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Ensuring that anchor product regulation is effective; or how to avoid a regulatory Chimera

March 2017

COMMUNICATIONS CHAMBERS

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1. Executive summary

Following a review by the government it is proposed that, from 2020, copper is deregulated whilst fibre access is subject to a combination of an anchor product coupled with an overall cost based fibre revenue cap and layer 1 (passive) fibre access on commercial terms.

This paper assesses this package of proposed measure and the challenges and some of the more detailed considerations that will be required by the regulator to implement the approach.

The anchor product approach proposed in New Zealand differs from that implemented in Europe in important respects:

- It is proposed that it provide an upper limit on pricing for a product that is attractive to a large number of end-users, as opposed to providing a basic anchor on other services via a chain of substitution, thereby allowing the market to innovate and adapt to market needs whilst also constraining abuse of market power.
- The anchor product is fibre based and would have a 100/20 Mbps specification, rather than relying on copper based ADSL as an anchor for fibre (relying on a fibre anchor is sensible given the prospect of copper retirement, nevertheless the speed specification is very high).
- The approach is coupled with an overall revenue cap and a requirement for layer 1 access.

Whilst recognising that New Zealand is adapting regulation to a changed market structure, including recognition that continued regulation of copper is redundant where fibre is available, taken together, what is proposed is a belt and braces approach.

It is likely to prove overly constraining on service-price flexibility and scope to adapt. It also involves interactions between the different elements which may prove complex to manage, and could have unintended consequences. It could prove to be a regulatory Chimera.

In assessing the proposals, the value of service price flexibility should be considered, allowing for the following:

- Promoting investment, and adopting a consistent approach before and after investment is made to maintain and enhance New Zealand's reputation for investment.

- Promoting adoption of fibre and copper retirement, since economic benefits will flow from use of fibre and copper retirement.
- Ensuring indoor mobile device data is efficiently backhauled, which requires adoption and continued use of fibre.
- Minimising the information burden on, and cost of, regulation.

Not only does flexibility increase the scope for investors to offer differentiated wholesale products, thereby better aligning investor interests with consumer willingness to pay, it also encourages assessment of cost, value and risk in making investment choices (since value, as well as cost, is a consideration with pricing freedom).

Whilst competition, including wireless competition, is good; however it is important to ensure that Chorus and other fibre providers are also able to compete and do not have their hands tied by regulation. From a converged fixed-wireless perspective, once the cost of passing and connecting a home has been incurred, the incremental cost of "backhauling" traffic from the home via fibre is lower than that for wireless, even though from a total cost perspective it may be higher. Flexibility can help align incentives with an efficient converged outcome.

Based on evidence in terms of service adoption in New Zealand, emerging competition from wireless, anticipated developments in terms of compression and evidence of limited incremental willingness to pay for speeds above 25 Mbps in Australia; an anchor product specification of 100/20 Mbps appears excessive.

A lower anchor product specification, at the level of the existing 30/10 Mbps service, would offer greater degrees of freedom in terms of service and price, and greater opportunity to achieve returns consistent with the proposed revenue cap, whilst also providing adequate consumer protection (the anchor would, in any case, be subject to review in 2023).

Turning to the proposed revenue cap, developing the cap is unlikely to be a trivial undertaking. It can be expected be more complex than that for utility services, since fibre demand is growing, uncertain, price sensitive and unlikely to reach anywhere near 100%. The proposed cap is complex, and appears unnecessary, in view of the proposed anchor.

If a revenue cap is pursued, a time profile for revenues will be needed, and consideration of demand can be expected to enter into

this. Further, having established a revenue cap, the linkage between over or under-recovery and future regulation is unclear.

One approach would be to treat the revenue cap as a soft constraint, leading to a downward/upward revision of the service level of the anchor product in the event of under/over recovery. This approach would also help avoid price discontinuity at reviews.

A layer 1 product, provided on commercial terms, should have no linkage to layer 2 services; and would need to be set so that it did not undermine price differentiation at layer 2.

The extent to which the proposed measures overlap, and may overly constrain market flexibility, should be assessed; and unnecessary constraints removed. This would contribute to the achievement of the goals envisaged when the government first embarked on the fibre investment program.

To avoid a regulatory Chimera, the break with the past should be clean. Not only should regulation be removed from copper, but multiple interventions should ideally not be applied to fibre. Further, if multiple interventions are applied to fibre one or more of them should be relaxed – with a lower anchor quality and/or less rigid feedback from the revenue cap.

Otherwise there is a risk of a heads you win tails I lose situation, which would undermine investor confidence, harm incentives to grow the market for fibre and ultimately prove unsustainable – inviting further political involvement in regulation. It is important to get it right this time.

2. The New Zealand regulatory context

A brief history of telecoms regulation in New Zealand

New Zealand has had a unique history in terms of telecoms regulation, shifting from reliance on competition law alone during the period 1987-2001 to sector specific regulation following a Ministerial Inquiry (the Fletcher inquiry in 2000).

However, concern that New Zealand lagged other countries in terms of competition and broadband adoption persisted. Further, whilst Telecom New Zealand invested in fibre to the cabinet, this was not a market success. An overly high initial price premium for VDSL of NZ$20 per month was effectively locked in by regulatory complexity and confusion, resulting in limited adoption.

Fibre became a political issue during the 2008 general election, with the incoming Government promising a NZ$1.5bn investment to bring fibre to the premise (FTTP) to 75% of New Zealanders by 2019 (with a further extension to 85% of households by 2024 announced in January 2017).

The investment involved public-private partnership, with awards of contracts on a regional basis. To be eligible, bidders had to be structurally separate wholesale providers, a condition that led to the voluntary separation of Telecom New Zealand into Chorus (wholesale) and Spark (retail). The deal struck was about improved broadband, with Chorus and local fibre companies investing in fibre and providing wholesale access to Spark and other retailers who would compete for consumers.

Responsibility for regulation of fibre rested with the Government, not the regulator, with contract prices set out to 2020. Acting independently, and with responsibility for copper but not fibre, the regulator proposed a significant reduction in the price of copper in 2012, thereby undermining the fibre business cases.

The copper price decision undermined market confidence in Chorus, and via the retail price impact, would have undermined the prospects for migration to fibre. Prime Minister John Key “indicated the Government would change the law rather than see its ultra-fast broadband network compromised by a Commerce Commission

decision."[1] In December 2015 the price of copper was partially restored to the pre-review level by the regulator.

In comparison with Europe, independent telecoms regulation was introduced comparatively late in New Zealand, has been more prescriptive for the regulator and has had an uneasy relationship with government. As Bronwyn Howell (2013) noted:[2]

> "It appears that the government's "grand strategy" for a fibre network was implemented as if it was a stand-alone project independent of any need to co-ordinate the integration of either the network or the requisite regulatory framework governing it into the existing industry. Meanwhile, the custodians of the regulatory framework governing the pre-fibre industry appear to have failed to appreciate the revolutionary effect of the government's strategy on their sector."

New Zealand's roll out of fibre to the premise is on track, and the highest take-up is for the 100/20 Mbps product (though with introductory price offers matching the 30/10 Mbps product). Whilst migration from ADSL to fibre is underway, fibre adoption can be expected to remain well below 100% and higher tier service adoption sensitive to the price of lower tier services.

Current proposals

Following review by the government, proposals for the regulation of copper and fibre post-2020 include:[3]

- Deregulation of copper, removing regulatory oversight of copper services and leaving Chorus free to continue operating or retire copper, subject to consumer safeguards.
- A 100/20 Mbps fibre anchor product based on the price of the equivalent regulated service under existing contracts, adjusted annually for inflation until review in 2023.
- A revenue cap for all fibre services based on estimated costs.
- A layer 1 (passive) access product on commercial terms.

Set against the historical backdrop, the current proposals, and their possible impact - intended or otherwise - are considered in this paper.

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[1] Radio NZ, *PM not ruling out legislation over broadband*, December 2012.
[2] Bronwyn Howell, *Broadband Regulation and Government Investment in Nationwide UltraFast Fibre Broadband Networks: evidence from New Zealand*, September 2013.
[3] MBIE, *Telecommunications Act Review: Post-2020 Regulatory Framework for Fixed Line Services*, February 2017.

3. Anchor product regulation – definition & motivation

In this section, the original concept of anchor product regulation, as first applied in Europe, is discussed; and the relationship between this approach and the different approach proposed in New Zealand is considered.

Defining features, and motivation for, anchor product regulation in Europe

Original conception

"Anchor product" regulation was first proposed in 2007 as an intermediate option between reliance on competition law alone and *ex-ante* cost orientated price controls for fibre.[4] A single anchor product would be specified and its price set by regulation, with the network operator free to devise and price other layer 2 fibre products.

The anchor product would act as a constraint on abuse of market power via a chain of substitution with other service tiers, whilst also leaving scope to innovate and adapt the price structure. Differentiation and scope to adapt pricing was considered important to motivate investment and efficient investment choices and adoption.

The anchor product approach was also seen as having the merit of avoiding the need to estimate costs and future demand to set an overall price control. Anchor product regulation is seen as an alternative to a cost-based price control in Europe.

At the time, it was envisaged that the anchor product would have a comparatively low speed and price (comparable to copper based ADSL), as this would also support copper to fibre transition and was considered likely to provide sufficient constraint on fibre pricing.

Implementation in practice in the UK

Ofcom first floated the idea of anchor product regulation in discussion document in 2007.[5] Ofcom saw anchor product regulation as one means of allowing for risk, and of allowing experimentation and service-price differentiation to encourage investment.

[4] Brian Williamson, *Anchor product regulation – a new regulatory tool*, *Info*, Volume 16(5), 2014. Working paper: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2336963

[5] Ofcom, *Future broadband – policy approach to next generation access*, September 2007.

In 2009 Ofcom announced its intention to allow pricing at a level that the market will bear, given the ready availability of alternative broadband services (principally copper based ADSL and cable availability for around 50% of households). [6] Simultaneous with the Ofcom announcement, BT announced its intention to invest in FTTP and FTTC. The policy approach was formally agreed in 2010.

Ofcom is also open to the possibility, should the chain of substitution break down, of adopting: [7]

> "…an anchor fibre price … combined with flexibility on more advanced service offers."

Adoption by the European Commission

In September 2013, the European Commission published its recommendation on costing and non-discrimination which recognised the benefits of pricing flexibility, price differentiation and the need for differentiation at the wholesale level:

> "…pricing flexibility at wholesale level is necessary to allow both the access seeker and the SMP [significant market power] operator's retail business to introduce price differentiation on the retail broadband market in order to better address consumer preferences and foster penetration of very high-speed broadband services" [8]

The European Commission added the anchor product approach, introduced by Ofcom, to the regulatory toolkit for national regulators (alongside safeguards relating to non-discrimination):

> "In view of the benefits of pricing flexibility in these circumstances, under the recommended approach, wholesale access prices for passive NGA wholesale inputs or non-physical or virtual NGA wholesale inputs offering equivalent functionalities are deemed to be sufficiently constrained (i.e. price-related competition problems are considered to be effectively addressed) when: (i) there is a demonstrable retail price constraint resulting from the infrastructure competition or a price anchor stemming from cost oriented wholesale copper access prices, and (ii) the ex ante economic replicability test is in place in those cases where wholesale price regulation should not be imposed,

[6] Ofcom, *Stimulus to super-fast broadband*, March 2009.
[7] Ofcom, *Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30*, Volume 1, June 2014. ¶12.144, 12.151 and 12.154
[8] *Commission recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*, September 2013. ¶49

> and (iii) there is an obligation of providing wholesale access services on the basis of EoI."

The European Commission foresaw the possibility that copper based ADSL might at some point in time no longer exert sufficient constraint on fibre pricing, with a next generation access (NGA) based anchor as a possibility:

> "If the product offered by the SMP operator on the legacy access network is no longer able to exercise a demonstrable retail price constraint on the NGA product (for example in the event of a copper switch-off), it could in principle be replaced by an NGA-based product that is tailored to have the same product features. However, it is not envisaged that such an NGA-based anchor will be required in the immediate future or before 2020."

Differences between the approach proposed in New Zealand and that in Europe

A key feature of the anchor product approach in Europe is that, aside from the anchor product and a non-discrimination requirement, no other price control or revenue cap is applied. Further, whilst regulated access to passive infrastructure such as duct and poles may be required, in general access to layer 1 fibre is not required.

In contrast, in New Zealand, a layer 2 anchor product is proposed alongside an overall revenue cap and layer 1 access to fibre (against the backdrop of structural separation and public/private sector investment in widespread fibre to the home). This is a fundamentally different approach to that in Europe, it is a belt and braces approach which would leave substantially less pricing freedom in practice. It could prove to be a regulatory Chimera.

4. The value of flexibility in a New Zealand context

The New Zealand context

Several aspects of the market and regulatory context in New Zealand differ from Europe:

- FTTP is deployment well advanced with a 85% coverage target - technology choice has, to a significant extent, been decided.
- Anchor product is not the only proposed constraint – a revenue cap and layer 1 access are proposed.
- Given the regulatory history, there may be an ongoing need to built a reputation for regulation which is independent and which provides a reasonable prospect of commercial returns.

In considering the value of service and price flexibility in a New Zealand context, the above are relevant considerations.

Value of service and price flexibility

In assessing and implementing the proposals, the value of service price flexibility should be considered, allowing for the following:

- Promoting investment, and adopting a consistent approach before and after investment is made to maintain and enhance New Zealand's reputation for investment.
- Promoting adoption of fibre and allowing copper retirement, since economic benefits will flow from use of fibre and copper retirement.
- Ensuring indoor mobile device data is efficiently backhauled, which requires adoption and continued use of fibre.
- Minimising the information burden on, and cost of, regulation.

Promoting efficient investment

Ensuring there are strong incentives for efficient and timely investment in network upgrades was a key rationale for the anchor product approach. Not only does flexibility increase the scope for investors to offer differentiated wholesale products, thereby better aligning investor interests with consumer willingness to pay, it also encourages assessment of cost, value and risk in making investment choices (since value, as well as cost, is a consideration with pricing freedom).

Having chosen an investment approach, these considerations might be considered less relevant to New Zealand. However, ongoing investment and a reputation for allowing investors a reasonable assurance of a return, remain relevant considerations. There may also be reputational effects beyond investment in the fibre market to consider.

Maintaining freedom for Chorus and others to innovate in terms of products and prices, above and below the anchor product is therefore important; as is ensuring that there is a reasonable prospect of earning a return.

Promoting fibre adoption and copper retirement

Passing homes is one thing, however connecting homes and ongoing use of fibre are key to delivering the economic benefits of high-speed connectivity. Fibre adoption is also key to achieving the eventual productivity gains from copper retirement.

To promote transition to fibre, and to ensure that copper retirement goes smoothly (from a customer and political perspective), transitional fibre products may be required. These might be temporary, and might include lower-speed lower-price offers.

Promoting of continued use of fibre & efficient backhaul

This wasn't a consideration in the past, as it was assumed that demand for fixed connectivity and high-speed access would rise progressively over time. However, the picture that is emerging suggests that it should not be taken for granted that all internet households will adopt or maintain fibre connections.

Spark New Zealand offer customers with low and moderate data usage a wireless alternative, and had 40,000 customers on wireless broadband out of a total of 675,000 customers by December 2016.[9] Wireless substitution may also grow in prominence as 5G technology comes to market. In the US, there is intense interest by operators – particularly outside their fixed access network footprints – in trialing 5G as a fibre substitute.[10] Google fibre now also offer a fixed wireless service.[11]

Competition is a good thing, but is important to ensure that Chorus and other fibre providers are also able to compete and do not have their hands tied by regulation. From a converged fixed-wireless

[9] *Spark New Zealand H1 FY17 Results*, 16 February 2017.
[10] Verizon, *Verizon to deliver 5G service to pilot customers in 11 markets across U.S. by Mid 2017,* February 2017. *AT&T Trialing Fixed-Wireless Millimeter Wave to Deliver High-Speed Internet Outside of its Traditional Wireline Service Area*, October 2016.
[11] Google fibre blog, *More places to grab gigabit, with Webpass*, 30 January 2017.

perspective, once the cost of passing and connecting a home has been incurred, the incremental cost of "backhauling" traffic from the home via copper or fibre is lower than that for wireless, even though from a total cost perspective it may be higher.

Having made a national investment in fibre, it makes sense to use it, and the opportunity to differentiate services and price closer to incremental cost is likely to be necessary to retain customers with low and moderate data usage. If service offers and pricing are unduly constrained, indoor Wi-Fi traffic that could have been backhauled efficiently over existing fibre may instead be backhauled using wireless, thereby potentially requiring otherwise avoidable investment in cell towers and use of scarce spectrum.

Further, to the extent that competition in the mobile market is limited, having widespread availability of Wi-Fi introduces additional competition – at least in respect of nomadic data usage. This represents an additional gain from maximising and sustaining fibre adoption, once the investment has been made.

The potential productivity gains from fibre will be realised only if fibre is used,[12] and copper is retired.

Minimising the information burden on, & cost of, regulation

A benefit of the anchor product approach is that it reduces the information burden on the regulator, since costs and demand do not need to be modelled to set a price or revenue cap. The complexity of doing so, in an adversarial setting, is demonstrated by the time and complexity involved in settling the price of copper in New Zealand. In proposing a revenue cap, as well as an anchor product, New Zealand will forego this advantage. Further, as the 2015 MBIE telecoms discussion document noted:[13]

> "Getting wholesale prices 'right' is now more important than ever because, unlike when the Act was first drafted, structural separation means regulated entities now have very few other opportunities to generate revenue."

The reality is that in setting a revenue cap, particularly alongside an anchor product, there is little prospect of getting it right. The costs of "errors" in setting different regulatory constraints should therefore be considered. No one has perfect foresight, and whilst a regulated firm may have information that the regulator lacks, both

[12] Sapere Research Group, *Economic value of the take-up of ultra-fast broadband in New Zealand*, 2016.
[13] MBIE, *Regulating communications for the future*, September 2015. Page 19.

the regulator and the firm operate with imperfect information and in an uncertain world.

Errors, and the costs associated with errors in setting price controls or defining anchor products, are therefore inevitable; as are the disincentive effects arising from "error correction" as new information becomes available.[14]

An anchor product is a soft constraint versus a price or revenue cap, may involve less risk of costly error and less harm to incentives when reset.

The challenge of applying utility style regulation to telecoms

The proposed approach in New Zealand draws on practice and experience in regulating other utilities. Whilst this approach, with a regulated asset base which is rolled forward over time and is not subject to revision (other than to take account of depreciation and new investment) can offer stability and predictability, the challenges and tradeoffs in applying the approach to telecoms access should not be underestimated.

Telecoms networks differ from utility networks including pipes and wires businesses; with telecoms networks having dynamic characteristics including rapid innovation and declining unit costs; competition between cable, telco and mobile networks; service price differentiation; and uncertain demand (with universal adoption of fixed broadband unlikely).

Utilities – pipes and wires - are stable in comparison. There is less innovation, competition, service differentiation and more universal and predictable adoption (though advances in battery storage and local generation may make electricity distribution more dynamic).

As Ofcom noted, telecoms is different:[15]

> "…the communications sector is different to utilities. The communications sector is characterised by a continual evolution in technologies and service capabilities, matching

[14] This inevitable information asymmetry between the regulator and the regulated firm (and within the regulated firm between managers and layers of management) is the reason that incentives, and the opportunity to earn economic rents, are required to promote efficiency. Tighter error correction reduces the opportunity to earn rents and therefore incentives. Jean Tirole, *Market power and regulation*, October 2014.

[15] Ofcom. July 2015. "Strategic review of digital communications – Discussion document." *http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/summary/digital-comms-review.pdf*

changing consumer demand and differentiated willingness to pay for different features." Paragraph 1.22

Unlike, say, piped water which is almost universally adopted; demand for broadband is significantly less than 100%, whilst future demand for fixed access will remain uncertain. In deciding the approach to policy and regulation, we should take the dynamic nature of telecoms networks and markets into account.

The challenge and risk of multiple interventions on fibre

The combination of anchor product regulation and a revenue cap appears problematic and risky, particularly given the interaction of constraints. A revenue cap may cap the upside from growing the fibre market, whilst an anchor product – particularly if the service level specification is high – increases the likelihood that outcomes undershoot the revenue cap.

The combination may therefore result in expected returns that are low. Further, the combination of constraints may blunt incentives both to invest and to grow the market in terms of fibre adoption. Such an outcome would run counter to the objectives of fibre investment in New Zealand.

The lesson in relation to copper in 2013, namely that the interaction of different aspects of regulation need to be carefully considered alongside one another, applies also to the application of multiple regulatory instruments to fibre. The proposed approach, and guidance to the regulator, should seek to ensure that the package of measures works as a whole.

5. Delivering & maintaining sufficient flexibility

This section considers the proposed approach regarding copper and fibre.

Freedom regarding copper retirement and pricing

The proposal to deregulate copper, where UFB or other fibre is available and subject to consumer safeguards, is sensible given that there will be an anchor product over fibre. Flexibility over the timing and approach to copper retirement is important, and would allow the approach to be decided commercially.

In the US, Verizon have retired copper line-by-line as faults arise, migrating those customers to fibre (or wireless where fibre is not available). Area-by-area retirement may also make sense, coordinated alongside fibre installation. Leaving as much commercial freedom as possible for Chorus will allow an efficient approach to be devised, potentially including trials of alternative approaches.

It is also important that Chorus has the option to introduce products below the specification of the regulated anchor, as this might promote transition to fibre, speed up copper retirement and minimise objections to copper retirement.

The (revenue cap constrained) anchor product

A 100/20 Mbps regulated anchor product is proposed, with prices set at the 2019 ultrafast broadband (UFB) contract level and increasing with inflation until review in 2023. The rationale is stated as follows:

> "This is to ensure that the most common residential voice and broadband services are available at reasonable prices on the UFB network, and to create a price and quality 'anchor' for the other services provided by the supplier."

The following points are considered in relation to the proposed anchor:

- First, a price and quality anchor for other services need not match the most common services to ensure that they are available at reasonable prices. Rather, the anchor would ideally be set on a basis that is least constraining i.e. the anchor product should be chosen based on consideration of the chain of substitution.

- Second, given that a revenue cap is also proposed, this is not anchor product regulation in the sense the term is used in Europe, and may over-constrain product and pricing freedom.

In deciding what anchor product is appropriate, demand, in the sense of incremental willingness to pay for different speed tiers, should be considered (information on existing adoption of different products may or may not be informative regarding the chain of substitution, depending on existing price differentials).

100/20 Mbps appears high as an anchor product specification. Whilst the market is transitioning to higher speed access, the distribution of speeds remains weighted towards lower speed access, whilst wireless only access is growing.

Statistics New Zealand data, for June 2016, shows that whilst the proportion of connections with a theoretical download speed of greater than 50Mbps has grown, the overall percentage share in the combined ranges of 8-24 Mbps and 24-50 Mbps has been relatively stable, increasing slightly over the past four years from 69% in June 2012 to 74% in June 2016.[16]

Further, from a forward-looking perspective there are indications that 30/10 Mbps may be more than sufficient as an anchor product - at least out to 2023 - when review is proposed:

- In home Wi-Fi is likely to be constraining for many, well below 100 Mbps.
- Compression is improving, driven by the desire to lower the cost and improve the reach of applications and content globally.
- Incremental willingness to pay for speeds beyond around 50 Mbps or so appears low.

Each of the above is considered below.

In home Wi-Fi constraints

Given the pivot to mobile devices, most in-home connections are via Wi-Fi, and Wi-Fi rather than access speeds may be constraining. A study of real world usage in the US found that:[17]

[16] Statistics New Zealand, *Internet Service Provider Survey: 2016*, October 2016.
[17] Sundaresan, Feamster and Teixeira, *Home Network or Access Link? Locating Last-Mile Downstream Throughput Bottlenecks*, March 2016.

> "…nearly 80% of the bottlenecks are in the wireless network when access throughput exceeds 20 Mbps."

This points to a need to improve Wi-Fi, and for broadband retailers to focus more on the quality of the Wi-Fi solutions they offer. However, over the next five years Wi-Fi is likely to remain an important constraint for users.

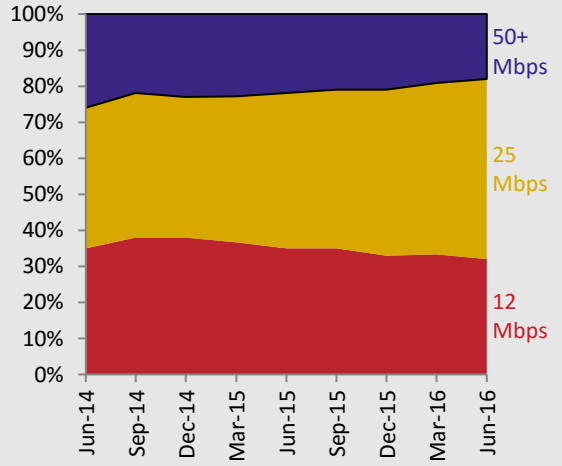
Advances in compression

Advances in compression including H.265 (which offers a 50% reduction in bandwidth requirement versus the still widely used H.264 standard), the proposed successor to H.265[18] and AV1[19] (the successor to VP9 which is used by YouTube) are likely to more than offset the additional bandwidth requirements of a shift to higher quality video. Compression is also under development for AR, VR and 3D graphics.[20] [21] Finally, advances in machine learning may support further reductions in file size, for a given quality of experience.[22]

Incremental willingness to pay

A market test of demand for bandwidth to the premise is provided by the NBN in Australia, where different speeds are offered at different price points (whereas 100/30 Mbps and 30/10 Mbps packages are offered at the same price by Spark for the first 12 months, making it difficult at this stage to infer incremental willingness to pay from New Zealand adoption data).

Figure 1: Declining willingness to pay for higher speeds in Australia[23]



The price premium of 50 Mbps over 25 Mbps is AUS$10, as is the price premium of 25 Mbps over 12 Mbps.[24] Figure 1 shows that the proportion of customers taking a speed of 25 Mbps or less has been growing, reaching 84% by June 2016.[25]

[18] The Register, *ITU-T wants video sizes to halve again by 2020*, February 2017.
[19] Streaming media.com, *What is AV1?*, June 2016.
[20] Facebook, *Next-generation video encoding techniques for 360 video and VR*, January 2016.
[21] Google Open Source Blog, *Introducing Draco: compression for 3D graphics*, January 2017.
[22] Google blog, *Saving you bandwidth through machine learning*, January 2017.
[23] NBN, *NBN Annual Report 2015-16*, November 2016 (and earlier reports).
[24] Based on retail prices from one provider: *V4 NBN Pricing and Product Information*, [accessed 22 February 2017]
[25] Wholesale tiers include 12/1, 25/5, 25/10, 50/20 and 100/40 Mbps. The two 25 Mbps download packages, and 50 and 100 Mbps packages, are combined in the figure.

Further, a forecast for the UK Broadband Stakeholder Group estimated that only the top 1% of households would have demand of 35-39 Mbps by 2023.[26]

Network build versus anchor product design

Whilst New Zealand has made the decision to build a fibre network to ensure it can meet all eventualities, the lead time and commitment in building a network differs fundamentally from that required to set or adapt an anchor product. Further, given that a review is proposed in 2023, the relevant question is what anchor is prudent in the near term and how the regulator is guided to review the anchor in future.

Based on the above evidence, an anchor product specification of 100/20 Mbps is likely to be considerably more than what is required to constrain other services.

Consideration should be given to adopting a 30/10 Mbps anchor product, in line with the existing product set. Irrespective of the decision regarding the regulated anchor product, Chorus should be free to introduce other products with a higher or lower specification, and to do so without regulatory "permission".

The proposed revenue cap - a belt and braces approach

In addition to an anchor product, an overall revenue cap for fibre is proposed. This represents a belt and braces approach. It is important to ensure that:

- The anchor product specification is not overly constraining on the possibility of reaching the revenue cap.
- The revenue cap is not overly constraining on the desirable attributes of anchor product regulation.
- Guidance to the regulator is designed in such a way as to minimise the above "coordination" risks.

A revenue cap, in addition to an anchor product, appears unnecessary; and is undesirable since it may be inconsistent with the rationale for the anchor product approach set out in Section 3. A revenue cap may undermine the prospects of achieving the goals envisaged when the government first embarked on the fibre investment program.

Further, developing a revenue cap for a market where there is growing but uncertain fibre demand (and an upper ceiling for

[26] Robert Kenny & Tom Broughton, *Domestic demand for bandwidth*, November 2013.

demand that may be significantly less than 100% of households, and in which there is limited pricing power) is likely to prove more complex than for utilities.

However, if a revenue cap is developed, it itself should not be overly constraining; and would ideally permit some flexibility in terms of when and how a "correction" is triggered. Setting a revenue cap is not an exact science, and too strong a feedback between outcomes in terms of demand and costs would blunt incentives for efficient operations and maximisation of overall demand.

Under utility style regulation, one approach is to rely on delay, perhaps 3-5 years, in applying corrections to maintain some incentive for efficiency. In the broadband market, incentives also matter in terms of service-price innovation and maximisation of overall demand, since very high adoption of fibre cannot be taken for granted.

Another approach, is to apply caps and collars to returns – within which correction is not triggered; and to have some sharing mechanism between the network owner and consumers/retailers for performance outside these bounds.

A further consideration is the possibility the "errors" in terms of assumed demand and therefore revenue – inevitable given uncertainty over copper-fibre transition and wireless competition – will result in abrupt price changes when corrections are introduced.

Whilst the full implications of a revenue cap will depend on the details of how it is set and how corrections would work, the likelihood that it is binding (alongside the anchor product), the impact of competition and the impact of "corrections" should all be considered in deciding the way forward.

One approach would be to treat the revenue cap as a soft constraint, leading to a downward/upward revision of the service level of the anchor product in the event of under/over recovery. This approach would help avoid price discontinuity at reviews. It may also be desirable that the anchor is not the main product in the market, and the influence is indirect via demand for other products.

Maintaining a separation between layer 1 & layer 2 pricing

In addition to the anchor product and revenue cap, Chorus is required to offer layer 1 access on commercial terms. There are two observations in relation to this.

First, since layer 1 access will offer the full capability of fibre, it will need to be priced accordingly, as otherwise it would unravel the layer 2 differentiated tariff structure, and make the anchor product irrelevant. Second, no linkage should exist, now or in the future, between this product and other service tiers and prices, in order that there is freedom over pricing at layer 2.

Conclusion

The proposed combination of an anchor product, revenue cap and layer 1 is complex and may be overly constraining on services and prices.

The anchor product specification could be lower, at 30/10 Mbps instead of 100/20 Mbps, and remain an effective constraint on abuse of market power.

A revenue cap appears redundant alongside this, but if maintained could be thought of as guidance in adjusting the anchor product at review, depending on revenue outcomes relative to the guide.

Consideration should also be given to adjusting the level of service of the cap at review rather than the price, as this would offer greater price continuity for consumers.

Layer 1 access should also remain separate and commercially determined, rather than transitioning to a regulated or reference product. This is necessary to support continued service-price differentiation to support and maintain fibre adoption.

To avoid a regulatory Chimera, the break with the past should be clean. Not only should regulation be removed from copper, but multiple interventions should ideally not be applied to fibre. Further, if multiple interventions are applied to fibre, one or more of them should be relaxed – with a lower anchor quality and/or less rigid feedback from the revenue cap.

Otherwise there is a risk of a heads you win tails I lose situation, which would undermine investor confidence, harm incentives to grow the market for fibre and ultimately prove unsustainable – inviting further political involvement in regulation. It is important to get it right this time.