Review of New Zealand Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services", paper published on July 22, 2014.

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Executive summary

1. The New Zealand Commerce Commission (in the following NZCC or the Commission) has asked me to assess whether in my opinion the above report addresses the High Court's comments and whether the NZCC's decision on the percentile adequately balances the available evidence.

2. I am impressed by the evenhandedness of this Draft Decision and am fully supportive of the overall result. The reduction in the WACC uplift from the 75th to the 67th percentile is unlikely to materially affect investment but will relieve consumers. In my view, the above report in a balanced way addresses almost all of the High Court's comments. The new empirical and theoretical evidence presented reduces the scope of necessary judgment and makes the residual judgment more informed. The time for an informed decision is therefore appropriate now. I only have some minor disagreements with the report in its current form. The Commission has taken utmost concern of the effects of the WACC uplift chosen on total welfare and/or consumer welfare. At the same time the Draft Decision is providing the regulated firms with a return that makes them whole and in that sense gives them confidence to invest and to innovate.

3. The only one of the High Court's comments that the report does not address relates to the two-tier proposal addressed in paragraph 1486 of the High Court decision. While the current decision to move to the 67th percentile of the WACC distribution is balanced and well-reasoned for the total cost of capital approach, it would not, in my opinion, be appropriate for the split cost of capital approach. From a commitment perspective at least for the energy networks I would therefore have liked to see the Commission definitively dispose of the split cost of capital approach in the current proceeding.

4. The NZCC's main conclusions draw heavily on an analysis of RAB multiples of the regulated firms. Unfortunately, the NZCC only has a valid sample of two firms as observations. The report makes the best of these two observations and does a convincing job trying to refute the arguments of commentators. It also adequately addresses the question what explains the large difference between the two valid observations. Nevertheless, the Commission had to exercise a substantial amount of judgment on this issue.

5. The NZCC takes an intermediate approach between consumer surplus only and total surplus as the objectives to be pursued in the quantitative analysis. This is understandable given the controversy about these two objectives among the parties and because the Commission was able to reach a decision without giving one of these objectives 100% and the other 0% weight. It

has, however, to be kept in mind that the two objectives can potentially lead to very different outcomes.

6. The Commission, in my view, goes beyond the High Court's queries by not only considering the best WACC uplift in isolation but also taking into consideration other policies in place for achieving the same purposes, for example, the purpose of a high level of grid reliability. This relieves the burden placed upon the WACC uplift as a policy tool.

7. The report generally balances well the available evidence from the NZCC's own analysis, from the academic literature, from the NZCC's commissioned expert reports, and from submissions posted on the NZCC's website. I have therefore only added two comments, the main one relating to the one major academic paper by Dobbs that addresses the current issue and pointing out that Dobbs' main contribution is about the function of a WACC uplift in enhancing investment in new services.

8. At the end this critique addresses several smaller issues, such as the appropriate weight of the status quo, the role of necessity as the mother of invention, the appropriate role of upper and lower bounds in the WACC uplift, and the role of international comparisons in the WACC uplifts granted by regulators abroad. The critique ends with a positive assessment of the commitment power of the current Draft decision.

Introduction

9. The New Zealand Commerce Commission (in the following NZCC or the Commission) has asked me to assess

    - Whether in my opinion the above report addresses the High Court's comments in paragraphs 1422-1487 of the input methodologies merits appeal judgement.

    - Whether the NZCC's decision on the percentile adequately balances the available evidence including:

        - NZCC's own analysis (particularly the RAB multiples analysis in Attachment A); and

        - the expert reports NZCC has received (primarily Oxera, but also submissions and the expert reports on the NZCC website at: http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/further-work-on-wacc/)

10. I am impressed by the evenhandedness of this Draft Decision and am fully supportive of the overall result. In a greenfield environment I would have supported a lower than the 67th percentile. However, in a path-dependent world the current 75th percentile does carry some weight. As Professor Franks noted, regulators do not and should not want to see the lights go out. Under the current decision there is little concern that this will happen. The reduction in the

WACC uplift from the 75th to the 67th percentile is unlikely to materially affect investment but will relieve consumers.

11. In my view, the above report in a balanced way addresses almost all of the High Court's comments in paragraphs 1422-1487 of the input methodologies merits appeals judgement and balances the available evidence. Furthermore, as a result of the current proceeding the evidence available for informed judgment on the appropriate allowed WACC has substantially improved. The new empirical and theoretical evidence presented reduces the scope of necessary judgment and makes the residual judgment more informed. While information can always increase further, the time for an informed decision is appropriate now. I only have some minor disagreements with the report in its current form.

12. The current proceeding has brought out the full complexity of a sound decision on the WACC uplift based both on theory and on empirical evidence. It has become clear that even with the best theoretical and empirical analyses a lot has to be left to the judgment of the Commission. Two issues in particular have to be on the Commissioners' minds. The first, openly addressed in the report, is the concern about the effects of the WACC uplift chosen on total welfare and/or consumer welfare. The second and related issue is that of providing the regulated firms with a return that makes them whole and in that sense gives them confidence to invest and to innovate. This issue is specifically addressed in the analysis of RAB multiples (Attachment A) and in the reasonableness test (Attachment B). Regulators have to make sure that with some high probability the regulated firms can actually cover their cost of capital in order to invest and innovate and that requires allowing the regulated firms a rate of return at least slightly higher than the regulator's own estimate. The history of the Averch-Johnson effect in the U.S. can only be understood under the assumption that regulators prefer to err by over-estimating rather than under-estimating the regulated firm's cost of capital. Evans and Garber (1988) made that point quite clearly.[1]

The split cost of capital approach

13. The only one of the High Court's comments that the report does not address relates to the two-tier proposal contained in paragraph 1486 of the High Court decision. In paragraphs 4.26 and 4.27 of the report the NZCC announces their decision not to treat this split cost of capital approach in the current proceeding but rather treat it later together with the wider review of the IMs. While the current decision to move to the 67th percentile of the WACC distribution is balanced and well-reasoned for the total cost of capital approach, it would not, in my opinion, be appropriate for the split cost of capital approach. This comes out clearly from Dobbs' analysis mentioned, e.g., in para 5.10 of the report or from the Oxera report, mentioned in para 5.21.4 of the report. Clearly, Oxera's whole analysis would have to change in order to do justice to the split cost of capital approach. The static welfare losses for consumers would be quite different

[1] See Evans, L., and S. Garber (1988), "Public Utility Regulators are Only Human: A Positive Theory of Rational Constraints", American Economic Review 78, pp. 444-462.

as would be the outcome w.r.t. optimal reliability. If the decision on the split cost of capital approach were deferred I could also see a commitment issue regarding past investments. This commitment issue would arise for all investments already done under the current 75th percentile regime. Under continuation of the current total cost of capital approach one can argue that a move from the 75th to the 67th percentile still balances the cost of financing of pre-2010 investments (which were mostly done without the uplift) with cost of financing the post-2010 investments, which were promised the 75th WACC percentile. This would not be the case for the split cost of capital approach. In sum, from a commitment perspective at least for the energy networks I would have liked to see the Commission definitively dispose of the split cost of capital approach in the current proceeding.

RAB multiples

14. The NZCC's main conclusions draw heavily on an analysis of RAB multiples of the regulated firms. Unfortunately, the NZCC only has a valid sample of two firms as observations. The report makes the best of these two observations and does a convincing job trying to refute the arguments of commentators. It also adequately addresses the question what explains the large difference between the two observations. Nevertheless, the Commission had to exercise a substantial amount of judgment on this issue.

15. More specifically, the report in Attachment A provides a detailed and careful analysis of the RAB multiples. It is clear from the outset that this work consists only of case studies that cannot be used for any statistical tests. The attachment mentions four potential cases, but bases its main conclusions only on two of them. The excluded cases concern Transpower, for which Northington Partners had found a valuation in excess of its book value, and Horizon, for which the RAB multiple appeared to be below 1.0. The exclusion of Transpower is understandable for lack of current market data and it is harmless, because it would only strengthen the report's hypothesis that the RAB multiple exceeds 1.0. The exclusion of Horizon, however, is less innocent, because it is one of only three publicly traded electricity distribution companies. The report argues (a) that Horizon's non-regulated business cannot be valued (implying that the value may be negative), (b) that because of Horizon's small size it carries little weight relative to the overall size of the sector, (c) that because of a thin market for Horizon's shares Horizon's share price may not reflect its true valuation, and (d) that Horizon may be suffering from scale disadvantages that could make it an inefficient company. While I would expect more knowledgeable people (including Horizon's management) to respond to these points in this proceeding, my conjecture is that information should exist to better assess points (a) and (d). While point (b) has some validity in the sense that including Horizon does not add much to covering the sector, Horizon would provide an independent additional observation.

16. The two crucial observations of RAB multiples for Powerco and Vector are clearly much less obscure than those for Transpower and Horizon. The observation for Powerco is the cleanest in the sense that Powerco is almost exclusively in the business that is subject to the WACC regulation and that a large fraction of its outstanding shares have been traded at about a 1.33

RAB multiple. The only question here is if the acquirer AMP of 42% of Powerco's shares paid a premium above the "true" market price. The report here convincingly argues that AMP has not been trying to take over the Powerco business but rather was seeking a long-term financial investment. An argument not pursued in the report is that if AMP had tried to buy an equivalent ownership percentage of any company of Powerco's size in the open market it would have had to bid up the share price. However, equivalently the seller of 42% of Powerco's shares would have seen the share price drop upon an attempt to throw so many shares on the market. This argument therefore balances, unless one has specific information to the contrary. Such information obviously was not available to the Commission. I can therefore follow the Commission's judgment on the Powerco RAB multiple.

17. Vector's RAB multiple of between 1.09 and 1.16 is both smaller and less clean than that for Powerco. The reason why it is less clean is that Vector consists of several businesses, not all of which are governed by the WACC regulation. The stock market, however, values Vector only as a whole. The Commission has done an admirable job piecing together the full company value from its regulated and non-regulated parts. In my view, the calculations done by the Commission are generally convincing. However, the resulting valuations are clearly subject to potential valuation errors. Because of such potential errors the comparatively low RAB multiples (compared to that of Powerco) are somewhat disturbing. It may be that from a statistical perspective they are not really larger than 1.0. On the other hand it may be that they are really much closer to the RAB multiple of Powerco.

Objective function relevant for setting the allowed WACC

18. The NZCC takes an intermediate approach between consumer surplus only and total surplus as the objectives to be pursued in the quantitative analysis. The difference between the two objectives can be huge. It may be worth noting that under a pure total surplus approach almost any uplift to the WACC can be justified based on Oxera's numbers about the value of reliability, because almost the whole consumer price increase from an increased WACC cancels out against the firms' profit gains. Using a pure consumer welfare approach neglects counting the profit gain and therefore leads to the really difficult decision trading off increased reliability against increased prices. In contrast to the price increase from the increased WACC alone the price increase from any additional investment necessary for the increase in reliability is counted approximately the same under total surplus and consumer welfare, because it is a resource cost to society and therefore in itself only increases consumer prices but not profits (except for the extra profit if the allowed WACC exceeds the firms' true cost of capital). If one uses a weighted surplus approach and adds in the additional investment costs one probably ends up close to the Oxera conclusions, which are based on pure consumer surplus analysis but leaves out the investment cost.[2]

[2] Buried in the redistribution between firms and consumers caused by a WACC uplift could be a real cost saving. It is that in my opinion a change in the allowed WACC uplift is likely to change the WACC itself. Assume that we

19. The total surplus objective is usually justified by a long-term dynamic approach, where the outlook of profits is viewed as necessary for future consumer benefits. However, static consumer surplus concerns from "costs to consumers from over-estimating WACC" are just as much "long-term" effects as those from investments. I see both of these effects as being "long-term", because the investments have a long life, for which the consumers have to pay over this lifetime. The beneficial investment effects may, however, occur with a lag and the capital costs decline with depreciation (although replacement sets in so that annuities may be appropriate).

20. The NZCC is very circumspect about the weights to be assigned to consumer welfare and to total surplus in the regulatory objective. This is probably intentional. There seems to be no general agreement among parties on what weights to use. Most parties to this proceeding either want consumer benefits only (consumer advocates) or total surplus only (regulated companies).[3] In my view, this lack of agreement introduces another level of uncertainty for the evaluation of the WACC percentile that requires judgment by the Commission.

Relevance of other policy tools besides setting the WACC

21. The Commission, in my view, goes beyond the High Court's queries. The High Court wanted the NZCC to justify the WACC percentile with sound theory and convincing empirical data. I understand this to mean that the Court would be satisfied with an analysis of the merits of the 67^{th} percentile against the 50^{th} and the 75^{th} percentile. The Commission went beyond that by asking the question if using the WACC percentile is a good policy relative to other policies that pursue the same objectives. For example, if the allowed WACCC were set at 67% then reliability incentive regulation could increase the achieved WACC relative to the allowed WACC and therefore could under very good reliability performance even get the firms back to something like the 75^{th} percentile. Thus, a further advantage of using the 67^{th} instead of the 75^{th} percentile is that it provides more room for the NZCC to use positive incentives ("carrots") for improving reliability. Thus, the grid owners may come closer to their old profitability via reliability incentives. Since reliability is the result of both dedicated investments and better operating procedures, using a too high WACC uplift may bias the achievement of reliability in favor of investment.

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increase the uplift. Then there can be two potentially opposing effects. The first effect is that ceteris paribus (i.e., with unchanged firm behaviour) the firm's business becomes less risky, because the firm commands higher prices. Thus, the likelihood of bankruptcy or illiquidity is reduced. Because of the higher expected profits the share price rises so that the debt/equity ratio falls. Thus, the cost of debt should fall. The second effect is that the firm may undertake additional investments (the effect the NZCC desires). This can increase risk so that the overall WACC and also the cost of debt capital may stay the same as before. However, that would be by pure coincidence of a balancing of the two effects

[3] In my reading the High Court seems to lean more towards a consumer welfare interpretation by emphasizing that "the outcome of providing regulated suppliers with incentives to invest and innovate … is to be decided within the context of what best promotes the long-term benefit of consumers, the overriding purpose of Part 4." (Paragraph 1461 of the High Court decision).

22. Using the WACC uplift is a very broad policy tool. Unless one uses it on a case-by-case basis it addresses all of the regulated firm's investments, those that are highly valuable and central to the public and those that are more tangential. Thus, the consumers may have to pay more for all the firm's investments in order to incentivize just a few of them. Thus, there may exist more targeted tools to achieve the same outcome or those targeted tools may complement the WACC uplift. I see this as a particular task and opportunity if different industries like transmission and distribution grids receive the same WACC uplift but may be characterized by different investment problems. In that case policies other than the WACC uplift may be able to bridge some of the differences. This may be feasible both if the WACC uplift is higher than necessary and if it is lower than necessary. If the WACC uplift is higher than necessary the other policies may use penalties ("stick") to achieve the desired outcome, while under a too low WACC uplift they may use premia ("carrots") for desired performance. A WACC uplift, however, can be a good or even the best tool for purposes, such as innovation, which arguably cannot fully be achieved with other policy tools.

Available evidence from submissions and expert reports

23. The report generally balances well the available evidence from the NZCC's own analysis, from the academic literature, from the NZCC's commissioned expert reports, and from submissions posted on the NZCC's website.[4] I therefore only comment on two issues.

24. Oxera and other experts draw heavily on a recent journal article by Dobbs.[5] Dobbs' analysis is largely about innovation. In that sense it complements Oxera's analysis of reliability. Dobbs differentiates between three categories of investments/services. "category 2 and 3" investments refer to new services, while "category 1" investments refer to existing services. Thus, category 1 investments relate to replacement and expansion investments for existing services. That could in principle include investments in reliability but those are not specifically addressed. Category 2 and 3 investments are particularly important, because they create new consumer surplus that would not be available without them.[6] Thus, Dobbs' analysis suggests that a WACC uplift may be a good tool for incentivizing innovation. This could hold, in particular, because contrary to the case of grid reliability few effective other policies exist for incentivizing innovation. However, more like the case of reliability, it is unclear what part of innovation efforts enters the RAB.

25. The report only summarizes the airport-related aspects of the Covec submission for BARNZ. Covec, however, more extensively deals with aspects related to energy networks. In this context

[4] For the purpose of this critique I accept the Commission's position that any WACC uplift considered in this proceeding should not relate to any potential bias in the Commission's WACC estimation and should not relate to one-sided or asymmetric risk. These issues may have to be addressed elsewhere.

[5] See Dobbs, I.M. (2011), "Modeling welfare loss asymmetries arising from uncertainty in the regulatory cost of finance", *Journal of Regulatory Economics* 39, pp. 1-28.

[6] Dobbs (in personal communication) is aware of but does not in the article address cross effects on the old services from category 2 and 3 investments.

Covec points out that, based on the Dobbs model, a 45 percentile WACC would be justified for most investments and that a higher WACC can only be justified for new investments (i.e., investments in new services). Furthermore, Covec points out that the consumer gain from a too low price is greater than the consumer loss from a too high price, providing an argument that the loss asymmetry from over- or underestimating the WACC may go in the other direction than conventionally asserted. Covec does concede, however, that very high outage costs may reverse the asymmetry.

Smaller issues

26. In paragraph 2.6 of the report the Commission denies that the current 75th percentile should carry any particular weight in the decision going forward.[7] In my view, there are two reasons why it might carry weight. First, the regulated firms have between 2010 and now invested with the expectation that the current WACC regime would be in place longer than until October 2014. Thus, there is a commitment issue at least until the next planned IM review. Because of the High Court decision the Commission is right to revise the WACC uplift now but the past may have to carry some weight for the outcome. The second reason is that, while I generally adhere to neoclassical economics, we may learn from behavioural economics that under prospect theory individuals tend to value gains less strongly than losses. Thus, for example, the gain from a reduction in the WACC uplift may be valued less by consumers that any decrease in reliability with the same monetary value ("lights go out") or in other quality of service features. Neoclassical economists could, in principle, come to a similar conclusion based on risk aversion, but that would only hold if outages were really large.

27. The argument contained in paragraph 3.5.5 of the report, namely that a lower allowed WACC may force the firm to lower its costs, has been very controversial in environmental economics. Here, most famously Porter (1991) has argued that environmental regulation will lead to more efficient technologies and at the end of the day will make firms more profitable.[8] This argument that regulatory constraints improve efficiency (or, as the High Court put it, "necessity, not plenty, is the mother of invention" [High Court decision, paragraph 1474]) has been mostly rejected by neoclassical economists.[9]

28. The Commission's approach of first finding upper and lower bounds for a WACC percentile and then choosing a point within the resulting range is a good one for reducing the complexity of the issues and for coming to a reasoned judgment. Although it implicitly comes out during the

[7] My reading is that the High Court, while giving the NZCC the benefit of the doubt on the 75th percentile, is open to a choice between the 50th and the 75th percentile.

[8] See Porter, M. (1991), "America's Green Strategy", *Scientific American* 264(4), p. 168. A more extensive version is Porter, M., and C. van der Linde (1995), "Toward a New Conception of the Environment-Competitiveness Relationship," *Journal of Economic Perspectives* 9, pp. 97–118.
Enhance Innovation and Competitiveness?", Resources for the Future discussion paper DP 11-01, January.

[9] For an overview of the ensuing discussion see Ambec, S., M. A. Cohen, S. Elgie, and P. Lanoie (2011), "The Porter Hypothesis at 20 - Can Environmental Regulation.

report's argumentation about the upper and lower bounds, I would have liked to see a clear and explicit statement that these are not true bounds but rather pragmatic bounds, within which the decision could reasonably lie.

29. The international comparisons of the New Zealand WACC uplift with those of other countries might have benefited from a statement that in the other countries considered the WACC uplifts generally relate only to specific investments, while other investments do not benefit from these uplifts. In contrast, the current WACC uplift in New Zealand applies to the full RAB, that is, to all past and future investments on the books. Thus, the New Zealand policy has been substantially more generous to the regulated firms than the WACC policies of these other countries. My view on this comes from a general impression of regulatory decisions I have observed over the years. It was reemphasized by the survey the NZCC had commissioned from Economic Insights. Most of my knowledge comes from telecommunications, where uplifts have been discussed and implemented for new next generation access networks. As I had noted above, in the U.S. rate-of-return regulation was generally viewed by the academic profession as providing an allowed rate of return above the true cost of capital. However, some noticeable exception has been documented by Joskow and MacAvoy (1975).[10]

30. In order to provide a stable outlook for long-term investments the current NZCC decision should hold up for a long time. There are good reasons to believe that such commitment can be achieved. The current decision is in no way extreme. It should provide the regulated firms with returns on their investments that will cover their cost of capital but not much more. Thus, both consumer groups and firms should have little reason wanting to deviate from this percentile. While new information on the various aspects of this proceeding can be expected in the future, it is unlikely to move the perceived optimum by a lot. In particular, new information will also apply to the measurement of the WACC so that it better reflects the firms' actual cost of capital. This applies, in particular, to concerns raised by parties about measurement biases addressed in paragraphs 4.14 and 4.15 of the report.

[10] Joskow, Paul L. and Paul W. MacAvoy (1975), "Regulation and the Financial Conditions of the Electric Power Companies in the 1970s," *American Economic Review* 65, pp. 295-311.