Advancing the return of capital in relation to regulated fibre assets

Chorus Ltd

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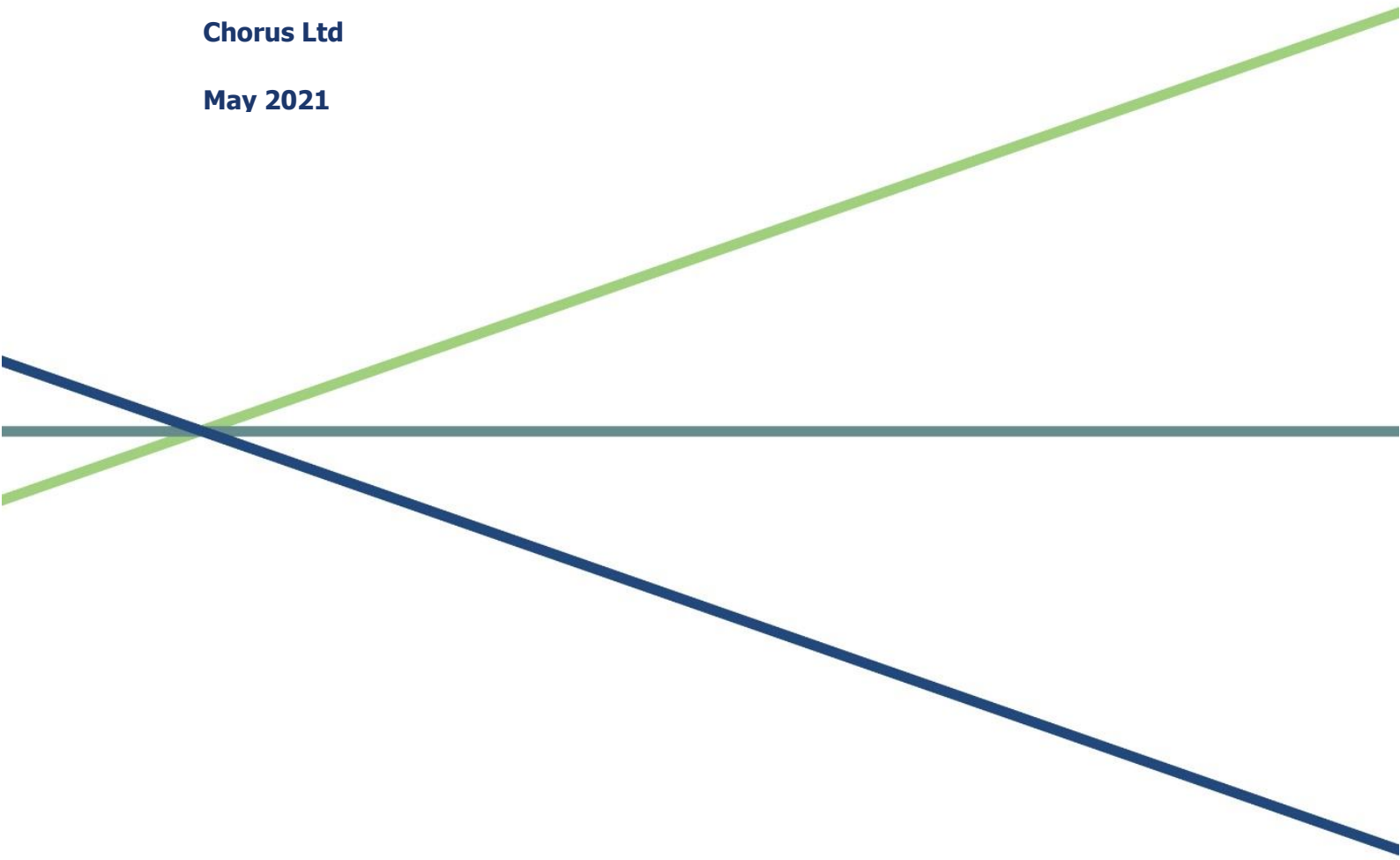

INCENTA
ECONOMIC CONSULTING

Contact us:

Incenta Economic Consulting
Unit 1, 19-35 Gertrude Street
Fitzroy, Victoria, 3065
Telephone: +61 3 8514 5119
Website: www.incenta.com.au

Disclaimer:

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1. Introduction and summary

1.1 Introduction and purpose of this report

1. As part of Chorus's proposed maximum annual revenue (MAR) for the 2022-24 regulatory period (RP1), Chorus is proposing to applyi an "alternative depreciation method", which means in this context a depreciation method that is different to straight line depreciation on a regulatory asset base that is being indexed for inflation. The specific measure being contemplated is to advance the recovery of its capital costs relative to what would follow under the default depreciation method, although I note that this would generate the same expected net present value of revenue over the life of the assets.[1]

2. The Input Methodologies permit the use of an alternative depreciation method if the Commission is satisfied that the result of applying the alternative method, amongst other things:

   a. better promotes the purpose of Part 6 of the *Telecommunications Act*, and

   b. where relevant, best gives, or is likely to best give, effect to section 166(2)(b) of the *Telecommunications Act*.

3. In addition, section 197 of the *Telecommunications Act* envisages a smoothing of revenue and prices across time where necessary or desirable to minimise any undue financial hardship to a regulated fibre service provider or to minimise price shocks to end-users.

4. Chorus's principal justification for advancing cost recovery in this manner is that the likely outcome for the revenue cap would provide the opportunity to recover a proportion of its capital costs earlier than otherwise as a greater recovery of cost would be possible without effecting a material increase in prices from current levels. This would permit Chorus to remove some of the residual but uncompensated stranded asset risk that it otherwise would face, and so advance the Part 6 purpose.

5. The purpose of this report is to assess whether Chorus's proposal is consistent with the requirements for the selection of the depreciation method, and to advise upon how to implement a decision to advance the recovery of capital, including the choice of depreciation method and its implementation.

[1] More specifically, the effect of the proposal would be net present value neutral to Chorus if the effect of stranded asset risk is ignored. The rationale for Chorus's proposed advancement of cost recovery is to manage stranded asset risk, which would have the effect of taking the outcome for Chorus from an expected NPV <0 situation to one where expected NPV ≈ 0.

1.2 Summary of conclusions

1.2.1 Background

6. In its final reasons paper for the fibre fixed line access services (FFLAS) Input Methodologies, the Commission concluded that there was "material but modest" stranded asset risk associated with Chorus's FFLAS. The Commission further concluded that the presence of such a stranded asset risk would result in an outcome whereby Chorus would not expect to recover its cost (i.e., generate an expected NPV<0).

7. In response to this, the Commission provided an *ex ante* allowance; however, the Commission noted that this allowance would not compensate for all stranded asset risk, rather the Commission assumed that this allowance would operate in conjunction with other methods to remove stranded asset risk where possible.

1.2.2 Advice

Rationale for advancing depreciation

8. As the Commission has recognised, FFLAS exist in an industry that has been characterised by fast technological change and increasing levels of competition, which has been accompanied by substantial and enduring reductions in real telecommunications prices. Chorus will face an increasing risk of having its assets stranded unless the cost-base that it will need to recover in the future reduces at a rate that keeps pace with anticipated technological change. It would be appropriate – and reduce the likelihood of Chorus facing an increasing stranded asset risk over time and so exacerbating the expected NPV<0 outcome – for Chorus to advance its recovery of capital as necessary to prevent this outcome.

    a. Importantly, managing stranded asset risk for a firm like Chorus will be an exercise in optimising between an exposure to current competitive constraints (which is made worse by advancing the return of capital) and expected future (possibly much more severe) competitive constraints (which is eased by advancing the return of capital).

    b. However, the prospect that the MAR for Chorus may be set below the level of revenue expected under current prices implies that there is an opportunity to advance the recovery of capital, without increasing its exposure to competition in the near-term.

9. We recommend applying the tilted annuity depreciation method as the framework within which to consider how to factor in the response to technological change. The tilted annuity depreciation method allows one to specify the annual rate of change in the capital charge for each asset, and so choose directly the trajectory in capital costs that is required to avoid increasing stranded asset risk over time.[2]

[2] The tilted annuity framework has a number of advantages over alternatives, which include that (i) there is a logic behind the choice of inputs, (ii) the method is directed specifically to addressing a specific

10. In terms of the rate of cost reduction that should be assumed, we note that the long-term historical trajectory of telecommunications prices suggest that an annual real reduction in the capital charge of between 4 per cent and 6 per cent would be appropriate, noting that:

    a. the lower figure reflects the long term historical real reduction in the prices for all telecommunications services in New Zealand, and

    b. the higher figure reflects the long term historical real reduction in the prices for wireless telecommunication services in the USA, and which arguably is a better indicator of the competitors to Chorus, and

    c. these trends in real prices are corroborated by the experience of a wider group of countries (including Australia, the UK and major European countries).

11. This depreciation method should be applied across all assets that are subject to a risk of being stranded, which are all of the network assets and L2 equipment,[3] but excluding assets like land and buildings, corporate assets and backhaul.

Consistency with the asymmetric risk allowance

12. As noted above, the Commission provided a modest ex ante allowance for stranded asset risk in the Input Methodologies. Clause (d) of the Purpose Statement requires consideration of whether altering the profile of depreciation would take away the risk for which the *ex ante* allowance was intended to compensate, and so potentially permit excessive profits to be earned.

13. As also noted above, however, the Commission did envisage that the asymmetric risk allowance and altering of depreciation would operate in tandem to manage stranded asset risk. To this end, we observe that NERA has provided convincing evidence that Chorus is subject to substantial stranded asset risk beyond that which is reflected in the ex ante allowance, and specifically due to:

    a. the conservative assumptions the Commission applied, including to carve communal assets out of the allowance

    b. an out-of-date view on the potential threat posed by fixed-wireless access

    c. the additional risk associated with the financial loss asset, being a material part of Chorus's RAB, but something that a new entrant would not need to replicate, and

form of stranding risk (namely, stranding arising from a continuation of past trends), and (iv) the recovery of capital costs will occur over the full life of assets, compared to shortening asset lives there are less likely to be "peaks and troughs" in future prices and Chorus will also have some RAB exposed to the threat of competition (which may be relevant to section 166(2)(b), discussed below).

[3] These are the categories of assets identified in Table 5.1 of NERA, 2020, Assessment of Type II asymmetric risk for Chorus' fibre network, January, p.25 as having a non-immaterial likelihood of stranding. NERA's labels for the assets that face such a stranding risk are "communal L1 network", "fibre lead-ins", "L2 equipment excluding ONT", and "ONT".

d. the additional risks that Chorus faces in Wellington from Vodafone's cable network, which was also underappreciated in the Commission's analysis.

14. Further, we observe that the stranded asset risk that would be managed via the adjustment to depreciation that we propose would be limited to the risk that would arise from the reasonably predictable improvement in technology and the likely enhancement of competition (including via new entry that is enabled by new technology) that may occur.[4] Thus, Chorus would still face stranded asset risk as it would be exposed to asset stranding that results from an unexpected step change in technology. Thus, there is no a priori reason to conclude that adjusting depreciation as proposed would not be compatible with the explicit *ex ante* allowance for asymmetric risk also being provided.

15. NERA's finding that there is substantial stranded asset risk that is compensated via the *ex ante* asymmetric risk allowance, and the fact that the proposed depreciation method would merely reduce – rather than remove – stranded asset risk, implies that applying the proposed depreciation method:

a. is likely to increase Chorus's "incentives to … invest, including in replacement, upgraded and new assets" as referenced in section 162(a), and

b. is unlikely to permit Chorus to "extract excessive profits", as referenced in section 162(d), and so

c. will better promote the purpose of the *Telecommunications Act* as set out in section 162 than the use of straight-line depreciation.

Section 166(2)(b) – where relevant, promotion of competition

16. The Commission has observed that workable competition is telecommunications services is likely to be promoted from having regulated fibre providers subject to some risk of competition-related asset stranding as this would provide a greater incentive for a competitive response. In my view, this outcome would be met by the advancement of capital recovery that I explained above. In particular, under the tilted annuity depreciation method as proposed:

a. Chorus will have an unrecovered RAB for the full life of the relevant assets, and so continue to be exposed to loss from competition (whereas if asset lives had been reduced, the exposure to loss would cease prior to the end of the assets' lives)

b. The proposal is merely to remove the reasonably predictable portion of stranded asset risk – Chorus would remain exposed to step-changes (for example, a step-change in wireless technology or a major new entry decision).

[4] One trend that is increasing Chorus's exposure to stranded asset risk is that many of the firms that it relies upon to retail fibre services are also its major competitors, and so have conflicting incentives with respect to marketing Chorus's fibre products.

Long term smoothing

17. As noted above, section 197 of the *Telecommunications Act* provides the Commission with the ability to smooth revenues over time if this is necessary and desirable to:

    a. avoid a "price shock" to customers, or

    b. prevent an undue financial hardship.

18. Turning first to price shock, Chorus has scope to advance its recovery of capital without the need for material price increases, and is constrained by competition in its capacity to increase prices from current levels in any event. As a consequence, concerns about price shock would appear unlikely to arise. However, if all elements of the final PQ decision combined did give rise to price shock concerns, then it would be open for the Commission to use the smoothing mechanism to avoid a material increase in customer prices.

19. Chorus is unlikely to experience undue financial hardship if Chorus's proposals and the recommended advancement to capital recovery recommended above are accepted. However, the final MAR for Chorus will depend upon the full suite of conclusions the Commission reaches as part of the PQ determination. The context of the Commission's first decision on the regulated fibre prices, where Chorus is transitioning from a Crown contract spanning more than a decade to a cost-based regime during the final phases of delivering a very large infrastructure project,[5] a given change in regulated revenue may be expected to have a larger impact financially on Chorus than for the energy utilities the Commission regulates. As such, it would be reasonable in this context to presume that a material reduction to revenue from expected levels would have the potential to cause undue financial hardship.

20. The most practicable means of addressing concerns about either price shock or undue financial hardship if one or the other were to arise would be to make an ad hoc adjustment to aggregate depreciation (either downward or upward) that is sufficient to avoid the relevant concern. This adjustment would then become an asset (either positive or negative) that would then be recovered over future regulatory periods.

21. In the context of Chorus, it should be unsurprising that an advancement to depreciation may be warranted both on the basis of managing stranded asset risk and avoiding an undue financial hardship. This follows because both reasons for advancing revenue are linked to the expected MAR outcome. That is, a low MAR outcome provides the opportunity to reduce long-term stranded asset risk without increasing exposure to competition in the short-term, and a low MAR outcome may also cause undue financial hardship. Similarly, the appropriate response to both issues – advancing recovery of capital costs – is the same. The situation for Chorus is different to, say, an EDB where there is little constraint raising current prices to manage long-term stranded asset risk, implying that the two issues are independent.

[5] The additional relevant context is that Chorus faces material competition for its services at present.

2. Conceptual framework for determining the depreciation method and settings

2.1 Guidance from the Input Methodologies

22. The Input Methodologies permit the use of an alternative depreciation method if the Commission is satisfied that the result of applying the alternative method, amongst other things:

    a. better promotes the purpose of Part 6 of the *Telecommunications Act*, and

    b. where relevant, best gives, or is likely to best give, effect to section 166(2)(b) of the *Telecommunications Act*.

23. The purpose of Part 6 is to promote the long-term benefit of end-users in markets for FFLAS, and most relevantly to this matter to ensure regulated businesses:

    a. have incentives to innovate and to invest (section 162(a)), and

    b. are limited in their ability to extract excessive profits (section 162(d)).

24. Section 166(2)(b) provides that, to the extent the Commission considers it relevant, a further objective is the promotion of workable competition in telecommunications for the long-term benefit of end-users of telecommunications services.

25. In addition, the Input Methodologies also refer to section 197 of the *Telecommunications Act*, which envisages that there may be smoothing of revenue and prices between time periods where necessary or desirable to minimise any undue financial hardship to a regulated fibre service provider or to minimise price shocks to end-users.

2.2 Effects of the choice and specification of depreciation method

2.2.1 Introduction

26. The choice and specification of depreciation method – and the related question of whether revenues and prices are smoothed under section 197 of the *Telecommunications Act* – will have the effect of determining the time profile of revenue and prices, whilst holding the value of cash flows constant.[6] A change to the time profile of revenue and prices has the potential to produce a range of different effects, which I discuss in turn below.

2.2.2 Exposure to stranded asset risk

27. The time profile of revenue will determine the extent of the costs that have been incurred to provide a regulated service that will remain outstanding – and hence to be recovered in the future – at any point in time. This extent of unrecovered cost will affect the degree of

[6] This statement assumes that there is no stranded asset risk, which is addressed further below.

risk that borne by the regulated business that future technological change in substitutes to the regulated service may limit the prices the regulated provider is able to charge and potentially preclude the regulated business from recovering the costs that it has incurred. Where a regulated business is exposed to "stranded asset risk" – but not compensated for this risk – then there is likely to be an adverse effect on the incentive for the regulated business to invest.

28. The implication of the above point is that charging more in the near term may reduce the amount of unrecovered investment in future periods, and so limit the risk of future asset stranding. However, the capacity for a regulated fibre business to advance cost recovery and so reduce the exposure to future stranded asset risk will be constrained by the degree of competition that is currently posed by existing substitutes to fibre services (such as fixed wireless access technologies). Accordingly, the outcome for stranded asset risk is better thought of as a process of *optimising* rather than *removing*, whereby the trade-offs inherent in seeking to recover cost earlier are considered, but where a degree of residual stranded asset risk is inevitable.

29. As the Commission has observed, however, exposing a regulated business to some stranded asset risk may enhance its incentive to respond to the competition, including the competition that may develop in the future as a consequence of technological change. Moreover, provided compensation was paid for the value of stranded asset risk that was to be retained by the regulated business, the incentive to invest would not be unduly affected. This outcome is something that may be relevant to section 166(2)(b).

2.2.3 Consistency with the *ex ante* stranded asset risk allowance

30. The Commerce Commission in its final reasons paper for the Input Methodologies accepted that Chorus would likely to face a "material but modest" risk of asset stranding in the future. In recognition of this stranded asset risk, the Input Methodologies include an asymmetric risk allowance of 10 basis points per annum on the regulatory asset base (where this includes the financial loss asset). The Commission's assessment of the magnitude of the stranded asset risk allowance was conducted in the context of the broader decisions on this matter, which included that:

a. the regulatory regime for fibre services would include a number of measures that reduced the potential for asset stranding, notably that natural disasters would be subject to *ex post* recovery[7] and that partly or wholly unused assets would remain in the regulatory asset base, except in the case where a service is deregulated

b. other measures to reduce the extent of stranded asset risk would operate in parallel, and most notably, adjustments to the depreciation method / settings,[8] and

c. the quantification of the stranded asset risk allowance specifically omitted certain elements of stranded asset risk, namely the lower probability – but high consequence

[7] That is, the asset stranding referred to here is what the Commission refers to as Type II asymmetric risk.

[8] The Commission also remarked that it intended it to be easier for a regulated fibre service provider to avail itself of the flexibility to apply non-standard depreciation than the electricity distribution businesses.

– risk that technological change may cause the communal infrastructure to become stranded.[9]

31. Thus, the allowance for stranded asset is best interpreted – and, indeed, was explained – as the residual, unavoidable stranding risk that would inevitably remain after other stranding-reducing options had been pursued.[10] However, given the provision of the *ex ante* allowance, the Commission in its final reasons paper sought a demonstration that, if a change from the default method of depreciation is to be proposed, this would not have the effect of removing the stranded asset risk for which compensation is being provided.

2.2.4 Efficiency of cost-recovery – encouraging efficient use

32. The time profile of revenue will flow directly into the time profile of prices that customers pay and may affect the efficiency with which the regulated service is used.

33. Generally speaking, the efficiency with which costs are recovered will be advanced by:

a. spreading the recovery of sunk costs over time in a manner that imposes the least economic distortion to the use of the assets, and

b. avoiding large step changes in prices, which can create uncertainty for customers and reduce their preparedness to make investments in things that make use of the regulated service.

34. The first of these matters deserves additional elaboration. Like many infrastructure services, a large part of the capital costs associated with the regulated fibre services are economically sunk (i.e., cannot be reversed once made) and are incurred upfront and then provide a flow of services over time. The consequence is that there is no marginal cost associated with the use of these assets – at least until capacity constraints are reached – and efficiency of use therefore will be encouraged by spreading the recovery of cost over time in a way that maximises use. Assessing which pattern of cost recovery over time maximises use requires a consideration of the price responsiveness of demand – which is the familiar Ramsey-pricing rule applied intertemporally. In this regard, however, a distinction can be drawn between the other utility services – like electricity distribution – and regulated fibre services.

a. For electricity distribution, it is often assumed implicitly that the price responsiveness of demand is unlikely to change materially over time, in which case the value of use of the network will be maximised by spreading cost-recovery over time such that a constant mark-up is charged over marginal cost. If it is further assumed – as is typical – that constraints tend to occur locationally and so are evenly spread over time, this justifies structuring the recovery of cost over time to generate prices that are relatively constant in inflation-adjusted terms.

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9 The Commission assumed when deriving the *ex ante* allowance that future competitors would continue to use the communal infrastructure and merely "strand" the downstream infrastructure.

10 Note that the reference to "stranding reducing options" includes the Commission's decision for assets to remain in the regulatory asset base unless there is deregulation, as well as the flexibility provided for depreciation.

b. However, for regulated fibre services, the assumption that the price responsiveness of demand is likely to be constant over the long term would be more difficult to maintain. In particular, the much greater potential for technological change and increasing competition in the telecommunications sector relative to electricity distribution and competition raises the potential for the already price-sensitive customers to become even more price-sensitive over time. This expectation of an increasing price sensitivity suggests that a price trajectory that declines in inflation-adjusted terms over time would be consistent with encouraging efficient use.

2.2.5 Undue financial hardship

35. A change to the time profile of revenue – depending on the precise mechanism employed – may permanently improve or worsen the principal financial indicators of the regulated business that are used by credit agencies to assess its credit worthiness, and so affect the financeability of the asset. In addition, the extent to which there are "shocks" to revenue – compared to an alternative where changes to revenue are transitioned in – will determine the set of measures that a regulated business has available to alter its financing structure, which in turn may affect the costs incurred and potentially also have an impact on the regulated business's capacity to attract finance.

36. The inclusion of section 197 in the *Telecommunications Act* was consistent with these concerns. The introduction of building block regulation for the regulated fibre services from 2022 created the potential for a material change to revenue levels than those implied by the pre-existing prices. The prices that were determined in 2011 reflected the assumptions and forecasts of the time, and in the context of a competitive tender for the right to roll-out the UFB project. Accordingly, the re-setting of revenue and prices from 2022 would have had the combined effect of:

a. updating the forecasts and assumptions applied in 2011 for actual outcomes and more contemporary forecasts, including with respect to costs incurred, demand and interest rates, and

b. replacing the assumptions applied in the tender process with those determined by the Commerce Commission, including views on the relative risk of the project, the allocation of costs between the fibre and copper business and the time profile of cost recovery.

37. In addition, not only was there a potential for a large correction to revenue at the time that the fibre services were first subject to building block regulation, Chorus and the other LFCs could reasonably have been expected to be more at risk of financial hardship arising from a given revenue correction. This reflects the fact that Chorus is in the final stages of delivering a substantial infrastructure investment, which in turn has necessitated a large increase in debt financing, indeed to the point where Chorus's actual gearing level is approximately twice that of the firms in the sample of comparable entities the Commission used to derive the asset beta.

38. We note further that there are constraints to the apparent option of infrastructure providers to adjust dividend payments to cope with material changes in revenue, and that pursuing a course of action whereby dividends are reduced materially is not costless.

Whilst in theory it may appear that firms should treat dividends as the residual use for cash flow after meeting all business expenses, in practice it is observed that infrastructure firms tend to attract a specific clientele of investor that target high dividend yields (at the expense of dividend growth) and stability in dividend levels. Further, it can be observed that, given this clientele, infrastructure firms place a high weight on meeting the expectations of this investor clientele, including to take actions that – absent this clientele effect – may seem irrational. The implication of this is that if infrastructure firms are forced to reduce dividends materially then this may compromise the ability of the firm to continue to attract capital, which would imply an undue financial hardship.

39. We provide a summary of recent finance literature in relation to the investor clienteles in Appendix A, and a case study involving behaviour that would be irrational absent a clientele effect (that of an Australian stand-alone toll road that commenced paying dividends prior to the toll road being in operation and revenue being received).

3. Application to the context of Chorus

3.1 Addressing stranded asset risk

3.1.1 Objective for managing stranded asset risk

40. As discussed above, the Commission has recognised that FFLAS exist in an industry that has been characterised by fast technological change combined with increasing levels of competition, which has been accompanied by substantial and enduring reductions in price. As such, Chorus faces a risk that changes in competition and/or major commercial decisions of its competitors (for example, a major new entry decision) leaves it unable to recover some or all of its RAB,[11] which implies a risk of asset stranding.

41. The extent to which Chorus faces this risk – and whether the risk to Chorus is managed or increases over time – will depend on the extent of costs that Chorus will be required to recover in the future. A neutral position for Chorus would be one where its stranded asset risk is expected to remain constant over time and so the risk is managed – rather than increasing – which would require Chorus to recover its capital costs in a manner that keeps pace with the expected price constraints applied by competitors. Achieving this neutral position would reduce the risk that Chorus does not expect to recover its costs and hence impact its incentives for investment. Adjusting depreciation in this manner would advance the purpose statement (most notably section 162(a)) as it would remove a potential barrier to Chorus having an incentive to "innovate and invest, including in replacement, upgraded, and new assets".

3.1.2 Tilted annuity depreciation method

42. We recommend applying the tilted annuity depreciation method as the framework within which to consider how to factor in the response to technological and commercial change. The tilted annuity depreciation method allows one to specify the annual rate of change in the capital charge for each asset, and so choose directly the trajectory in capital costs that is required to avoid increasing stranded asset risk over time. Appendix B sets out the formula for calculating tilted annuity depreciation.

43. In arriving at this conclusion, I have considered the main alternative depreciation methods for advancing the return of capital, namely by shortening asset lives or applying a geometric depreciation function. The main advantages of the tilted annuity method compared to these alternatives are as follows.

    a. First, the tilted annuity method is already well-known to the Commission. It has been used in a similar context to that proposed here for TSLRIC modelling, and also by Christchurch International Airport Limited (albeit in a context where it sought to back-end cash flows) in a standard Information Disclosure setting.

[11] As discussed above, Chorus could be unable to recover part of its RAB if a subset of its regulated services were deregulated and the conditions in that deregulated market precluded recovery of the deregulated share of the RAB.

b. Secondly, the additional input to the tilted annuity depreciation method (namely the real tilt rate) is a well-defined parameter that can be arrived at via empirical evidence, and the method is focussed directly on a specific source of stranded asset risk (i.e., the risk caused by the continued trend in technology and competition). In contrast, the input required for geometric depreciation (the multiplier factor) and the extent to which asset lives are shortening of asset lives are matters over which an additional level of judgement is required.

c. Thirdly, as the tilted annuity method effects a recovery of costs over the life of the assets, there is less potential for "troughs" followed by "peaks" in prices that may occur where stranded asset risk is managed via shortening of asset lives.

d. Fourthly, again the tilted annuity method effects a recovery of costs over the life of the assets, Chorus will be exposed to a loss of RAB value due to competition for that entire life, whereas this risk would be stop earlier if stranded asset risk was instead managed by shortening asset lives. This observation is relevant to section 166(2)(b), discussed in section

3.1.3 Specifying the tilt-factor

44. As discussed above, the risk of asset stranding to Chorus stems from the combination of technological change and competition, which may occur in tandem (i.e., a new technology enabling new entry into the market) or separately (i.e., new technology being applied by competitors over time, or a commercial decision by a firm to enter the market using existing technology).

45. The competitive constraint to Chorus – and hence, the limit as to whether it will be able to recover its cost – will be given by the price that its competitors are expected to charge. Accordingly, for Chorus not to face increasing stranded asset risk over time, its cost structure will need to decline by a sufficient rate to keep pace with the price that is expected to be offered by its actual and potential competitors.

46. In my view, the most reliable means of forecasting the trend in the expected competitive constraint to Chorus is to observe the historical trend in the output prices observed in the telecommunication sector, noting that these trends will include the combined effects of past technological change and competition.

47. A summary of the most relevant historical real output price trends are summarised in Table 1, where the real prices have been calculated with reference to movements in the home-country's movement in the main Consumer Price Index. The data spans the period until December 2019 in order to avoid any potentially transitory Covid-related issues.

Table 1 – Historical real price trends for relevant telecommunications services

	Compound annual real price change (over stated years to December 2019)				Series / Table ID / Source
	20	*15*	*10*	*5*	
Output prices					
US data					
PPI - Prices for wireless telco services	-5.92%	-6.49%	-5.78%	-6.76%	PCU517312517312
PPI - Prices for wired telco services	-1.66%	-0.54%	-0.17%	0.20%	PCU517311517311
NZ data					
CPI - telecommunications services	-3.64%	-4.01%	-4.81%	-4.01%	CPI013AA
Australian data					
CPI - telecommunications equipment and services	-3.12%	-3.94%	-4.52%	-6.67%	A2328546F
European data					
European Union (20 countries) (PPI - telecommunications services)		-4.30%	-3.63%	-1.84%	Eurostat
United Kingdom (PPI - telecommunications services)		-5.22%	-4.51%	-2.23%	Eurostat
France (PPI - telecommunications services)			-3.76%	-1.37%	Eurostat
Italy (PPI - telecommunications services)		-5.47%	-4.83%	-2.35%	Eurostat
Spain (PPI - telecommunications services)		-4.47%	-4.22%	-1.22%	Eurostat
Selected input prices					
US - PPI - Prices for wireless networking equipment				-10.35%	WPU117603021
Europe (20 countries) (PPI - telecommunications equipment		-4.98%	-2.72%	-2.45%	Eurostat
United Kingdom (PPI - telecommunications equipment)		-0.40%	-0.78%	2.17%	Eurostat
France (PPI - telecommunications equipment)			-0.90%	-1.33%	Eurostat
Italy (PPI - telecommunications equipment)		-1.62%	-0.63%	0.00%	Eurostat
Spain (PPI - telecommunications equipment)		-3.88%	-2.93%	-4.13%	Eurostat
Germany (PPI - telecommunications equipment)		-2.02%	-1.66%	-0.83%	Eurostat

Notes: (i) all price trends reflect real price changes relative to the home-country CPI (ii) the US price index series for the two telco services span 19.9 years rather than the 20 years stated (iii) the longest period cited for the European PPI series are 13 or 14 years, rather than the 15 years stated (iv) output price indices for Germany were identified as confidential until Q1,2015.

48. From these price trends:

a. the New Zealand data on the price change for all telecommunications services suggest that a real annual average price reduction of approximately 4 per cent would be a reasonable assumption

b. the US data provide separate price trends for "wired" and "wireless" services,[12] and shows that wireless services have achieved a much larger reduction in price than for the wired services. Focusing on the achievements of the wireless carriers – which is the more likely source of competition for Chorus – would suggest that a real annual average price reduction of approximately 6 per cent would be a reasonable assumption, and

12 The contents of this sector are summarised as follows:

> *This U.S. industry comprises establishments primarily engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular phone services, paging services, wireless Internet access, and wireless video services. [Note: satellite services are expressly excluded. (https://www.census.gov/naics/?input=517312&year=2017&details=517312)]*

c. the experience in other jurisdictions, with longer-term real trends in prices generally in the range of -3 per cent (e.g., Australia) to in excess of (in absolute terms) -5 per cent (UK and Italy).

49. I have also summarised the price trends for key telecommunications equipment, some of which may be indicative of the cost of inputs to telecommunications businesses; however, these are more difficult to interpret. I observe that the experience in different jurisdictions is mixed, these price trends will not be comprehensive (and may include irrelevant items).[13] Moreover input price trends will incorporate only part of the driver for Chorus's expected price constraints (competitive actions being the other). Accordingly, whilst these are reported, I do not think they should be accorded substantial weight.

50. I am aware that, by applying the trends identified above to Chorus's capital cost base that this may not translate into a one-for-one change in Chorus's price. There are two effects:

a. First, Chorus's price, all else constant, may fall faster in real terms as a consequence of migration to fibre and new connections, and so better utilisation of assets, assuming Chorus's demand expectations materialise. However, this does not necessarily justify altering the tilt rate. I say this because at least part of the price reduction associated with greater asset utilisation will be in the form of Chorus "catching up" to the competitive constraint provided by its competitors after having built ahead of demand, rather than "keeping up".[14] I am assuming here that Chorus's competitors would be expected to enter and expand via incremental investments that commence operations with an efficient level of asset utilisation.

b. Secondly, Chorus's price, all else constant, may not fall at the tilt rate because the tilted annuity will only change the time profile of capital costs, rather than its total cost of service. It is noted here that Chorus's operating expenditure is not expected to decline substantially over time, and other cost items will increase (most notably, the allowance for the cost of tax).

51. In my view, the factors that I discussed in the previous paragraph would not justify a reduction to the (absolute) value of the real tilt factor.

52. On this basis, I recommend selecting the real tilt rate for the tilted annuity depreciation model from within the range spanning -4 per cent to -6 per cent.

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13 Of the countries surveyed, the USA had the most comprehensive series of input price trends to sectors; however, this data is of limited use to the current matter. This is because a separate input price trend is not produced for the telecommunications sector, and also because all of the input price trends exclude capital, wages and imports, and hence key variables of interest (capital in particular).

14 Chorus's competitive disadvantage arising from having built ahead of demand is currently offset (at least to some extend) via the receipt of the Crown financing; however, the requirement to repay or to commence paying a commercial dividend on this finance commences in 2025, and the current concession will have disappeared fully in 2036.

a. the lower figure reflects the long term historical real reduction in the prices for all telecommunications services in New Zealand, and is consistent with the experience across telecommunications services (defined broadly) in other jurisdictions, and

b. the higher figure reflects the long term historical real reduction in the prices for wireless telecommunication services in the USA, and which arguably is a better indicator of the competitors to Chorus.

3.1.4 Assets for which tilted annuity should be applied

53. We recommend applying the tilted annuity depreciation method to all assets that are subject to a non-immaterial risk of being (economically) stranded. We note that these assets were defined in the report that was authored by NERA in response to the Commission's input methodologies draft determination as follows:[15]

    a. Communal L1 network

    b. Fibre lead-in

    c. L2 equipment excluding ONT, and

    d. ONT.

54. In addition, as the financial loss asset would also be stranded if a stranding event occurred, tilted annuity should also be applied to this asset.

55. It is noted that the assets for which tilted annuity would not be applied include land, buildings and corporate assets and transport (back-haul).

3.2 Consistency with the *ex ante* asymmetric risk allowance[16]

56. As noted above, the Commission provided a modest ex ante allowance for stranded asset risk in the Input Methodologies and has sought an assurance that altering the profile of depreciation will not imply that would not undermine the rationale for that allowance, as follows:[17]

We consider an approach that requires the regulated fibre service provider to submit justification for the depreciation method adopted, including shortening asset lives in excess of GAAP rules, is appropriate. This is because we are also proposing some additional ex-ante compensation and need to ensure broad consistency between the two forms of compensation.

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15 Table 5.1 of NERA, 2020, Assessment of Type II asymmetric risk for Chorus' fibre network, January, p.25 as having a non-immaterial likelihood of stranding. NERA's labels for the assets that face such a stranding risk are "communal L1 network", "fibre lead-ins", "L2 equipment excluding ONT", and "ONT".

16 Including response to A5.1 of the Commerce Commission's notice under section 221 of the Telecommunications Act 2001, dated 29 April 2021.

17 Commerce Commission, 2020, Fibre input methodologies – final reasons paper, October, para.6.1105.

57. Equally, however, the Commission was clear that it envisaged that the asymmetric risk allowance could operate in tandem with adjustments to depreciation where possible to manage stranded asset risk.[18] The Commission also emphasised that it intended there to be more flexibility to use alternative depreciation methods than would be the case for EDBs, notwithstanding the presence of the asymmetric risk allowance.[19]

58. I have read the report that NERA has prepared for Chorus on the question of asymmetric risk,[20] and observe that it provides compelling evidence that Chorus is subject to substantial stranded asset risk that is not factored into the 10 basis point per annual ex ante asymmetric risk allowance. In particular, NERA observes that:

a. the Commission deliberately applied conservative assumptions when deriving the allowance, which included excluding any allowance in respect of the potential stranding of communal assets[21]

b. the Commission's assumptions about the threat imposed by fixed-wireless access (FWA) have been shown to be unduly optimistic, with growth of connections continuing and statements from the mobile network operators signalling that their aggressive marketing of FWA will continue[22]

c. the financial loss asset is subject to an additional risk of stranding – as this is a financial asset deriving from Chorus investing ahead of demand that would not need to be replicated by a new entrant – that was not factored into the Commission's calculations (a matter that is particularly notable given its significance),[23] and

d. there is a higher risk of assets being stranded in the Wellington region – given the existence of Vodafone's existing cable network – that also was not factored into the Commission's asset stranding calculations.[24]

59. We observe that the stranded asset risk that would be managed via the adjustment to depreciation that we propose would be limited to the risk that would arise from the reasonably predictable improvement in technology from Chorus's competitors. Consequently, Chorus would still face stranded asset risk associated with changes to technology and/or competition that were above those factored into past trends. Thus, there would be no reason to conclude on *a priori* grounds that there was an inherent incompatibility between the proposed depreciation method and the ex ante allowance for asymmetric risk.

60. NERA's finding that there is substantial stranded asset risk that is uncompensated via the *ex ante* asymmetric risk allowance, and the fact that the proposed depreciation method

18 Commerce Commission, 2020, Fibre input methodologies – final reasons paper, October, para.6.1201 in relation to L1 communal assets.
19 Commerce Commission, 2020, Fibre input methodologies – final reasons paper, October, para.6.1133.
20 NERA, 2021, Frontloading depreciation to account for asset stranding risk, April.
21 NERA, 2021, Frontloading depreciation to account for asset stranding risk, April, paras.16-22.
22 NERA, 2021, Frontloading depreciation to account for asset stranding risk, April, paras.23-30.
23 NERA, 2021, Frontloading depreciation to account for asset stranding risk, April, paras.31-38.
24 NERA, 2021, Frontloading depreciation to account for asset stranding risk, April, paras.39-43.

would merely reduce – rather than remove – stranded asset risk, implies that applying the proposed depreciation method:

a. is likely to increase Chorus's "incentives to … invest, including in replacement, upgraded and new assets" as referenced in section 162(a), and

b. is unlikely to permit Chorus to "extract excessive profits", as referenced in section 162(d), and so

c. will better promote the purpose of the *Telecommunications Act* as set out in section 162 than the use of straight-line depreciation.

3.3 Section 166(2)(b) – where relevant, promoting competition[25]

61. The Commission has observed that workable competition is telecommunications services is likely to be promoted from having regulated fibre providers subject to some risk of competition-related asset stranding as this would provide a greater incentive for a competitive response. For example, the Commission commented as follows:[26]

Where regulated providers are immunised from the financial effects of competition, this may affect their competitive choices and thereby affect the promotion of competition.

62. In my view, this outcome would be met by the advancement of capital recovery that I explained above. In particular, under the tilted annuity depreciation method as proposed:

a. Chorus will have an unrecovered RAB for the full life of the relevant assets, and so continue to be exposed to loss from competition (whereas if asset lives had been reduced, the exposure to loss would cease prior to the end of the assets' lives).

b. In addition, the proposal is merely to remove the reasonably predictable portion of stranded asset risk. Accordingly, Chorus still would remain exposed to step-changes (for example, a step-change in wireless technology or the entry of a major new competitor).

3.4 Section 197 – Potential for long term smoothing[27]

3.4.1 Effect on customers' prices

63. As noted above, the *Telecommunications Act* provides the Commission with the ability to smooth revenues over time if this is necessary to avoid a "price shock" to customers. Whilst there is likely to be scope for Chorus to advance its recovery of capital to some extent without the need for a price increase, it would be open for the Commission to use the smoothing mechanism to avoid a material increase in customer prices if that would otherwise be the outcome of the full adjustments to depreciation that were recommended

25 Including response to A5.2 of the Commerce Commission's notice under section 221 of the Telecommunications Act 2001, dated 29 April 2021.

26 Commerce Commission, 2020, Fibre input methodologies – final reasons paper, October, para.6.990.

27 Including response to A5.3 of the Commerce Commission's notice under section 221 of the Telecommunications Act 2001, dated 29 April 2021.

above. The most practicable means to do this would be via an ad hoc downward adjustment to aggregate depreciation that is sufficient to avoid the price shock.

64. Whilst Chorus prices for the regulated fibre services may be expected to trend downwards over the long term in real terms (albeit with this outcome dependent on Chorus achieving its expected demand level), this is not an outcome that should be seen as inconsistent with encouraging the efficient use of the regulated fibre assets. Rather, given the downward pressure on prices that is provided by technological change and competition in the telecommunications sector as discussed above, it is reasonable to expect that the price sensitivity of demand for the regulated services would increase over time. In this context, the efficient use of regulated fibre services would be maximised by a gradual reduction in (real) prices over time.

3.4.2 Potential for undue financial hardship

65. Lastly, as discussed above section 197 of the *Telecommunications Act* also encourages the Commission to smooth revenues across time where this is needed to minimise undue financial hardship. Whilst such hardship would not be expected if Chorus's proposals and the recommended advancement to capital recovery recommended above are accepted, the final result will depend upon the conclusions the Commission reaches.

66. As explained earlier in paragraphs 36 to 39 above, the context of the Commission's first decision on the regulated fibre prices mean that a given change in regulated revenue may be expected to have a larger impact financially on Chorus than for the energy utilities the Commission regulates. Amongst other things, this reflects the fact that Chorus is in the final stages of delivering its share of the UFB project, which has necessitated a large increase in financial leverage, and where it attracts a clientele of investors that are likely to be particularly averse to material changes to dividends payments. It would be reasonable in this context to presume that a material reduction to revenue from expected levels would have the potential to cause undue financial hardship, and that a smoothing of revenues to phase in the change would be justified. The most practicable means to do this would be via an *ad hoc* upward adjustment to aggregate depreciation that is sufficient to avoid the undue financial hardship.

67. Lastly, I note that, in the context of Chorus, it should be unsurprising that an advancement to depreciation may be warranted both on the basis of managing stranded asset risk and avoiding an undue financial hardship. This follows because both reasons for advancing revenue are linked to the expected MAR outcome, that is:

    a. an outcome for MAR that is below the revenue expected under current prices (as Chorus anticipates) is the thing that provides the opportunity to advance the recovery of cost and so manage stranded asset risk without materially increasing Chorus's exposure to competition in the near term, and

    b. a low outcome for MAR compared to the revenue that would be expected under current prices is also what may give rise concerns about undue financial hardship.

68. Similarly, the same response – advancing the return of capital – would be the appropriate response to each driver. I observe that the position of Chorus in this regard is different to,

say, an EDB. In this latter case, there is little constraint to raising current prices to manage stranded asset risk if this is warranted, and so questions of managing stranded asset risk and avoiding undue financial hardship can be assumed to be independent.

A. Investor clientele effects

69. As noted in the main body of this report, infrastructure attracts a "clientele" of investors who desire high and stable dividend payments. As a consequence of this clientele effect, a reduction in dividends is considered more harmful to investors than in non-infrastructure businesses and is therefore avoided as much as possible. The presence of this effect may make it more difficult for a business such as Chorus to attract equity investment in the future should it be forced to reduce dividends.

70. In this appendix we show that theory supports the presence of a dividend clientele effect that should be particularly strong in the case of regulated infrastructure businesses whose share registers are dominated by financial institute in countries with an imputation tax system. We show that empirical evidence for regulated energy businesses in the US, evidence from mergers and acquisitions from around the world, and the Eastlink case study all confirm these expectations.

A.1 Investor clienteles – the theory

71. Modigliani and Miller (MM) famously asserted that dividend policy is irrelevant since it does not affect shareholder value.[28] That is, investors are able to create their own current income stream by selling shares. In the MM world of no transaction costs or taxes dividends are a residual, and in such a world we would expect to see no dividend payments or erratic payments reflecting volatility in earnings and management's perceptions of the firm's future investment prospects.

72. In practice real world market imperfections exist and dividend payments are observed to be relatively stable on a per share basis compared with company earnings, with several theories being advanced. In their leading financial economics textbook, Brealey Myers and Allen (BMA) observe that is a strong body of opinion in the finance field (referred to as the "Rightists") who identify the importance of investor clienteles.[29]

73. Specifically, this view holds that "there is a natural clientele for high pay-out stocks," for example many financial institutions are legally restricted to hold only dividend paying shares, and trusts and endowments would prefer dividends that are 'spendable' with capital gains being retained and added to their capital base. There "is also a natural category of investors, such as the elderly, who look to their stock portfolio for a steady source of cash to live on,"[30] and a view that payment of dividends creates a discipline on managers' reinvestment of free cash flow, since they will need to submit future investment proposals to the capital market rather than relying on a large pool of retained earnings. While BMA also identify alternative bodies of thought about dividends (the Leftists and Middle of the Roaders), they note that neither alternative theory for dividends is inconsistent with the existence of investor clienteles.

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28 M. H. Miller and F. Modigliani, (October 1961), "Dividend Policy, Growth and the Valuation of Shares," *Journal of Business*, Vol. 34, pp. 411–433

29 Richard A. Brealey, Stewart C. Myers and Franklin Allen, (2011) *Principles of Corporate Finance*, Tenth Edition.

30 Richard A. Brealey, Stewart C. Myers and Franklin Allen, (2011), p.402.

A.2 Investor clienteles – empirical support

74. The existence of investor clienteles and their influence on company dividend behaviour has been firmly established in the empirical finance literature.

Impson (1997, 2000)

75. Impson (1997, 2000) produced a pair of studies that consistently found the share price for public utility companies suffered a higher negative share price reaction than non-regulated businesses when a reduction in dividends was announced.[31] That is, in a regulated utility business the reduction in dividends is seen as a stronger signal of future earnings impairment because of the reluctance of management to cut dividends in such businesses, as they understand their investor clientele's preference for a high and stable dividend. This finding implies that in order to retain equity investors it is necessary for a regulated utility to maintain a relatively high and stable dividend yield.

D'Souza, Jacob and Willis (2015)

76. D'Souza, Jacob and Willis (2015) examined a transitional period during which the US electric utility industry became subject to a less highly regulated framework (e.g. decoupling was taking place). It was reasoned that this might have provided greater flexibility in the business, investment and dividend policies being pursued. However, their conclusion was that businesses maintained their dividend policies with the objective of retaining their investor clientele:[32]

> *Overall, we interpret our results as being consistent with the theory of dividend clienteles. Electric utilities appear to attempt to retain their high dividend clientele even as they face greater competition and have access to greater investment opportunities.*

Golubov, Lasfer and Vitkova (2020)

77. The Golubov, Lasfer and Vitkova[33] study assessed the behaviour of acquiror businesses in public-to-public mergers where the purchase consideration included a large share component that introduced new shareholders to the acquiring firm. Their sample included 5,366 acquisitions from around the world, including 200 Australian acquiring businesses that are subject to dividend imputation.

78. Their findings can be summarised as follows:

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31 Michael Impson (1997), "Market reaction to dividend decrease announcements: public utilities vs unregulated industrial firms," *The Journal of Financial Research*, Vol. 20, pp.407-422; and Michael Impson (2000), Contagion Effects of Dividend Reduction or Omission Announcements in the Electric Utility Industry," *The Financial Review*, Vol. 41, pp.121-136.

32 Julia D'Souza, John Jacob and Vedronda F. Willis (2015), "Dividend Policy Responses to Deregulation in the Electric Utility Industry," *International Journal of Business Administration*, Vol. 6, No. 2, pp. 1-16.

33 Andrey Golubov, Meziane Lasfer and Valeriya Vitkova (2020), "Active catering to dividend clienteles: Evidence from takeovers," *Journal of Financial Economics*, 137, pp.815-836.

a. firms actively manage their dividend policy toward the preferences of their investors. Acquiring firms adjust their dividend payout toward that of the target when they inherit target shareholders through a stock-swap transaction,

b. this adjustment is more pronounced when legacy shareholders are more influential or vocal (or both),

c. adjustment is greater when the target firm's shareholders reveal a greater preference for dividends via their portfolio holdings and trading behavior, and

d. find that the clientele effect is stronger when dividends are tax-advantaged.

79. Golubov, Lasfer and Vitkova's research showed, with 99 per cent confidence, that investor clienteles exert a material influence on dividend behaviour. The last point in the findings outlined above is of particular relevance to New Zealand, which like Australia, applies an imputation tax framework. It implies that the clientele effect is stronger in countries like Australia and New Zealand than in countries such as the US, UK and Canada that do not have dividend imputation.

A.3 Eastlink case study

80. The Eastlink case study provides additional evidence of the importance of a stable and high dividend policy for infrastructure businesses. Eastlink is a tollroad that connects the eastern and south-eastern suburbs of Melbourne, Australia. In the case of Eastlink a dividend was paid ahead of revenue being earned. That is, dividends were seen as so important to the attraction of the investor clientele that seeks high and stable dividend payments that additional costs were incurred by the business to ensure those dividend payments could be made.

81. In 2004 the ConnectEast Group approached investors to raise equity funds for the construction of the Eastlink tollroad. Since revenue would not be earned for a number of years during the construction phase, the solution was to offer investors a dividend stream during that phase which would be funded by investor contributions. The ConnectEast Group Prospectus informed prospective investors that:[34]

ConnectEast Group intends to pay semi-annual Distributions equivalent to 6.5 cents per Stapled Unit per annum during the Fixed Distribution Period (the period ending 31 March 2010). These Distributions equate to an annualised distribution yield on the Initial Instalment of 11.8% (for the first 12 months from Allotment Date) and a distribution yield of 6.5% per annum for the remainder of the Fixed Distribution Period (based on the Issue Price of $1.00). Distributions made during the Fixed Distribution Period are expected to be 100% tax deferred (see Section 5.3.3). Distributions to Unitholders over the remainder of the Concession Period will be from any cashflows generated from the MFP.

[34] ConnectEast Prospectus (10 December, 2004), *Product Disclosure Statement for the Offer of 1,120,000,000 Stapled Units in ConnectEast Investment Trust (ARSN 110 713 481) and ConnectEast Holding Trust (ARSN 110 713 614)*, p.16.

82. The total offering raised $3.795 billion, of which $2.008 billion was bank debt. Of the total amount raised from investors, $315 million was preserved for the regular payment of "equity coupons." These were distributions that provided equity investors a consistent high dividend yield in advance of revenue being earned through the eventual operation of the tollroad.

B. Tilted annuity depreciation

83. The outcome of tilted annuity depreciation is that the depreciation allowance is derived such that the sum of the return on assets and depreciation component for each asset grows over time at a pre-set rate. The pre-set rate can then be derived in order to target a particular objective.

84. Of most relevance to Chorus, by selecting a tilt rate that is related to the expected trajectory in the constraint that is expected by potential competition than the current relativity between Chorus and those competitors would be maintained.

85. The tilted annuity formula is often specified in a firm that generates a total capital charge (i.e., ROA plus depreciation) for a new asset. However, it is straightforward to derive the formula for the depreciation component as a separate item, and so apply the formula in a standard building block application.

86. The standard formula for the rate of depreciation on the written down asset value in year *i* under the tilted annuity method is as follows:

$$Dep_i = 1 - \left(\frac{(1+R)^{L-1} + (1+T)^{L-1}}{(1+R)^{L} + (1+T)^{L}} \right) \times (1+R) \times (1+T)$$

where *T* is the selected tilt-rate, *R* is the discount rate and *L* is the remaining life of the asset as at the beginning of year *i*. In the standard specification, a nominal discount rate and tilt factor are applied. The depreciation for a particular year is derived by multiplying this rate by the opening written down RAB for that year.

87. However, with a minor amendment, the tilted annuity depreciation method can be made compatible with a CPI indexed RAB, as follows:

$$Dep_i = \left(1 - \left(\frac{(1+r)^{L-1} - (1+t)^{L-1}}{(1+r)^{L} - (1+t)^{L}} \right) \times (1+r) \times (1+t) \right) \times (1+CPI_i)$$

where *r* and *t* are now the real discount rate and tilt factor, and CPI_i is CPI inflation (forecast or actual) for year i. Given that the RAB under the FFLAS Input Methodologies is escalated for CPI inflation, this second form is the one that is relevant.