Approaches to Determining Telstra's Regulated Asset Base

Introduction

1. My name is John Philip Small. I am economist and a Director of Covec Ltd, an economics practice I co-founded in 2001. I hold a PhD in economics, and served as an academic economist for eleven years, primarily in at the University of Auckland but also including visiting appointments in Australia, the USA, Canada and England. My special academic interests are in the fields of econometrics and network economics, topics on which I have published research in top-tier international journals.

2. I have worked as a consulting economist for twenty years, for public and private organisations in many industries. I have been engaged by New Zealand government agencies to advise on the regulation of telecommunications on several occasions over the last decade. This included work for the Ministerial Inquiry that recommended sector-specific regulation in 2000, for the Ministry of Economic Development on policy matters, for the Commerce Commission on some details of regulation and for Crown Fibre Holdings on the new Ultra-Fast Broadband initiative which is broadly analogous to Australia's NBN.

3. I have also advised private clients in the telecommunications sector, including Vodafone and Kordia in New Zealand, Digicel in Samoa, and BeMobile in Papua New Guinea. In the late 1990's I was Director of the Network Economics Consulting Group and in that capacity provided advice to Telstra in Australia.

4. I have a long-standing interest in regulatory asset valuation and have recently been advising the New Zealand Commerce Commission ('NZCC') on the subject. Following amendments to the Commerce Act, the NZCC is required to publish 'input methodologies' that describe the regulatory models that will be applied in some detail. Asset valuation is one aspect of that broader project. Part of my work on this project involved the preparation of a report co-authored with several UK-based economists on asset valuation in workably competitive markets. This report has been published by the NZCC. I also published academic research on asset valuation with two colleagues in the European Economic Review in 2006.

5. I have read the Guidelines for Expert Witness in the Federal Court of Australia and prepared this statement in accordance with those guidelines.

6. Telstra has asked for my expert opinion as follows.

    1) Please briefly describe those matters of principle which a regulator should take into account when establishing an initial asset base value to be used in the course of shifting from a forward looking, replacement cost

methodology to a 'locked in' asset base for use in a building block regulatory pricing framework.

2) Assuming an approach to valuing the CAN and Core for the purpose of establishing an initial RAB value which applies the same accounting system used to date under TSLRIC+ (i.e. replacement cost/tilted annuity), please consider:

   (a) whether this approach would constitute an orthodox method of calculating a DORC value for the CAN and Core?

   (b) what principles and approach would need to be adopted in order to calculate a DORC value in this way?

   (c) whether the methodology and calculation applied to determine a DORC value for the CAN and Core set out in Attachment A is consistent with your view in (b) above?

3) The approach you consider should be used to calculate an indexed depreciated historic cost value for assets, for the purpose of establishing an initial RAB valuation.

4) Consider whether the methodology and calculation applied to determine an indexed depreciated historic cost of the CAN and Core set out in Attachment B is consistent with your view in 3 above.

Principles

7. Regulation of firms that own and operate long-lived sunk assets involves repeated interactions over time between regulators and regulatees, plus others that have an interest in the outcomes. Those involved remember the past and know they will probably be involved in new interactions in the future. In this respect, regulation is similar to long-term trading relationships in business, in which context trust is highly valued.

8. High levels of trust take a long time to create, but they can be lost very quickly. In a regulatory context, they are particularly vulnerable when significant changes are being sought to the structure of regulation. Shifting from one asset valuation system to another is a very significant change in the structure of regulation.

9. In this situation, there are several principles that could, and in my opinion should guide the decisions and processes adopted by the regulator. The following list is adapted to this particular issue from more broadly applicable

lists and discussions of regulatory principles that have been published by various organisations and individuals in the past.[1]

a. Respect all relevant legislative guidance;

b. Ensure that the new method of valuation is fully consistent with other parts of the regulatory model, in particular the definition of the cost of capital and the approach to depreciation and capital additions;

c. Align the initial valuation in the new regime with the final valuation in the old regime, to the extent reasonably possible.

10. The first of these requires no elaboration. The second concerns the internal consistency of the new regulatory model. In the context of a 'locked-in' regulatory asset base ('RAB') model, depreciation charges raised in one year will reduce the RAB in the following year, while capital additions will increase it. The definition of the cost of capital and the RAB must be aligned to ensure that investors are compensated for inflation.

11. The third principle is based on the desirability of regulatory commitment, its link with trust and the impact of trust on investment incentives.

DORC and TSLRIC+

12. Under the existing TSLRIC+ system, service prices are based on the incremental cost of a notionally optimised asset base. The model relies on capital charges, representing a combination of depreciation and the return on capital, that are defined using a tilted annuity of the following form.

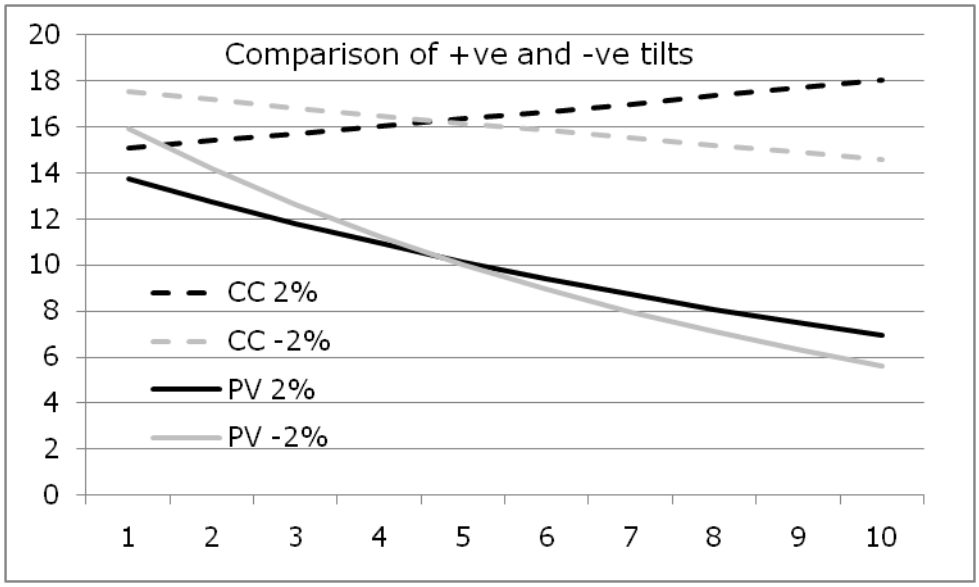
$$C_t = V_t \frac{(1+r)^N (r-\alpha)}{(1+r)^N - (1-\alpha)^N}$$

Where C_t is the capital charge in year t, V_t is the optimised replacement cost (ORC) of the asset in year t, N is the economic lifetime of the asset in years, r is the cost of capital and α is the tilt factor representing the annual percentage change in the cost of the asset.

13. This pattern of capital charges can lead to a wide variety of depreciation profiles, depending on the parameters, and particularly on the tilt factor. Positive tilt factors will tend to backload depreciation, which defers the recovery of capital. This is illustrated in the following diagram which shows the pattern of capital charges (CC) and their present values (PV) for an asset with original

[1] See for example, Five Principles of Good Regulation, by the Better Regulation Commission of the UK Cabinet Office (http://archive.cabinetoffice.gov.uk/brc/upload/assets/www.brc.gov.uk/principles.pdf), Ofcom's Principles for Regulation (http://www.ictregulationtoolkit.org/en/PracticeNote.aspx?id=1938), and Alfred Kahn's 1988 book, The Economics of Regulation: Principles and Institutions.

cost of $100 assuming a 10% cost of capital and two different tilt factors (2% and -2%)



14. Both of these structures just recover the original $100 (in nominal terms), and both pay interest at 10% per annum on funds not yet recovered. When the tilt is positive, initial charges are lower than for negative tilts, and later charges are correspondingly higher. This defers the recovery of capital, so that at any date between the initial investment and final recovery the investor has more cash invested in the asset under positive than negative tilts.

15. As noted above, TSLRIC+ is a form of ORC valuation. For any year, the total capital charge is a set function of the new build cost of the asset in that year. This can be seen by the 't' subscript on the asset value (V) in the tilted annuity formula.

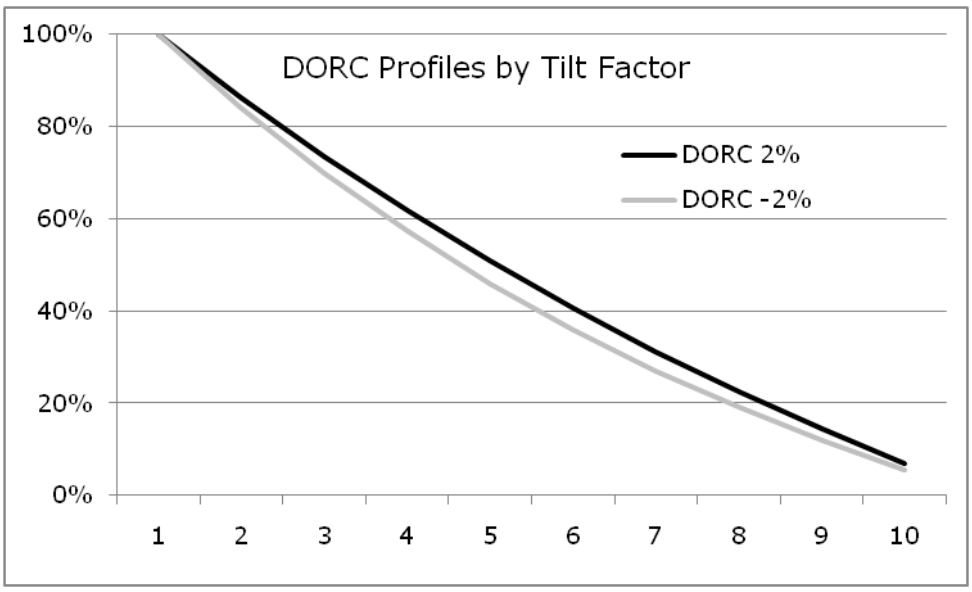
16. It may be worth noting that although current (ORC) asset values feed into the capital charge in each year, the entire structure only recovers the ORC of the asset at the outset of the regime. Suppose the regime started eight years ago with an ORC of $100. The capital charge calculation for this year will *refer* to today's ORC which may be $115 (assuming a 2% tilt), but the sum of all capital charges over the whole ten years will still only recover the original $100 (plus interest on funds invested while they remain unrecovered). Again, the only effect of the tilts is to accelerate or defer the timing of capital recoveries. Any tilt value, consistently applied, will only recover the present value of the original investment.

17. Depreciated optimised replacement cost ('DORC') is another option for regulatory asset valuation. It is usually rationalised on the basis of the potential entry by a firm that could either build a new asset or buy the existing one. For any given asset except a totally new one, DORC will be lower than ORC by the amount of the depreciation allowance.

18. It is possible to translate from the ORC concept underlying TSLRIC+ into the corresponding DORC value at any given point in time. Doing so simply requires estimating the amount of capital that remains unrecovered in the TSLRIC+ framework. By definition, this is the DORC that corresponds to the TSLRIC+ model.

19. The easiest way to achieve this is to calculate the present value of the tilted annuity capital charges over the future remaining life of the asset, using the cost of capital (r) as the discount rate. In my opinion, this approach is also mathematically and economically correct and is an orthodox way of translating from a TSLRIC+ valuation to a DORC valuation.

20. The value so calculated represents the value in today's dollars of the capital yet to be recovered under previous applications of TSLRIC+. It will be lower than today's ORC in every time period except the first, irrespective of the size or sign of the tilt. However it will be higher for positive tilts than for negative tilts, because capital recovery is delayed by more, so more funds remain invested at any particular date. The following diagram uses the same example as above and shows the fraction of the original $100 investment remaining in the asset base (i.e. the DORC) at the start of each of the 10 years of the asset life.



21. I have examined three spreadsheet models provided to me by Telstra that seek to perform exactly this calculation to translate from different TSLRIC+ valuations to the corresponding DORC valuations for the assets in its customer access network (CAN) and its interexchange network (IEN). Two of these models were prepared for the CAN by the TEA model, one each for Telstra's and the ACCC's inputs into the TEA model. The third was prepared by Analysys and included the IEN.

22. In my opinion, the logic of these calculations is correct. I have not audited the inputs into the calculations. In particular, I have no basis for assessing whether the ORC values have been correctly transcribed from their original TSLRIC+

models. I also express no view on the WACC in these models, which is set at 10.77%.

23. With reference to my discussion of principles in paragraphs 10 and 11 above, I consider that the method Telstra has used aligns closely with the third principle. It results in an initial RAB value that is exactly equal to asset valuations embedded in the recent TSLRIC+ models, at least up to the limits of accuracy embedded in those models.

24. Telstra's approach to the DORC valuation can also be used in an internally consistent regulatory model, so it can be consistent with the second of the principles I proposed. Whether that actually turns out to be the case depends on the way other parts of the regulatory model are designed and implemented.

25. In my opinion, this approach can also be consistent with the relevant legislation contained in Part XIC of the Trade Practices Act 1974, so it can also be consistent with the first principle I outlined above. I infer this, in part from its relationship with the existing and legally compliant TSLRIC+ valuation method. However this view also relies on my understanding of the overarching objectives of promoting the long-term interests of end-users, and the three objectives lined with the LTIE in s152AB.

Indexed Depreciated Historic Cost

26. An alternative way to value assets for regulatory purposes is based on historic costs. For pre-existing assets, especially assets that have been installed for some time, this approach can be difficult to achieve due to lack of consistent information. However, where reliable information is available, historic cost valuation models can be used, and in this case they constitute a lower bound on reasonable RAB values.

27. When the RAB is based on historic costs, it is built up from a sequence of capital investments made over several years, often many years. The investments enter the RAB at their nominal value in the dollars of the day, from which point they earn a rate of return. Depreciation charges raised in each year reduce the value of the RAB, so the method is sometimes referred to as depreciated historic cost ('DHC').

28. Under this approach, a decision is required as to whether or not to index the RAB for inflation. Provided the regulatory models are internally consistent under each option, the outcome of this decision only affects the timing of capital recovery, not the total amount of capital recovered. Either way, investors need to be compensated for inflation, but not over-compensated.

29. This point can be explained with reference to the revenue requirement for a regulated firm operating under a locked-in RAB model. Total revenue required in any year (t) can be represented as follows.

$$R_t = RAB_t \times WACC + Depreciation_t + Opex_t$$

30. If the asset base is not indexed, then compensation for inflation is provided through the cashflows by using a nominal WACC. Alternatively, inflation could be incorporated into the model by inflating the RAB each year. This will result in an indexed depreciated historic cost valuation (IDHC).

31. Under this IDHC approach, compensation for inflation can be delivered through increases in the RAB, rather than through the cashflows. In effect, this involves a back-loading or deferral of depreciation. This is how the TSLRIC+ model operates when the annuity tilt is positive: a nominal WACC is combined each year with an inflating asset base. Depreciation recovers the original investment cost only.

32. Using this method for a locked-in RAB model based on indexed historic costs, the asset base will evolve from year to year as follows.

RAB Closing Value = (RAB Opening Value + Capex) * (1 + inflation rate)
- Depreciation

33. Using this recursion, it is possible to convert an historical stream of capital investments and depreciation charges into a current IDHC valuation. This could either be done by using the sequence of actual depreciation charges, or by back-casting the current accumulated depreciation over the years that the asset has been in service. A sequence of inflation rates is also required.

Starting Point

34. For long-lived assets it may be necessary and appropriate to initialise a DHC model at some date that may be well after the first assets were installed. For example, when assets are privatised, the vesting values are often an appropriate starting point. Another option is a date at which some other reasonably objective valuation was undertaken.

35. Under this approach, there will be an identified date at which the recursive process of adding assets, depreciating (and inflating if used) begins. Provided the initial value is acceptable to the relevant parties, there need be no concerns with such an approach.

Telstra's Model

36. Telstra have provided me with a spreadsheet model that seeks to calculate the value of their CAN, IEN and Network Support assets using the indexed depreciated historical cost (IDHC) methodology.

37. The dataset for this model includes three sets of values, recorded annually by major asset class. These are the written down value (WDV) carried in Telstra's books, the historic cost (HC) of new capital additions recorded in the dollars of the day in the year of investment, and the accumulated depreciation to 2009. Each of these values is recorded separately for each vintage of capital (by year) in which it was added into the asset register as it exists at 30 June 2009. For example, the accumulated depreciation is recorded in the year the capital was purchased and represents the total of all (nominal) depreciation charges raised against that investment between the purchase date and 30 June 2009. The dataset covers a time period of 1901 to 2009.

38. The dataset is a snapshot of Telstra's asset base as at 30th June 2009 so it only includes assets in the register at that date. When an asset is fully depreciated or retired, it is removed from Telstra's asset register, therefore the only assets on the register as at 30th June 2009 are those that haven't been fully depreciated or retired.

39. Annual depreciation has been calculated from the accumulated depreciation by assuming the capital depreciates equally every year between purchase date and 2009. This method of depreciation is known as straight line depreciation and is a reasonable approach to estimating the depreciation in IDHC.

40. The adjustment for inflation is measured as the percentage change in the consumer price index. The period over which the opening asset value and capital expenditure has been adjusted for inflation varies depending on the assets. For those assets that have been subject to an explicit revaluation, the inflation adjustment is only made from that point in time. For all other assets, the inflation adjustment is made from the first capital expenditure. I consider this a reasonable and orthodox approach, provided that the revaluations were appropriate at the time they were made.

41. To calculate the RAB using the IDHC methodology for any year, Telstra have used the same updating method I outlined at paragraph 32 above. I consider this appropriate and orthodox.

42. As with the DORC model, I have not audited the figures contained in the IDHC model, but I am satisfied that its logic is consistent with the IDHC concept.