21] This provides the equilibrium outcome:

$$\begin{aligned} Required\ Return\ on\ Assets &= WACC \\ &\equiv \frac{\$D}{\$V}(1 - T_C) \times r_D + \frac{\$E}{\$V} \times r_E \end{aligned}$$

which is why the term WACC and asset cost of capital are often used interchangeably.[22]

19. It is important, however, to recognize that this is an equilibrium condition where the costs of debt and equity reflect their corresponding asset risk exposures under the given capital structure. It is the market's perception of underlying asset's (forward-looking) risk – and how that risk is currently shared – that drives the resulting costs of equity and debt, not the other way around. Assets with comparable business risks will demand a similar return per dollar of asset value, regardless of the WACC of the buyer or owner.[23] The required return (i.e., asset WACC) for a given set of operating assets is a property of the assets themselves.

20. This is the basis of the common caveat found in corporate finance textbooks, warning that the WACC of the parent is the applicable cost of capital for projects or subsidiary operations only when those projects are of comparable risk to the average risks of the parent. For example, the Brealey-Myers-Allen text on corporate finance notes:

> *…all the variables in the WACC formula refer to the firm as a whole. As a result, the formula gives the right discount rate only for projects that are just like the firm undertaking them. The formula works for the "average" project. It is incorrect for projects that are safer or riskier than the average of the firm's*

[21] As this is all on an after-tax basis, the cost of debt reflects the tax value of interest deductibility. Also, there are a number of underlying regularity assumptions being made when the equivalence of the WACC and the asset cost of capital is asserted. For example, there is a need to assume additivity, no-arbitrage, and market efficiency, among other assumption (e.g., see the 2010 Brattle report at p. 64).

[22] In more technical terms, the equilibrium r_D and r_E that show up in the equality are each *functions* of the capital structure and underlying asset risk, not just single numbers. In other words r_D and r_E are the curves $r_D(Asset\ risk, Debt\ and\ Equity)$ and $r_E(Asset\ risk, Debt\ and\ Equity)$. An example of the r_E function, with respect to capital structure, is illustrated in Figure 3 of Section IV.A below.

[23] The market's perception of the asset risk that is the driver of the resulting costs of equity and debt under a given capital structure, not the other way around.

existing assets. It is incorrect for projects whose acceptance would lead to an increase or decrease in the firm's target debt ratio.[24]

21. This warning is often provided in the context of alerting readers to the fact that the risks of the *project* are the relevant risks to consider when evaluating whether a project earns an appropriate rate of return, and whether or not it adds value.[25] However, it reinforces the important point that the WACC, when used as an opportunity cost, must always reflect the risks of the asset in which the capital is invested.[26]

22. A direct consequence for the present consultation is that if the average risk of the parent company's operations (CN or CP) are comparable to the risks of their regulated assets, then the properly computed cost of capital allowance for the regulated assets should be roughly comparable to the WACC of the parent company. To the extent that the 2020 interim methodology fails to provide this outcome, it is not a good approach.

23. A further implication is that to the extent that CN's and CP's regulated operations are of comparable risk, the CTA should be finding a comparable cost of capital allowance per dollar of regulated capital assets.[27] If comparable in terms of risk, the costs of the regulated operations would not be materially different from one another if both were standalone entities issuing claims in a liquid capital market.

24. However, under the 2020 interim methodology, CP's regulatory WACC was computed as 4.79%, while its consolidated WACC would have been 6.46% (at the Agency's estimated costs).[28] Conversely, CN's regulatory WACC was determined to be 5.19%, while the consolidated WACC would have been 5.51%.[29]

[24] Brealey, Richard A., Stewart C. Myers, and Franklin Allen. *Principles of Corporate Finance*, 13th Ed. McGraw-Hill Education, 2020, pg. 508. ("Brealey-Myers-Allen")

[25] A project only adds value to the company if the NPV of the project – evaluated using the WACC of the project – is positive. If a project's risks are substantially different from the average risk at the parent, then a WACC estimated from comparable risk companies (to the project) that are publically traded is more appropriate. (See, e.g., Chapter 5 in Brealey-Myers-Allen.)

[26] Failure to properly evaluate projects or operations on the basis of project risk lead to longer term loss of value, or internal disinvestment in projects that fail to earn their economic cost of capital. Over time, it also leads to a diminished ability to compete for capital in markets, raising costs of capital. (See, e.g., Chapter 5 in Brealey-Myers-Allen.)

[27] See also, fn. 7 in the 2010 Brattle report.

[28] CP Response Submission, page 8.

[29] CP Response Submission, page 8.

IV. Higher Leverage Increases the Cost of Equity Capital

The 2020 interim methodology results in an extremely levered and inappropriate standalone regulatory capital structure for CP. The resulting RBS for CP reflects a railway that is in financial distress, in contrast to the financially healthy capital structure of the parent company.

- **Under the 2020 interim methodology, the standalone CP entity would have trouble accessing capital markets at efficient costs of capital.**

The 2020 interim methodology significantly increases the financial risk of CP's regulatory equity, and fails to capture this risk with its computation of CP's regulatory WACC. More specifically:

- **The 2020 interim methodology estimates the regulatory cost of equity for CP at the parent level, which has a capital structure – and financial risk exposure – materially different from the capital structure it allocates to the regulatory operations.**

25. Since the cost of equity is the required expected return needed to compensate for the risks it faces, the main drivers of changes to the cost of equity capital are: i) changes in the underlying asset risk to which it holds a claim; and ii) changes in its *financial* risk from being placed in a different capital structure. The prior section dealt with the first driver: the role of asset risk. This section focuses on the second driver: changes in leverage (or financial risk).

26. CP's Response Submission describes the change in leverage indicated by the 2020 interim methodology:[30]

> *When the Agency added the general purpose debt to CP's regulated balance sheet, it reduced equity in order to maintain balance in the balance sheet…*

[30] CP Response Submission, page 5 and page 6.

> *…the Agency allocated significant amounts of "general purpose debt" to the balance sheet of CP's regulated rail entity, resulting in a capital structure that does not resemble the rest of the company. The debt-to-equity ratio of the regulated rail entity is now multiple times higher than that of the consolidated corporation and the remaining divisions.*

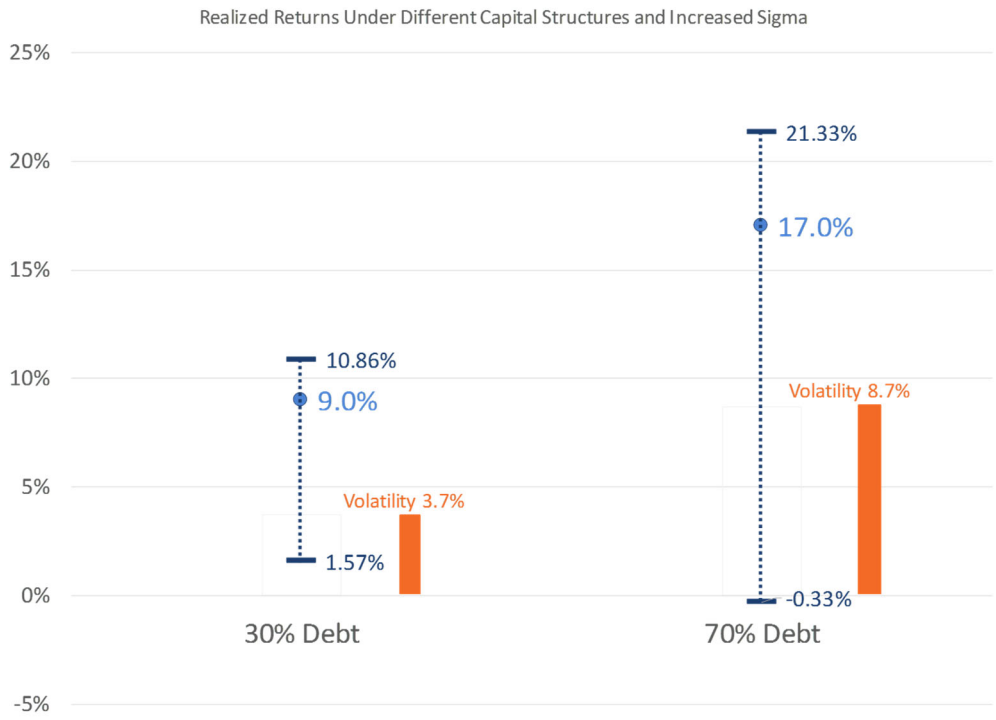
27. Below, we detail the consequences of the 2020 interim methodology to the change in CP's capital structure. We first explain the expected impact of an increase in leverage on the financial risk of equity. We then describe the challenges introduced when the estimated capital structure of the regulated entity (CP) is materially different than the overall company (CPRL). In the next section, we provide an illustrative example that demonstrates why, when shifting the capital structure of CP, the 2020 interim methodology fails to calculate a fair and reasonable cost of capital.

A. Capital Structure and the Modigliani-Miller Theorem

28. A pitfall of the WACC formula is that it can invite a mechanical treatment of the r_E and r_D components, where they are wrongly treated as fixed numbers that can be combined with alternative capital structures to form a meaningful number – as suggested above, they cannot. Even when the risk of the underlying assets is unchanged, a different capital structure splits that risk differently between debt and equity holders and makes the equity at one capital structure more risky than equity at another.[31] Stated differently, increased leverage adds financial risk to a company's equity.

29. Figure 2 below demonstrate this mathematical relationship by comparing equity's risk when a company uses 30% debt to finance its assets, and when it uses 70% debt capital structure, holding the asset risk unchanged. For illustrative purposes, the figure assumes that the asset cash flows will be either $8.50 (with probability 80%) or $2 (with probability 20%).

[31] The difference in risk due to how the assets are financed is called financial risk. The impact of leverage on risk is conceptually no different than that faced by a homeowner who takes out a mortgage. The equity of a homeowner who finances his home with 90% debt is much riskier than the equity of one who only finances with 50% debt.



	30% Debt Capital Structure						*70% Debt Capital Structure*					
	$D	**$E**	**Asset CF**	**Debt CF**	**Equity CF**	**Realized Equity Return**	**$D**	**$E**	**Asset CF**	**Debt CF**	**Equity CF**	**Realized Equity Return**
High 80%	$ 30	$ 70	$ 8.50	$0.90	$ 7.60	**10.86%**	$ 70	$ 30	$ 8.50	$2.10	$ 6.40	**21.33%**
Low 20%	$ 30	$ 70	$ 2.00	$0.90	$ 1.10	**1.57%**	$ 70	$ 30	$ 2.00	$2.10	$ (0.10)	**-0.33%**
	Expected Equity Return					***9.00%***						***17.00%***
	Equity Return Volatility					***3.71%***						***8.67%***

FIGURE 2. INCREASED LEVERAGE INCREASES EQUITY RETURN VOLATILITY AND COST OF CAPITAL (SIMPLE 2-STATE EXAMPLE)

30. As illustrated by the example, the changes in risk sharing from alternative capital structures is generally absorbed by equity, as the residual claimholder.[32]

31. The chart below extends this 2-state numerical example over the range of capital structures from 20% to 85% debt, again assuming that the asset cost of capital is invariant to the debt ratio (i.e., it is a flat line; see the teal coloured line labeled "Expected Asset Return"). The possible equity returns in the up and down state from the tree are identified by the dotted blue

[32] Technically, this assumes that that there is enough equity capital such that the value of debt is not at risk (i.e., the firm is not in financial distress).

line, and are labeled "Realized Equity Returns (re)". As illustrated by the figure, realized returns are increasingly volatile as the amount of leverage (debt ratio) increases, giving the range of returns a horn shaped band. This reflects the increasing financial risk of equity with increasing leverage. The expected return is plotted as the dark blue line labeled "Expected Equity Return".

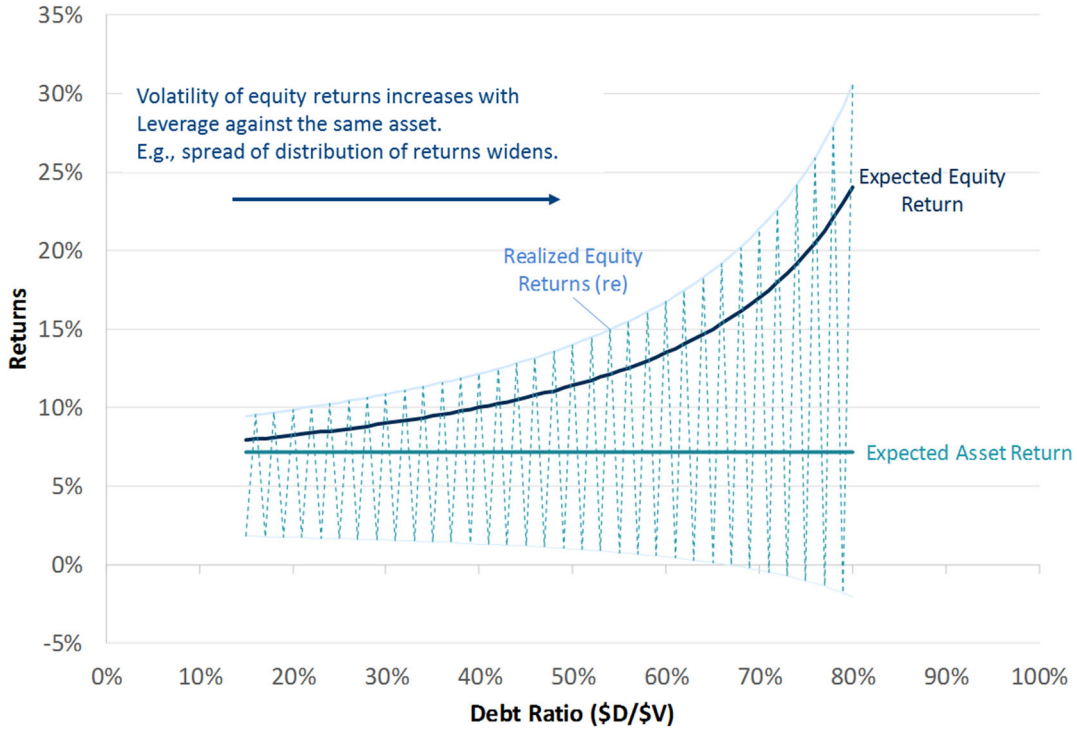


FIGURE 3. EXPECTED EQUITY RISK CHANGES WITH LEVERAGE

32. Notice that the increased volatility of r_E as the debt ratio rises that is shown in Figure 3 is a purely mathematical result at this point – no specific economic theory was required. This is because we have simply assumed that the asset risk and its corresponding cost of capital were invariant to the capital structure in constructing the figure (i.e., we assumed the asset cost of capital curve/WACC is flat). Indeed, the discussion throughout the report has implicitly treated the asset cost of capital as if it were constant across capital structures. There is, however, an influential economic principle that supports the validity of this invariance assumption, at least for a wide range of "reasonable" capital structures.[33] Specifically, this is the result of the Modigliani-Miller ("M-M") capital structure irrelevance theorem.[34]

[33] The "reasonable range" can potentially vary by industry. (See, e.g., 2010 Brattle Report, Section III.G.)

[34] Modigliani, Franco, and Merton H. Miller. "The cost of capital, corporation finance and the theory of investment." *The American economic review* 48, no. 3 (1958): 261-297. See also Chapter 17 of Brealey-Myers-Allen.

33. In its most simple, and perhaps extreme, statement, the M-M theorem says that the WACC curve is flat across the entire range of capital structures ($D/$V = 0 to 1). This means, among other things, that the operational decisions of the firm are completely independent of its financing decisions. The result also means that the choice of capital structure does not affect the value of the firm. The economic principles behind the M-M theorem are essentially those that we have been outlining throughout the prior sections of this report (risks occur on asset side and flow through to the claims). However, this simple version of the M-M theorem ignores the impact of corporate taxes (and the value of the corporate tax shield) and the costs of financial distress (i.e., costs due to increased default and/or insolvency risk as leverage becomes excessive).

34. Modern versions of the M-M theorem have explored the impact of the additional considerations, such as taxes and costs of financial distress (among others).[35] The result of extensions to the theory is a modified WACC curve that has curvature at both low and high levels of debt, with relative flatness in between (see Figure 4 below). The initial drop in the cost of capital reflects the growing impact on value of the corporate tax deduction for interest on debt, which favours debt over equity. The marginal benefits of extra tax shields start to dwindle as debt is increased, and additional costs of increased debt start to weigh more on the firm. As leverage becomes excessive, the costs of financial distress start to weigh on the firm and its cost of capital rises rapidly in that range.

[35] See, e.g., Chapters 17 and 18 in Brealey-Myers-Allen.

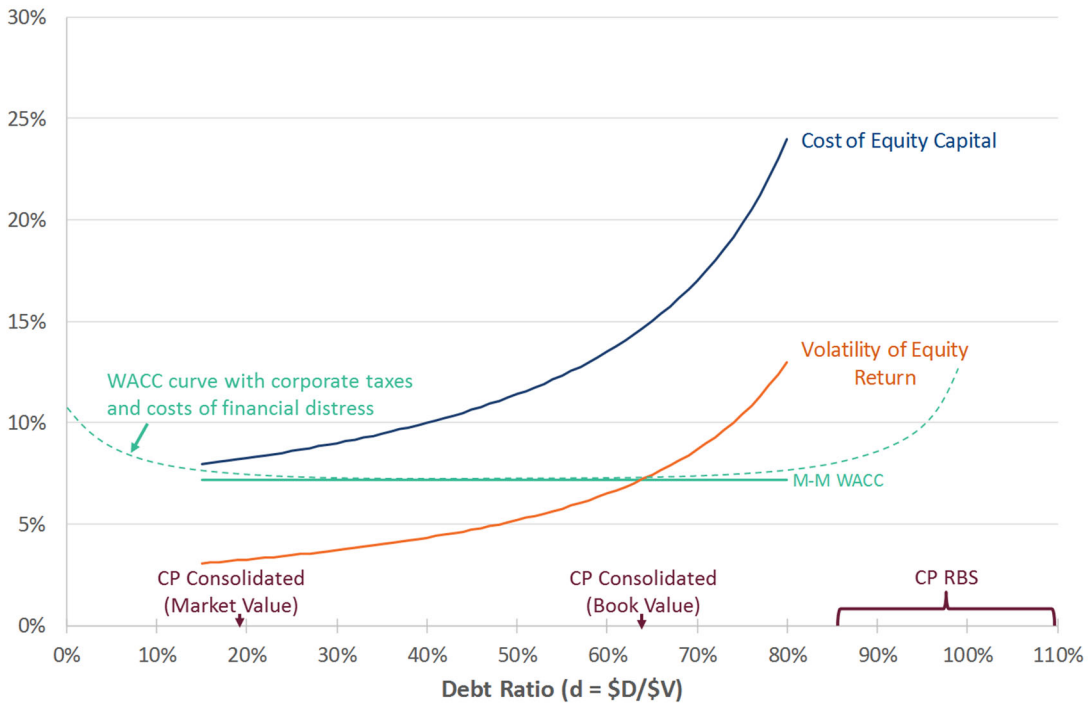


FIGURE 4. EQUILIBRIUM WACC CURVE ONLY APPROXIMATELY FLAT IN A BROAD MIDDLE RANGE OF CAPITAL STRUCTURES WHEN CORPORATE TAXES AND COSTS OF FINANCIAL DISTRESS ARE INCLUDED. CP'S RBS UNDER THE 2020 INTERIM METHODOLOGY SITS IN A REGION OF FINANCIAL DISTRESS, AND IS SIGNIFICANTLY DISCONNECTED FROM THAT OF THE PARENT ON BOTH A BOOK AND MARKET VALUE BASIS.

35. A more detailed discussion of the theory and evidence supporting the modern version of the M-M proposition and WACC curve is beyond the scope of this report. The key takeaway, however, is that the WACC curve can reasonably be treated as essentially flat – but only so long as capital structures are in a reasonable range as compared to financially healthy companies within the industry.

36. Figure 4 assumes that an 80% debt ratio is the point in this industry where the costs of financial distress start accelerating -- beyond this point, the costs of financial distress will increase the cost of debt as well as the cost of equity. Because the 2020 interim methodology places CP beyond this threshold, it results in a regulatory capital structure for CP that one would associate with financial distress and will likely lead to negative regulatory equity for CP in the coming years.[36] This is not an appropriate or economically credible capital structure for a railway when viewed on a standalone basis, and is out of line with the existing financial strength of CP on a consolidated basis.

[36] CP Response Submission, pp. 10-11.

B. The Cost of Capital is Not an Accounting Cost "Stapled" to Capital

37. The M-M theorem allows us to reasonably approximate impact of changes in capital structure on the equilibrium cost of equity for a wide range of reasonable capital structures. Specifically, the M-M theorem allows us to treat the asset cost of capital on the left side of the WACC equation as a fixed number once it has been estimated for a specific asset risk. Under the simplified M-M theorem, that cost will not change as we move to different capital structures within a reasonable range. The impact of changing financial leverage on the equity cost of capital can then be derived by re-arranging the WACC equation.

38. Specifically, we can rearange the formula to make the equilibrium return on equity a function of the fixed asset cost of capital, the fixed costs of debt and taxes, and a variable capital structure:[37]

$$r_e = \frac{Asset\ WACC - d(1 - T_C)r_D}{1 - d}$$

where *d* now represents the debt ratio *d = $D/$V.* This implied cost of equity at different debt ratios *d* ranging from 15% to 80% - the relatively flat range – is also illustrated in Figure 4 above (the blue line labeled "cost of equity capital").[38]

39. Thus, the M-M theorem provides the foundations for why a shift in capital structure would impact the cost of equity. The implementation of the 2020 interim methodology, while inducing an increase in leverage, fails to account for any corresponding impact to the risk of equity.

40. The discussion above reinforces the fact that the cost of equity capital is not a fixed or tangible accounting price that is somehow "stapled" to specific equity capital, and which follows that equity around as it is deployed to projects within an organization. Capital is fungible. As noted previously, the cost of equity is an opportunity cost that reflects the risks to which an equity

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[37] Technically, this assumes a zero beta for debt (see 2010 Brattle report, page 107).

[38] The cost of equity for capital structures beyond 80% is not show. For this example, 80% is the assumed point where costs of financial distress kick in for the industry – can start being driven by a plethora of factors that make it harder and less reliable to estimate an appropriate cost of equity. Moreover, there is often little data available for companies operating in this range of capital structures, so there are practical estimation problems to deal with as well.

interest is exposed, wherever that capital is deployed – it is not a cost associated with how that capital was raised.[39]

41. For example, consider two comparable risks companies, Sub A and Sub B – each with $100 of capital assets (see Figure 2). Sub A is financed primarily with equity capital and has a debt ratio of 30% (i.e., debt A = $30). Sub B is financed primarily with debt and has a debt ratio of 70% (i.e., debt B = $70). The pre-tax cost of debt is the same at both companies (i.e., 4%). The cost of raising equity capital at the two companies, however, differs: Sub A equity has a cost of capital equal to 9.4%, while Sub B equity has a cost of 18%, reflecting its relatively higher financial risk exposure. With a corporate tax rate of 25%, one can verify that the WACC of each company is 7.5%.

42. Now consider a merger between the two companies under a new parent ("Parent"), where they continue to operate as before and market costs of capital do not change.[40] Parent issues new equity at the consolidated level representing a claim on the portfolio of equity in Sub A and Sub B. The cost of Parent equity claims would be a weighted average of Sub A and Sub B equity cost, and, in this case, is 12%. This clearly does not, however, make the equity at Sub A less risky than before, nor does it change the cost of that equity from 9.4% to 12%. Similarly, the cost of equity at Sub B does not suddenly become 12% instead of 18%.[41] This is another way to see that the cost of equity is attached to the risk where it is invested, not the average risk where it raised (i.e., it is not "stapled").

[39] See, e.g., Chapter 5 in Brealey-Myers-Allen.

[40] Under this set up, Parent WACC would just be 7.5% percent, the same as Sub A and Sub B. Parent cost of debt would be 4%.

[41] E.g., consider a grocery bill that has a mix of bread, milk, bananas, etc. If the bill totals $100 and there are 25 items total, then the average food item cost is $4. But it is not correct to say that the bananas, which had an actual cost of $1, had a $4 cost because that was the average cost per item. Similarly, equity in higher risk projects have higher costs of capital versus ones in lower risk projects. The cost of equity estimated at the firm or parent level is a weighted average of this mix of these equity costs, but the costs of the equity sitting in each of the projects can generally be higher and lower than this firm level estimate.

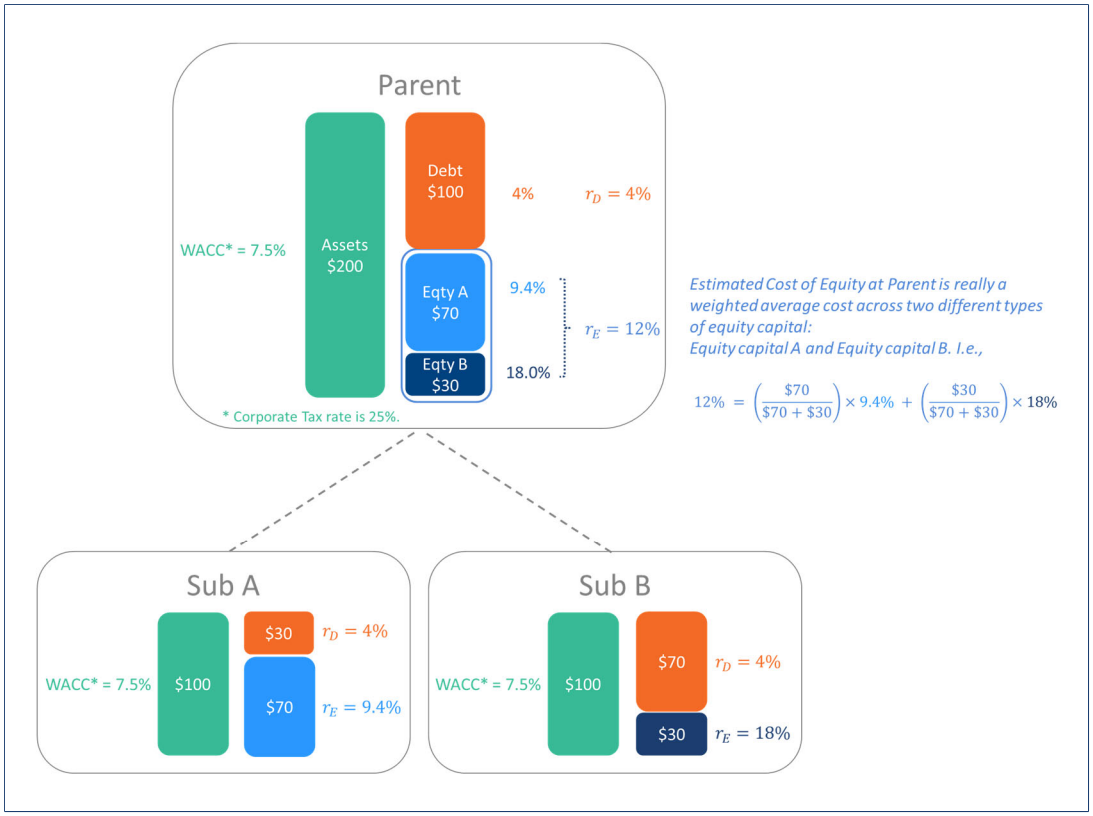

FIGURE 5. EQUITY CAPITAL AT THE PARENT IS A BLEND OF DIFFERENT TYPES – EACH TYPE REFLECTS THE SPECIFIC RISK EXPOSURE IT FACES WHERE IT IS PLACED IN THE ORGANIZATION, AND EACH HAS A POTENTIALLY DIFFERENT COST OF EQUITY CAPITAL. THE ESTIMATED PARENT COST OF EQUITY CAPITAL IS A WEIGHTED AVERAGE OF THE DIFFERENT EQUITY CAPITAL COSTS IN THE BLEND.

43. Notice that if the example was modified so that Sub A and Sub B had the same capital structures instead – at 50/50 debt and equity – then the cost of equity capital at each (prior to the merger) would have been 12%, and Parent cost of capital after the merger would still be 12%. However, in this scenario, the parent cost of equity is the same as the cost of equity at the Subs, since the capital structures are all consistent throughout the organization. This reinforces the point that significant differences in capital structures between the parent and any subs of otherwise comparable asset risk will make the cost of parent equity less appropriate for use in computing the WACC of the Subs.

44. In the context of the 2020 interim methodology, this effect can, in part, explain the difference between the regulatory WACC that the Agency computes for CP, at 4.79%, versus its consolidated WACC of 6.46% (using the Agency's estimated costs of equity and debt capital at

the consolidated level).[42] Conversely, CN's regulatory WACC was determined to be more comparable with its consolidated WACC, at 5.19% and 5.51%, respectively. [43] This contrast between the two railways' outcomes, in terms of economic substance, again indicates that GP debt should be treated differently in order to provide economically equitable outcomes between the railways.

V. Example in the Context of the 2020 Interim Methodology

45. In the context of the 2020 interim methodology, consider a hypothical example of a Canadian railway company ("Parent") that has both regulated and non-regulated operations of comparable risk. The Parent has $580 of consolidated assets and a capital structure comprising of 60% debt and 40% equity. GP debt makes up approximately 24% of the total debt in the consolidated operations, at $83. To keep things simpler, we assume that there are no deferred liabilities. Parent issues all the debt and equity for the consolidated operations. The consolidated balance sheet of this hypothetical Parent is given in Figure 6 below.

Consolidated Parent Balance Sheet

Regulated Capital Assets		**$**	**580**
Liabilities and Equity			
GP Debt	**60%**	$	83
Debt		$	265
Equity	**40%**	$	232
Total Debt + Equity		**$**	**580**

FIGURE 6. HYPOTHETICAL CONSOLIDATED BALANCE SHEET

46. Suppose that the regulated operations of Parent have an RBS with $250 of capital assets, and its capital structure comprises of 60% debt (in book value) as well. Now consider the impact of the 2020 interim methodology where we assume that the regulated RTM account for 60% of total Canadian RTM, so that the RBS is allocated 60% ($50) of Parent's GP debt. Figure 7 below shows the hypothetical RBS both before and after the 2020 interim methodology.

[42] CP Response Submission, page 8.

[43] CP Response Submission, page 8.

Regulatory Balance Sheet

		Before		Impact of GP Debt Allocation Using 2020 Interim Methodology (@60%)	After	
Regulated Capital Assets		**$**	**250**		**$**	**250**	
Liabilities and Equity							
GP Debt	**60%**	$	-	$ 50	$	50	**80%**
Debt		$	150		$	150	
Equity	**40%**	$	100	$ (50)	$	50	**20%**
Total Debt + Equity		**$**	**250**		**$**	**250**	

FIGURE 7. HYPOTHETICAL REGULATORY BALANCE SHEET EXAMPLE – IMPACT OF THE 2020 INTERIM METHODOLOGY

48. As shown in the figure, the 2020 interim methodology takes the RBS from a 60% debt ratio to an 80% debt ratio, which is now materially different from the capital structure of Parent. As we discussed above, this exposes the equity capital in the regulated operations to significantly more financial risk.

49. To explore the impact of the GP debt allocation on the calculated WACC (with no further cost adjustments), suppose that the (weighted average) pre-tax cost of debt is 4%, the corporate tax rate is 25%, and the cost of equity estimated at Parent is 13.5%. Under these assumptions, the WACC formula gives an asset cost of capital of 7.2% (see green dot in Figure 8 below). Since this was estimated from market data at Parent, and the company is not financially distressed, the 7.2% WACC estimate is presumed to be a reasonable estimate of the cost of capital for that type of risk. Under the M-M theorem, the WACC for this type of risk is approximately 7.2% for a wide-range of non-distressed capital structures (see the green line labelled "Asset WACC" in Figure 8).

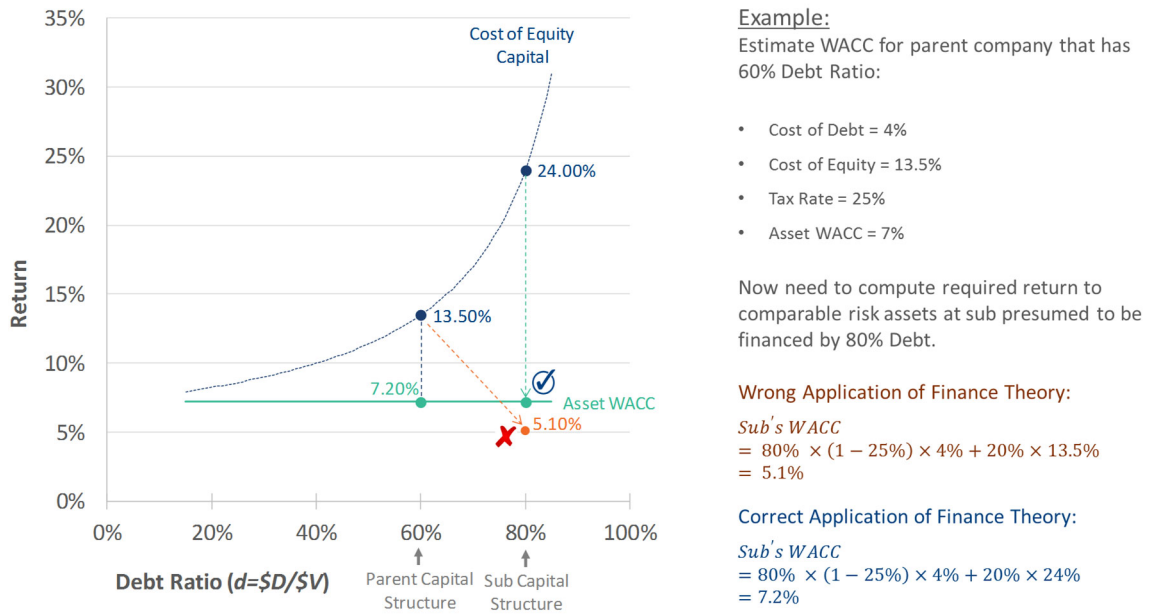

FIGURE 8. FAILURE TO ADJUST FOR CAPITAL STRUCTURE DIFFERENCES LEADS TO ERRORS IN THE ESTIMATED WACC FOR REGULATED OPERATIONS IN THE EXAMPLE

52. Applying the WACC formula to the regulated operations before the 2020 interim methodology gives the correct WACC of 7.2% as well (trivially, since it has the same capital structure as Parent). However, mechanically applying the WACC formula to the post-GP debt allocated capital structure with 80% debt – while using the same (Parent) costs of capital – predictably leads to a material error. As shown in the second panel of Figure 8, the resulting WACC from this calculation is 5.1%, or 2.1 percentage points lower than the true cost of capital of 7.2% in this example. The problem with this latter computation is that it failed to properly recognize the cost impact of the added financial risk on the cost of equity. To account for this, we can use the earlier formula for the equilibrium cost of equity to see that the impact of the added financial risk is 10.5 percentage points (see blue curve in Figure 8). That is, under the GP debt allocated capital structure, the cost of equity is 24%, not 13.5% (see blue dot in Figure 8). With this adjustment, the WACC formula now properly finds that the cost of capital for the regulated operations is 7.2%.

53. More generally, we can plot the impact of failing to adjust for financial risk in this example by computing the resulting WACC estimates for different changes to the capital structure (see the orange line in Figure 9 below). As illustrated in the figure, the mistakes can become substantial even within the range of reasonable capital structures.

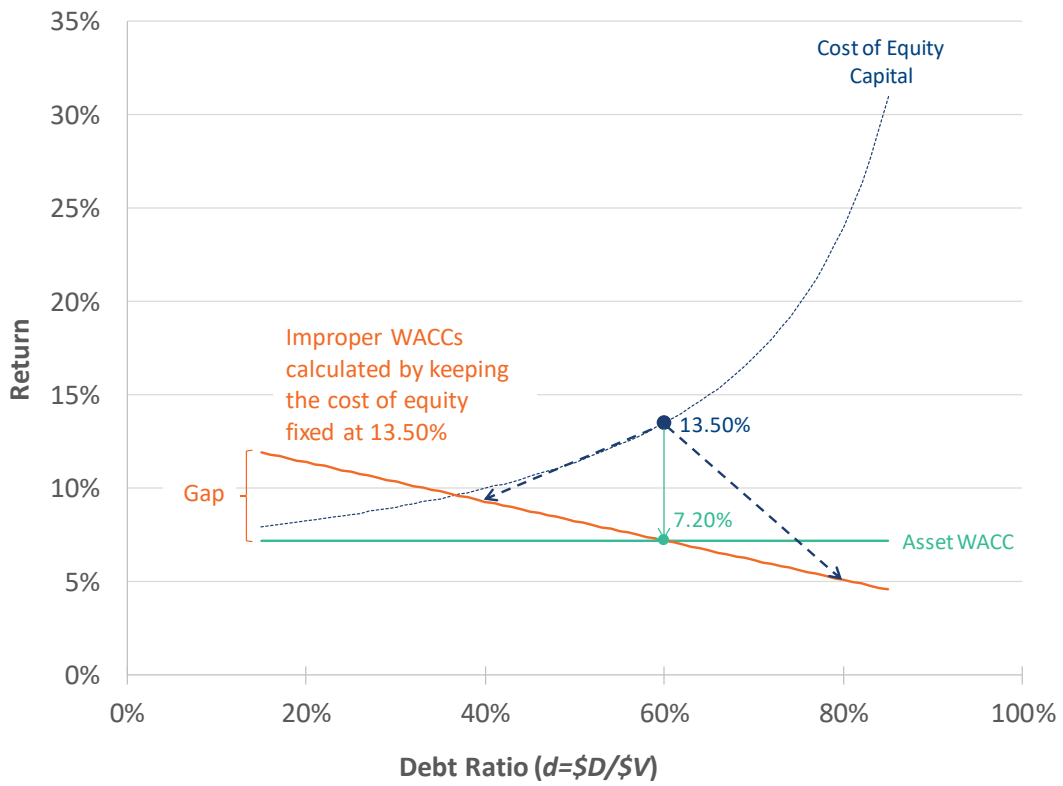

FIGURE 9. ESTIMATING THE WACC AT DIFFERENT CAPITAL STRUCTURES WITHOUT ADJUSTING THE COST OF EQUITY FOR THE CHANGES IN FINANCIAL RISK CAN LEAD TO MATERIAL ERRORS

54. The problems become even more pronounced if the resulting regulatory capital structures start looking like those of a firm in financial distress. When capital structures extend beyond the region where the WACC can be considered reasonably flat, it is difficult to come up with reliable cost adjustments that can correct the WACC formula - when applied to the RBS. As standalone capital structures enter the region of financial distress, the cost of debt also starts to rise and will no longer be represented by the cost of debt at the parent. Equity also becomes significant more volatile, making reliable estimation more challenging. One could consider a comparable sample with similar financial distress – if such were even available – but that would also be subject to significant data errors. Alternatively, one might think to simply back-out the right cost of equity using the estimated parent WACC and assuming the cost of debt is the same (or perhaps equals the parent cost of debt plus some appropriate spread). But this just raises the question of why bother with tracking the right side of the RBS if the parent WACC is simply going to be applied to the regulatory capital assets balance – which is estimated independently from the debt and equity allocations.

55. For these reasons, any allocation approach for general-purpose debt cannot be one that can potentially put the regulated railway operations in a position of financial distress. Yet, the 2020

interim methodology not only has the potential to do so, as noted earlier, it is already doing so for CP. Moreover, CP predicts that the 2020 interim methodology will completely wipe out the equity on its RBS in the foreseeable future and put it in a position of negative equity: [44]

> *Under the current methodology we expect that CP's regulatory balance sheet will likely show near-zero equity, or even negative equity, in the foreseeable future.*

This situation would produce more extreme challenges in determining an appropriate regulatory cost of capital than the financial distress scenario noted above.

56. As illustrated by the example, to the extent that the 2020 interim methodology is introducing material differences between CP's consolidated capital structure and its Canadian RBS, it is inappropriate to mechanically treat CP's consolidated average cost of equity as the cost applicable to its RBS. The cost of equity capital sitting on CP's RBS (and potentially the cost of debt) will have increased financial risk that needs to be accounted for if a fair return (i.e., WACC) is to be obtained.[45]

VI. Conclusion

57. An economically principled allocation for GP debt would be one that ensures: i) a required fair return to regulated capital assets; and ii) an appropriate standalone capital structure for the railways' regulated assets; and iii) equitable treatment between the railways in terms of economic substance. The 2020 interim methodology is essentially a mechanical *rule of thumb* approach to making this allocation. Like all mechanical approaches, it may work by chance, or perhaps even more often than not by design – but only when the design is calibrated to ensure that desirable *economic* outcomes prevail under existing conditions or reasonably expected conditions. The 2020 interim methodology has already failed on multiple of these fronts with respect to CP. This strongly indicates the need to treat GP debt differently between the railways within the scope of the 2020 interim methodology.

[44] CP Response Submission, page 5.

[45] As discussed below, to the extent that the 2020 interim methodology places CP's RBS in a position of financial distress – when viewed on a standalone basis – it is possible that no principled adjustment would reliably reflect the adjustments needed to compute an appropriate regulatory WACC.

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