Comments on aspects of NBN Co’s SAU variation

A REPORT PREPARED FOR THE CCC

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1 Introduction

Frontier Economics has been engaged by the Competitive Carriers’ Coalition (CCC) to prepare a report addressing certain aspects of NBN Co’s application to vary its Special Access Undertaking (SAU) that was first accepted by the ACCC in 2013.¹

In this introduction, we provide relevant background and the specific questions we have been asked to address.

1.1 NBN Co’s SAU and variations

In 2017, NBN Co has submitted a variation and then a revised variation to its SAU. The main purpose of the SAU variations has been to incorporate the three additional technologies under the multi-technology mix (MTM) model – fibre-to-the-node (FTTN), fibre-to-the-building (FTTB) and hybrid fibre coaxial (HFC) – into the SAU. This includes extending the pricing provisions in the SAU to the new technologies.

NBN Co has made no further changes in the revised SAU variation compared to the previous SAU variation, but has made additional supporting submissions on the application of SAU price terms to MTM services. We understand that outside the SAU variation process, NBN Co is also consulting directly with its customers about pricing issues.

1.2 Key pricing issues

In its discussion paper, the ACCC acknowledges the ongoing industry concerns about NBN Co’s pricing, particularly the level of connectivity virtual circuit (CVC) prices.²

The ACCC considers these concerns have the potential to impact competition in downstream markets and end-user experiences, and notes there is a risk that these concerns will continue and may even be magnified as the NBN rollout continues and usage increases.

The ACCC has stated that it is aware of pricing issues and the importance of incentives to the SAU:

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² ACCC, Variation to NBN Co Special Access Undertaking Consultation paper, August 2017, p. 5.
However, the ACCC is also aware that incentives need to be in place for wholesale and retail service providers to provide services with data rates and levels of services that meet end-users’ needs and willingness to pay.\(^3\)

The ACCC notes a preference for an agreed industry outcome.\(^4\) However, if a commercial outcome cannot be achieved, the ACCC will consider whether changes to NBN Co’s pricing could be made that would promote more efficient outcomes for NBN Co, RSPs and for consumers.

The ACCC has also sought views on whether NBN Co’s prices can be appropriately reconsidered with the SAU variation in place.

### 1.2.1 NBN Co’s views

NBN Co’s submission with its revised variation re-iterates many of the points made in support of the original SAU accepted in 2013. This particularly relates to incentives to set prices, and change prices over time, to obtain efficient outcomes and drive uptake. For example:

NBN Co expects to face significant ‘long term revenue sufficiency risk’ well beyond the initial network rollout and migration due to significant up-front investment, the wholesale only business model and dependence on growth in take-up and usage over time. Therefore, NBN Co states that it faces strong incentives to incur costs and invest efficiently, price efficiently to drive the uptake of higher value services, and increase the prospects of long term cost recovery...

...The discounts to CVC pricing [are], NBN Co suggests, one such example of incentives working in practice. The ability to discount prices such as through the [dimension based discounting] scheme helps drive up demand and achieve cost recovery over the longer term

NBN Co has pricing flexibility (and natural incentives) to price efficiently to drive take up of services and respond to changes to evolving technology, applications and demand to maximise cost recovery, but remains price constrained through MRPs and other regulatory backstops within the SAU...\(^5\)

NBN Co also submits that the effect of including the MTM related price terms within the SAU is to extend the operation of the current revenue neutral price rebalancing regime to MTM services. The price rebalancing mechanism operates as a regulatory backstop if efficient outcomes do not eventuate through the broader incentives and revenue sufficiency risk.

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\(^5\) ibid., p 22.
1.3 Questions to address

The CCC is submitting on the majority of the issues raised by the ACCC in a separate submission. It has asked Frontier Economics to address three questions that are relevant to elements of the ACCC’s consideration of the SAU variation process.

Broadly, these questions are directed at addressing whether it would be in the LTIE for the ACCC should reserve powers to intervene in pricing on the MTM elements of the network, reflecting on the sufficiency of the SAU to deal with changing circumstances, including through mechanisms such as the revenue neutral pricing review.

The three questions and our summarised responses are:

1. Have the circumstances surrounding the setting of AVC and CVC charges changed substantially since the initial NBN business planning and SAU development and consideration?

   Answer: Yes. NBN Co is recovering a far greater proportion of its revenues from CVC charges than predicted. This appears to have primarily been caused by RSPs acquiring more than twice as much CVC capacity per end user as forecast in 2010.

   See Section 2.

2. Is the CVC pricing issue likely to be self-correcting due to either commercial pressures which lead to strong uptake by lowering CVC prices, or other constraints in the SAU?

   Answer: Doubtful.

   Recent changes by NBN Co to CVC pricing are clearly positive and suggest there may be a medium term amelioration of the CVC capacity constraint. However, as addressed in Question 1 (Section 2) lower prices have followed rather than driven uptake, and still left RSPs to pay more than expected.

   In the longer term, it is debateable whether NBN Co faces sufficient incentives – through the operation of the SAU or otherwise – to reduce the additional expense of acquiring CVC. The SAU applies few constraints on CVC pricing in the short to medium term. The strongest constraints on NBN Co will come from competition with fixed and mobile wireless internet in coming years. High CVC pricing will accentuate this competition; however, this appears to be the consequence of high prices rather than the kind of behaviour we would expect to see in a genuinely competitive market. NBN Co appears to have only weak incentives to take commercial risks on pricing.

   See Section 3.
3. What would be the impact of lowering CVC prices on NBN Co’s financial objectives and consumer outcomes, say in a rebalancing process under the SAU?

Answer: The impact of lowering CVC prices on financial outcomes is complex and difficult to predict. It relies on accurate forecasts of likely behaviour in both the short and long run. As the SAU price variation process is one means by which the ACCC can address the CVC pricing issue, it should be cautious in finding the price review process will be able to provide better outcomes for end-users.

See Section 4.
2 The balance of per user and capacity charges

The first question to be addressed is whether there have been material changes in circumstances regarding the setting of per user charges (AVC)\(^6\) and capacity-based charges (CVCs).

We consider that patterns in the drivers of service demand have materially deviated from initial expectations, which should have been reflected in way that NBN Co prices. That NBN Co’s response has been relatively muted indicates potential issues with NBN Co’s incentives and constraints under the existing SAU which will be extended to the MTM services if the variation is accepted.

Two patterns which we discuss are:

(i) the importance and size of CVC capacity, and
(ii) the composition of uptake of the AVC speed tiers.

2.1 CVC capacity

A widely-commented on current feature of the NBN is the under-provision of CVC capacity by RSPs.\(^7\) CVC capacity is the amount of throughput that can be transferred between the RSP and customers at any point in time. Specifically, there are 121 points of interconnect between the NBN and RSPs; to serve customers connected to the NBN, RSPs must transfer data through these points of interconnect, one for each customer serving area. If an RSP purchased 200 Mbps of CVC capacity for a particular area, the combined throughput of that RSP’s customers in that area will not exceed 200 Mbps.

If RSPs have not acquired sufficient CVC capacity to satisfy demand during peak times, customers may see their speed fall below the capability of the tier they are on. For example, a customer on the “25/5” Mbps tier may be limited to 10 Mbps due to congestion. If the RSP had purchased more CVC capacity from NBN Co, there would have been less congestion (and possibly no congestion) and therefore higher speeds available to end users.

RSPs have argued that that under-provisioning of CVC capacity, leading to congestion and low speeds during peak hours, is caused by CVC pricing that is at

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\(^6\) Recognising that these are not strictly per user charges but using this as shorthand for a per premises service.

\(^7\) A problem recognised by NBN Co, see e.g. [http://www.nbnco.com.au/blog/the-nbn-project/getting-the-balance-right-on-the-nbn-network.html](http://www.nbnco.com.au/blog/the-nbn-project/getting-the-balance-right-on-the-nbn-network.html)
odds with what consumers are (currently) willing to pay for superfast broadband services.\(^8\)

In, Figure 1 below, reproduced from NBN Co’s 2010 Corporate Plan, NBN forecasted that CVC revenue would account for approximately 19% of combined CVC and AVC revenue in 2017. We estimate the current proportion as 40%\(^9\). CVC is playing a much larger role NBN Co’s than originally anticipated. This suggests that either NBN Co was expecting that either CVC usage would be lower than it is now, or that the price of CVC would have fallen lower than current levels.\(^10\)

Figure 1: Forecast components of revenue

![Figure 1](image)

Source: NBN Co

The latter does not seem to be the case: CVC pricing is not that different than expected. In the 2010 corporate plan, NBN planned to reduce the price of CVC capacity in line with downloads per customer, as shown in Figure 2. The average household connected to the National Broadband Network downloaded around 144 gigabytes of data every month in the 3 months ending 31 December 2016 increasing to 157 gigabytes by August 2017.\(^11,12\) Taking the planned relationship

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\(^10\) Alternatively, that AVC charge per customer is substantially lower than anticipated. This does not appear to be the main driver, as can be seen in the next section.


\(^12\) According to the 2018 Corporate Plan, released 31 August 2017, the average is 157 GB per user [connection] per month.
between download volumes and CVC pricing, NBN Co was expecting to price CVC capacity at around $17.50 per Mbps. CVC was actually less expensive than this, at $15.25. Moreover, NBN Co would likely have predicted download volumes to be lower than eventuated, further widening the gap between anticipated and actual CVC prices.

Figure 2: CVC price vs data usage average

Source: NBN Co

Is CVC usage per user in fact higher than forecast? This seems a much more plausible explanation of the revenue share increase. For example, we can determine that very low levels of CVC per user were referenced in the 2010 corporate plan.

The CVC is priced initially at $20 per Mbps, adding approximately less than $1 per average end user for a 12/1 megabit per second service with current average data usage. It is currently envisaged that CVC capacity will be sold in fixed-sized blocks of capacity, with an expectation that the price will decline to $8.75 representing a CAGR of -6.2% p.a. (FY2012 to FY2025) (pricing option A, refer Section 9, Revenue Forecasts, below). This price decline is based on expectations of increased usage and will be adjusted on a yearly basis to reflect take up rates, average speed increases and usage increases.

The balance between AVC and CVC pricing has been designed to enable NBN Co to drive – and benefit from – substantial increased usage in the future. This has been achieved by keeping the AVC as low as possible in order to encourage consumers up the speed tiers, and relying on CVC revenues to drive ARPU growth.

Note that if CVC is $20 per Mbps, an average of less than $1 per end user for a 12/1 Mbps service implies a CVC capacity of less than 0.05 Mbps per user. Currently CVC is typically around 1.1 Mbps per user. Thus purchased CVC capacity, driven by CVC demand, has increased by more than a factor of 22. This is a substantial change in CVC per user compared to when the pricing was determined. Indeed, the 2010 Corporate Plan implies a CVC capacity of less than
The balance of per user and capacity charges

0.5 Mbps per customer for FY2017. In turn this implied that RSPs could have expected to pay less than $8 in CVC charges per customer per month, rather than the more than $17 per month currently paid.

The discrepancy between anticipated and actual CVC demand can be explained by substantial uptake of streaming video on demand services such as Netflix and Stan. These services are bandwidth intensive, and are most commonly used during peak hours: weekday evenings. As a result, consumption of data is concentrated in peak hours, leading to considerable rises in demand for CVC capacity; CVC capacity is an instantaneous limit and cannot be reallocated from quiet periods. Thus, demand for CVC per user is more than double the expected demand.

What this analysis ultimately illustrates is that while RSPs might have expected to pay more in CVC charges due to growth in demand, in fact, they have paid even more than expected to keep up with changing peak demands. It is therefore not correct to attribute problems with CVC under-provisioning as entirely to a failure or unwillingness on the part of RSPs to “keep up with demand”. Shifts in CVC demand have not been reflected in lower prices; as we go on to discuss in section 3.1, this appears more consistent with a market power explanation than efficient pricing to drive uptake and lower average cost.

2.2 AVC uptake

The other major component of revenue is the AVC access charge. Each connection attracts a monthly charge payable to NBN depending on the tier of connection. The tier represents the maximum download and upload speeds of the connection.

2.2.1 Connections

There is no doubt that NBN connections are well behind initial forecasts, which has resulted in AVC revenues being well below those forecasts.

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13 Estimate, based on CVC revenue, customer numbers and CVC pricing.
14 This $8 estimate can be derived by dividing forecast CVC revenue of approximately $400 million by the average forecast number of premises connected at end FY16 and FY17.
15 Potentially more than double: congestion may suppress internet usage, for example limiting the quality of video streams.
16 The charge does not depend on the technology used, only the speed (except satellite).
17 The actual speeds experienced may depend on a number of factors, including line quality and CVC capacity.
Current indications from August 2017 are that there are around 2.75 million connected premises. This compares with a FY17 forecast of 4.7 million (FTTP plus satellite and wireless) connections based on rollout to almost 8 million premises.

The financial result of the delays are highlighted in Table 1. As we have already noted, the key area of deviation from initial plans is not CVC revenue, which appears to be consistent with early projections. Rather, it is AVC revenues which are well behind expectations.

Table 1 Summary of FY17 forecasts and actuals

<table>
<thead>
<tr>
<th></th>
<th>FY17 Forecast</th>
<th>FY17 Actual (Estimate)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVC revenue</td>
<td>1,700</td>
<td>608&lt;sup&gt;20&lt;/sup&gt;</td>
<td>-64.2%</td>
</tr>
<tr>
<td>CVC revenue</td>
<td>400</td>
<td>409&lt;sup&gt;21&lt;/sup&gt;</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

Source: NBN Co Corporate Plan 2010 and WMI reports

As we now discuss, AVC revenues are also affected by take up of speed tiers, as these are differentially priced.

### 2.2.2 Speed tiers

Shown below in Figure 3, the 2010 Corporate Plan projected the speed tier composition, with a substantial proportion of customers utilizing the lowest tier, up to 12 Mbps download and 1 Mbps upload. In 2017 a substantial proportion of customers were projected to have connected at tiers equal to or above 100/40. Very few customers were projected to be on the 25/5 Mbps plan.

The recent NBN wholesale reports illustrate that the projections were not borne out in a number of ways. As shown in Table 2, most connections were on the 25/5 tier, with few less than a third on the lowest tier, and less uptake of the highest tiers.<sup>22</sup> The 50/20 tier is not typically advertised by the major RSPs; the share of connections on the 50/20 tier is accordingly substantially below projections.

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<sup>19</sup> December 2010 Corporate Plan.

<sup>20</sup> Estimate based on interpolation of quarterly volumes from wholesale market indicator reports and price data.

<sup>21</sup> Includes CVC revenues on TC-1 services. If these are excluded, revenues of $378 million are estimated.

<sup>22</sup> The highest tiers, 250/100 and above, are not commonly advertised by major RSPs
Figure 3: Forecast uptake of AVC tiers

![Graph showing forecast uptake of AVC tiers]

Source: NBN Co 2010 Corporate Plan

Table 2: Uptake of AVC (PIR) tiers, 2017 actuals and forecasts

<table>
<thead>
<tr>
<th>Tier</th>
<th>2017 Wholesale Report</th>
<th>2010 Corporate Plan (estimates)</th>
</tr>
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<tbody>
<tr>
<td>12/1</td>
<td>29.3%</td>
<td>48%</td>
</tr>
<tr>
<td>25/5 and 25/10</td>
<td>54.2%</td>
<td>8%</td>
</tr>
<tr>
<td>50/20</td>
<td>3.4%</td>
<td>17%</td>
</tr>
<tr>
<td>100/40</td>
<td>13.1%</td>
<td>23%</td>
</tr>
<tr>
<td>250/100 and higher</td>
<td>0</td>
<td>4%</td>
</tr>
<tr>
<td>Proportion ≥25Mbps down</td>
<td>70.7%</td>
<td>52%</td>
</tr>
<tr>
<td>Proportion &lt;25Mbps down</td>
<td>29.3%</td>
<td>48%</td>
</tr>
</tbody>
</table>

Source: NBN market indicator wholesale reports and 2010 Corporate Plan

The two clear trends are better than expected uptake of ‘mid speed’ (25 Mbps) plans, and lower than expected uptake of super-high speed plans.

On the mid-speed plans, this may indicate that consumers are willing to pay to upgrade speeds from ADSL, which are generally in the range of 10-15 Mbps. Indeed, NBN Co is recovering more total revenue from consumers on 25 Mbps plans than it was initially expecting from consumers on the (dominant) 12 Mbps plans.

The most likely explanation for that increase is the benefit derived by customers from the 25 Mbps tier has changed. Substantial uptake of video streaming services that perhaps make the 12 Mbps plans too restrictive for many households where...
multiple users access video at the same time. For these customers, the option to double maximum headline speeds for a small charge may be appealing, especially given the relaxation of data caps.

On the less-than-expected uptake of higher tiers, a number of factors appear to be possible explanations, as there are a number of drivers of uptake of higher tiers. First and likely foremost is the improved experience that upgrading to a higher tier can offer. Higher tiers may not be offering a material improvement over lower headline speeds, due to:

- Line quality issues as part of the multi-technology mix that the NBN switched to subsequent to the 2010 Corporate Plan, including a large number of connections through FTTN technology. This appears to come with the risk that attainable speeds are well below those promised, depending on distance from the premises to the node, line quality and temporary issues with maintaining legacy connections.\(^\text{23}\)

- Generally insufficient CVC capacity which limits speeds during busy times.

- An inability of RSPs to differentiate between lower and higher speed tier customers when congestion occurs (so that higher tier customers may be no better off).\(^\text{24}\)

Arguably, many of these issues could be dealt with through CVC pricing and product construct amendments (i.e. to guarantee better performance from higher speed plans). If such quality factors are not foremost in consumers’ minds, then it might also be the case that, given the shift from 12 to 25 Mbps plans, lower prices for higher speed tiers could stimulate demand.

The net impact of the different take up rates appears to be that average AVC revenue (residential users) are slightly below projections as at June 2017.\(^\text{25}\) Combining the data on AVC and CVC expectations suggests that, driven by higher CVC consumption per user, RSPs are paying more per user than they might have reasonably expected based on early projections from NBN Co which were influential in the establishment of the SAU.

\(^{23}\) In May 2017, NBN CEO Bill Morrow stated that the average download speed capacity of FTTN lines was limited to 68 Mbps.

\(^{24}\) While RSPs may technically be capable of allocating different tiers to different CVCs, this raises issues related to network size effects.

\(^{25}\) Using wholesale market indicator data we derive an ARPU per PIR AVC of $27.80 for June 2017, against a forecast in the 2010 Corporate Plan of $30.20.
3 Pricing constraints and incentives

The second question we have considered is whether the CVC pricing issue likely to be self-correcting, via one or a combination of commercial incentives and the SAU provisions. In particular, is it the case that NBN Co faces strong incentives to increase uptake of NBN services by lowering prices (and particularly CVC prices)?

We first consider the general economic principles involved, before turning to NBN Co’s specific pricing behaviour over the last few years in relation to CVC, taking into account its regulatory and commercial constraints.

3.1 Relevant principles

In general, there are good reasons to expect that a firm with market power would not set prices that are efficient. This is because the firm is able to capture more surplus from transactions by keeping prices higher and selling fewer units than are optimal. Optimal here simply means pricing at the marginal cost of supplying a further unit.

Of course, the nature of NBN Co as an entity incurring a large base of fixed and sunk costs means that it will have to price some services above the marginal costs of supply, in order to achieve its return objectives (commercial or otherwise). NBN Co is also subject to a range of regulatory constraints, including a cap on total revenues which are constrained to be no more than total costs.

Will these constraints encourage efficient pricing? The most important considerations are intertemporal; will prices tend towards efficient prices as demand and uptake grow? This is possible, but by no means guaranteed:

- As a general point, if NBN Co has market power and a long-run revenue constraint then it will not necessarily set prices optimally. Rather, one would expect that it will seek to recover its fixed costs as fast as it can, consistent with a firm exercising market power. Specific price caps would need to prevent this.26

- NBN Co will also not necessarily lower CVC prices over time to the same degree as a firm operating in a more competitive market.

26 See following section.
On the first point, any profit-maximising firm with market power that is subject to a total revenue cap will (a) maximise profits and not take up or output and (b) try to mitigate its risk of revenue insufficiency by trying to recover its costs as fast as it can by keeping prices as high as it can. This may well imply setting prices that are as higher than optimal in early periods. The most efficient path of prices (that maximises the sum of consumer and producer surplus) might involve lower prices and higher uptake.

The incentives of regulated entities to push forward cost recovery are favourable to shareholders, but come at the expense of efficiency and consumers. This incentive has been noted in past regulatory decisions. For example, in 2006 the Australian Competition Tribunal rejected an undertaking from Telstra on the grounds that while the undertaking would not necessarily result in any cost over-recovery, recovering costs over too short a period was unlikely to be consistent with behaviour in a competitive market or sufficiently consider the long term interests of end users.

In its undertaking, Telstra proposed to “levelise” (or smooth) prices and recover costs over a four year period for assets that were expected to deliver service for longer than four years. The Tribunal agreed with Telstra’s consultant that “in a competitive market service providers may smooth prices over limited periods, and in particular avoid high prices in early periods and low prices in later periods, as they anticipate such smoothing would be attractive to access seekers”. However, the Tribunal noted that if that approach was correct, it could not also be the case that access seekers would be indifferent between “a choice of $9.00 (the charge claimed by Telstra to be a reasonable access charge) for the first four years and an unspecified but probably lower charge in the fifth year of the assets’ life, …[and] a levelised but certain charge over each of the five years of less than $8.00.”

On the second point, at face value, standard economic analysis of competitive markets would not tend to support that prices fall as uptake and demand grow.

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27 It may be that NBN Co’s mandate from government may mean that this behaviour is less likely. Our understanding is that there is no clear direction to NBN Co about how to balance objectives between cost recovery and maximising take-up.

28 On this point, we note that the ACCC correctly noted in a submission on the Productivity Commission’s review of the Gas Access Regime that the notion that high fixed and sunk costs means that there are strong incentives to set reasonable prices is “…a fallacy. Pipeline owners face the same incentive as every other business owner, that is, to maximise profits. Thus, pipeline owners that possess market power will choose the combination of prices and throughput that maximises their profits, not the combination that maximises throughput per se.” See http://www.pc.gov.au/inquiries/completed/gas/submissions/sub048/sub048.pdf, at pp. 23-24.

29 Re Telstra Corporation Limited (ACN 051 775 556) [2006], ACompT 4 (2 June 2006). Compared with NBN Co, we note that Telstra would have had an additional incentive to charge high prices because it would potentially harm its downstream competitors.

30 ibid at [112].
Profit maximisation for a firm with an upward sloping marginal cost curve would result in increases in prices and profits rather than decreases over time.

Of course, NBN Co’s network has very high fixed costs and low marginal costs, meaning that average costs are falling as output expands. But if marginal costs are low and remain constant at different rates of output, then there will still be little incentive to lower prices in response to shifts in demand (i.e. market growth). This is shown in Figure 4; in this example of a firm with market power facing linear demand, quantities supplied increase but so do prices – there is no incentive to reduce prices. Only declining marginal costs could result in price falls, but it is unclear whether this accurately characterises NBN Co’s costs at current levels of output.

**Figure 4: Effect of growing demand on prices**

There is also some doubt that NBN Co would pass through cost reductions (shifts in the marginal cost curve) to prices to the same extent as a firm (or firms) in a competitive market facing the same ongoing cost reductions. For example, a well-known result is that a monopolist facing a linear demand and constant marginal cost will only pass through 50 per cent of any marginal cost reductions as lower prices. In a competitive industry facing the same demand curve, reductions in marginal cost applying to each firm will be passed through completely.  31

We recognise that the extent of pass through ultimately depends on the shapes of the marginal cost and demand curves. Without further knowledge of these it is not

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possible to be definitive about likely behaviour. However, it illustrates that in principle there are some reasons to be sceptical that NBN Co will adopt efficient prices over time, and that the ACCC needs to exercise some caution with regard to claims that NBN Co’s incentives are aligned with consumers’ interests in maximising take up or throughput at the expense of (short run) profitability.

Figure 5: Monopolist facing linear demand, marginal cost decrease and pass through

![Monopolist facing linear demand, marginal cost decrease and pass through](source: Frontier Economics)

### 3.2 Other regulatory constraints

Constraints imposed by the SAU are not particularly onerous or relevant with respect to addressing issues with CVC pricing:

- **Price caps on AVC and CVC prices** both allow for nominal price increases. Given even moderate growth in CVC demand there is likely to be strong pressure from RSPs to drop CVC prices to make the NBN attractive to users, meaning that commercial constraints are much more likely to be binding than regulatory constraints.

- **Price review or “rebalancing” provisions** means that NBN Co’s revenues are protected in the event that CVC prices fall. Under Schedules 1G.3 (Module 1) and 2E.2 (Module 2), either NBN Co or the ACCC can instigate a price rebalancing review at various times during the SAU. It would allow the ACCC to adjust any SAU price or group of prices subject to the constraint that any adjustment must be revenue neutral across the life of the SAU. The neutrality of any changes may in turn dissuade these provisions from being used (see also the discussion in Chapter 4 for an examination of the difficulty using these provisions).
Arguably, even though the SAU has not constrained CVC pricing directly, it may be partly responsible for high CVC prices, due to the restrictions placed on AVC charges.

3.3 Market behaviour, dimension-based discounting and competition

As pointed out by the ACCC, NBN Co’s behaviour suggests that it has been somewhat responsive to concerns of RSPs on CVC pricing. However, there is doubt about whether these responses have been sufficient, or sufficiently timely. In the longer term, it is debateable whether NBN Co faces sufficient incentives – through the operation of the SAU or otherwise – to reduce the additional expense of acquiring CVC.

3.3.1 The impact of dimension-based discounting

While the SAU allows a CVC price of $20 per Mbps of capacity, NBN Co has sought to address RSP concerns by:

- reducing the base charge to $17.50 and then to $15.75
- implementing an industry wide discount model based on total bandwidth contracted and
- implementing a retailer level discounting model that may substantially reduce expense incurred by RSPs in making more concurrent capacity available to users.

We understand that NBN Co also continues to consult with users on alternative pricing models.

Recent changes by NBN Co to CVC pricing are clearly positive and suggest there may be a medium term amelioration of the CVC capacity constraint; once the CVC capacity per user increases to 1.5Mbps, there is very little expense in increasing to above 2 Mbps. This is shown in Figure 6, showing the cost per customer of providing a specified level of CVC per customer.\(^{32}\)

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\(^{32}\) Price per Mbps depends on previous purchase level of the RSP under the discounting scheme, hence this is more accurately described as the price if the level of capacity were maintained. It should also be noted that CVC capacity is purchased in discrete blocks of 100 Mbps (small quantities can be bought in blocks of 50Mbps).
That being said, there is still a material increase required to push supply to 1.5 Mbps per user. As of June 2017 CVC capacity was 1.1 Mbps per customer on average, compared to an average of 1.0 Mbps in the first quarter of 2016.

Notwithstanding these changes, widespread concern remains regarding CVC charges and consumer experiences are anecdotaly much poorer than expected. A commonly stated reason for this under provision is a charge that substantially exceeds the cost (to NBN Co) of supplying increments of CVC capacity; this still remains the case despite the changes NBN Co has made to the charges for CVC. This has occurred even though, as demonstrated in Section 2, CVC provisioning and expenditure is well ahead of early forecasts on a per user basis.

### 3.3.2 Competitive pressure on NBN Co’s pricing

In the short term, there are only limited constraints on the ability of NBN Co to charge high prices, especially for connections demanding large data volumes. We expect that the strongest constraints on NBN Co will come from competition with fixed and mobile wireless internet in coming years. In particular, NBN Co should face a strong incentive to increase uptake of services, specifically connections, in competition with wireless internet. This might be expected to materially constrain NBN Co’s pricing of CVC.

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It is clearly true that to the extent CVC pricing remains high, competition will be heightened. However, such competition is actually a manifestation of the exercise of market power; and more an illustration of the consequence of high prices rather than the kind of behaviour we would expect to see in a genuinely competitive market. This is analogous to the “cellophane fallacy” widely considered in the competition literature on market definition and market power analysis.34

The reality remains that there is a serious risk of market distortion from allowing prices to deviate from marginal costs to such a degree that wireless/mobile technologies become strong substitutes. As NBN Co itself has recognised, the incremental price of CVC capacity is well above the incremental costs of supplying more capacity.35

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34 See e.g. Bishop and Walker, *The Economics of EC competition law*, 2010 at 4.017.

35 Increasing capacity requires enhancements to NBN Co’s transit network, which is largely built with established optical fibre leased from third parties. NBN Co’s vendors and NBN Co have stated that while there are large fixed costs in network establishment, the incremental costs of upgrades are much lower. NBN Co’s vendor has said in relation to a recent upgrade that:

The flexible and highly compact line side interface solution will enable nbn to improve utilization of existing fibre resources by over 50% and increase capacity up to 45 Tbps per fiber link, while reducing CapEx and OpEx via reduced footprint, lower power consumption, and improved throughput density. [Source: http://www.coriant.com/company/press-releases/NBN-Co-and-Coriant-Successfully.asp]

NBN Co’s technology consultants Analysys Mason considered that a single fibre pair leased from Telstra will be able to accommodate all traffic requirements over the medium and long term. [Source: http://www.nbnco.com.au/content/dam/nbnco/documents/analysys-mason-report.pdf]
4 The possibility of lowering CVC prices under a rebalancing constraint

4.1 SAU provisions

To the extent that CVC charges are not considered to be in the LTIE, and there are inadequate commercial incentives for NBN Co to correct this, there is a question about to what extent the SAU provisions adequately provide for price restructuring. In turn, this may inform the ACCC’s decision about the costs and benefits of extending the SAU to MTM services.

As noted by the ACCC and NBN Co in its submissions, there is already a process for dealing with the restructuring of NBN Co’s pricing in the SAU. Extending the SAU to the MTM services would mean that the prices for all NBN Co’s services can be reconsidered at the same time if a price rebalance was undertaken. In contrast, a rejection of the SAU variation would mean the rebalance would only apply to FTTP, satellite and fixed wireless services.

Under Schedules 1G.3 (Module 1) and 2E.2 (Module 2), either NBN Co or the ACCC can instigate a price rebalancing review at various times during the SAU. It would allow the ACCC to adjust any SAU price or group of prices subject to the constraint that any adjustment must be revenue neutral across the life of the SAU. This constraint is said to ensure that a price review will not adversely affect NBN Co’s ability to recover its efficiently incurred costs across the life of the SAU.36

4.2 Relevant considerations and difficulties in a price rebalancing exercise

The impact of lowering CVC prices on NBN Co’s financial outcomes is complex and difficult to predict.

This is obviously difficult in the short term, but is made harder by the requirement to ensure that there is no material difference between the present value of the difference between the expected revenue and the sum of the expected ABBRR for each financial year in the period between the commencement of the review and the expiry of the SAU.37

As an example, we would expect that the short-run impact of any CVC price change will depend on estimation of the following four elasticities:

36 ACCC, Draft Decision on NBN Co’s SAU variation, April 2017, p. 63.
37 SAU, 1G.3.8.
The possibility of lowering CVC prices under a rebalancing constraint

The own price elasticity of CVC demand

The cross-price elasticity of AVC demand with respect to CVC

The own price elasticity of AVC demand

The cross-price elasticity of CVC demand with respect to AVC.

This would enable an accurate assessment to be made of the cross-effects between AVC and CVC prices; lower CVC prices will increase the attractiveness of NBN offers and increase the demand for AVCs. Equally, increasing AVC prices will reduce CVC demand. Getting the balance of these cross-effects right would be crucial to identifying overall revenue outcomes.

Further, and perhaps more crucially, to confidently make predictions we would need to know how changes in demand in the short term for CVC and AVC will affect long term demand (i.e. long run as well as short run elasticities).

It would be ideal to estimate these elasticities using an econometric model of demand, which would relate past usage of CVC to drivers of CVC demand, including prices of substitutes (e.g. data usage on mobile devices) and complements (e.g. AVCs). However, there are likely to be significant barriers to the estimation of such a model; in particular, the rapid changes in AVC and CVC take up and the attribution of these changes to price changes as opposed to other factors. For example, consumers’ tastes for broadband are continually evolving, as shown through the increasing demand for video streaming services. An econometric approach would also require sufficient variability in the data; AVC prices have been unchanged since the commencement of the SAU.

Finally, any econometric model (using time series data) is likely to be far more accurate in predicting short run rather than long run changes in revenue as required by the SAU.

What this means in practice is that the SAU price review provisions may be of less value than they initially appear. In principle, the provisions are a reasonable protection for NBN Co. It may also be feasible for NBN Co to use them, because it has have informational advantages over other parties and if seeking a rebalancing would have incentives to reveal this information. However, if the ACCC uses the provisions against NBN Co’s wishes (if the ACCC is not satisfied with NBN Co’s proposal), a re-balancing process will be difficult to manage and contentious, given the uncertainty about the impact of lower prices on demand for data and connections. As the SAU price variation process is one means by which the ACCC can address the CVC pricing issue, we suggest the ACCC should be cautious in presuming that the CVC pricing issue will be self-correcting under the SAU.
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