

The nbn™ Network Wholesale Pricing Review

Moving to a fixed price wholesale pricing model: Risks for low data users

26 May 2021

Commissioned by



 accenture

The Accenture logo consists of a white chevron symbol pointing to the right, positioned above the word 'accenture' in a lowercase, sans-serif font.



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Executive Summary

The national broadband access network (“the **nbn™** network”) was created to foster productivity, drive innovation and lift Australia’s digital capability in order to deliver economic and social benefits for Australians. The **nbn™** network regularly reviews its performance against this objective, including its wholesale pricing construct.

This report was commissioned by **NBN Co** to review the current pricing construct, with a particular focus on the impact of removing the connectivity virtual circuit charge (‘CVC’) from the pricing model. CVC is a usage-based charge that varies according to an end consumers usage of the **nbn™** network. It differs from the access virtual circuit charge (‘AVC’) which is a fixed charge.



This report has been commissioned by **NBN Co** and prepared by Accenture Strategy.

The **nbn™** network wholesale pricing model, with AVC and CVC components, is a variant of the two-part tariff, a common and effective pricing construct used in infrastructure settings. Low data users (those on data cap plans under 500GB per month) will be most adversely impacted if CVC is removed.

The removal of CVC is expected to have four key impacts:

1.4m
households

1.4 million nbn™ network households with low data usage will impacted by the accelerated phase out of data capped plans. CVC is the primary incentive for the presence of data caps which are sold at a discount to unlimited equivalents. Without CVC, the pricing stimulus for data caps is forgone and it is likely that data capped plans in the retail market will be phased out by RSPs, and possibly disappear altogether, reducing choice for consumers.

\$120
p.a. price rise

95% (~1.3m) of these low data households are expected to face an average price increase of \$120 per year if data caps are phased out. The monthly increase will likely vary between \$7 and \$30 a month depending on their current data limit, with an average of \$10. Data cap users facing this price rise are more likely to be on lower incomes or fall into more vulnerable segments of the population.

70k
leave the nbn™
network

The remaining 5% (~70,000) of these low data households are estimated to leave the nbn™ network when faced with this price rise. 95% (1.3mill) are expected to absorb the price rise, staying on the same plan or switching to an alternative plan, such as a lower speed tier.

\$213m
impact

The consumer surplus for these low data households is estimated to reduce by up to \$213m p.a. Consumer surplus is the value that consumers place above the price that they pay for the **nbn™** network. Of the 1.4m data cap users, 1.3m are expected to stay on the **nbn™** network and forgo an aggregate surplus of up to **\$155m p.a.** (a loss of 14% on a per household basis). The ~70,000 households who will likely leave the **nbn™** network could forgo up to **\$58m p.a.** in aggregate consumer surplus derived from the **nbn™** network.

Overall, removing CVC will reduce choice, increase entry level prices, reduce fairness and result in fewer consumers on the **nbn™** network. Low data users (considered to be those households on data caps under 500GB) will be most adversely impacted. Removing CVC will also have several broader market impacts, including curtailing NBN Co’s pricing flexibility and ability to respond quickly and effectively to market changes whilst balancing its pricing objectives.

Introduction to the nbn™ network pricing

NBN Co's wholesale pricing construct must balance five pricing objectives to support the overall purpose of the nbn™ network

NBN CO'S PURPOSE STATEMENT

To lift the digital capability of Australia, allowing Australians to have access to a fast and reliable broadband network, at the least possible cost to the taxpayer.

01 MAXIMISE



SOCIETAL BENEFITS

Wholesale pricing should maximise the take-up of the nbn™ network (and minimise the loss of consumers to substitute products) such that society reaps the full productivity, connectivity and digital uplift benefits of widespread nbn™ network use.



INDIVIDUAL UTILITY

A sound pricing construct will incentivise efficient matching of consumers to products available, such that their individual utility is maximised, subject to their willingness to pay.



AFFORDABILITY

The wholesale pricing construct should enable and incentivise RSPs to sell affordable, lower speed products for consumers.



CHOICE

Wholesale pricing should stimulate competition and product differentiation such that Australians can select from a broad choice of products that meet their diverse preferences.

03 BALANCE



EQUITABLE COST RECOVERY

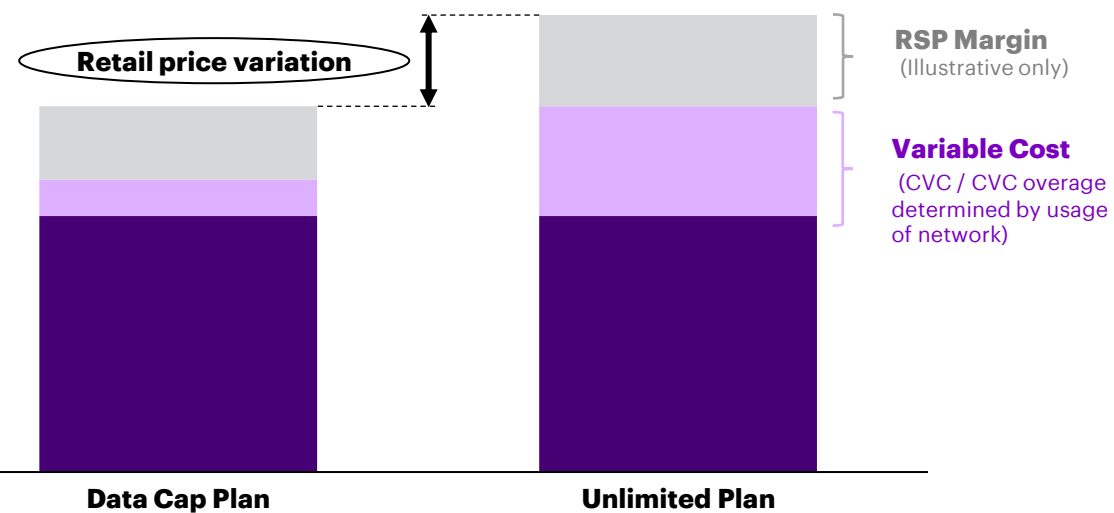
The pricing construct should enable a fair recovery of efficient costs to support continued investment in the nbn™ network to benefit consumers.

NBN Co uses a two-part pricing construct with a fixed charge (AVC) and variable charge (CVC) that allows pricing to vary by speed and network usage

Illustrative nbn™ network retail pricing difference for customers on data cap and unlimited plans

■ Retail margin ■ Variable cost ■ Fixed wholesale cost

The variable wholesale cost component enables retailers to design products with different data caps and sell these at different price points



	Data Cap Plan	Unlimited Plan
% Retail margin	20%	20%
% Variable wholesale cost	10%	25%
% Fixed wholesale cost	70%	55%
Example retail price	\$29.99	\$59.99

The wholesale price paid by an RSP is the sum of:

- A fixed access charge ('AVC'); and a
- A variable usage charge ('CVC')

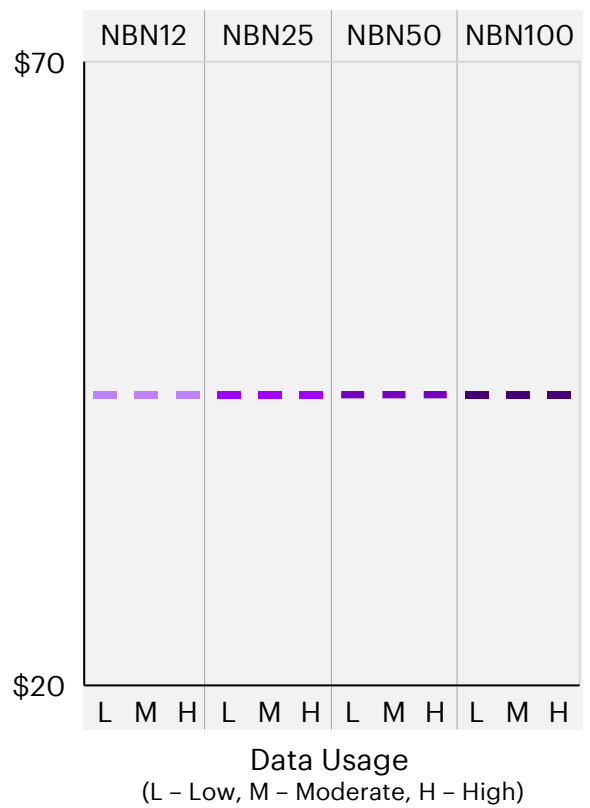
The **fixed access charge (AVC) varies by speed tier**. This flows through to the retail price as higher costs for high-speed products. This enables consumers to select a speed tier that best meets their preference for speed, subject to their willingness to pay.

The **variable usage charge (CVC coverage) varies by a consumer's usage** of the network (i.e. data consumption). CVC charges are based on national pooling of peak hour bandwidth of the RSPs' customer base. RSPs can reduce CVC charges by targeting low usage cohorts or offering capped data plans which suppress peak hour usage. This is demonstrated in the exhibit to the left.

The combination of AVC and CVC leads to a diverse range of plans on the nbn™ network that **cater to the broad set of preferences for data, speed and capacity to pay across the community**.

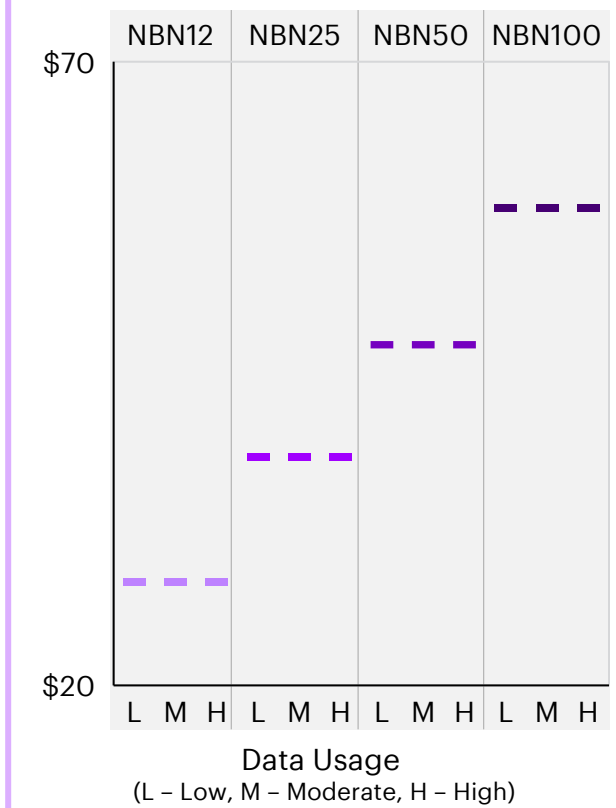
CVC enhances price differentiation which caters to a broader set of consumer price points and ensures costs are recouped from those who use the network the most

Single Price Model No price differentiation



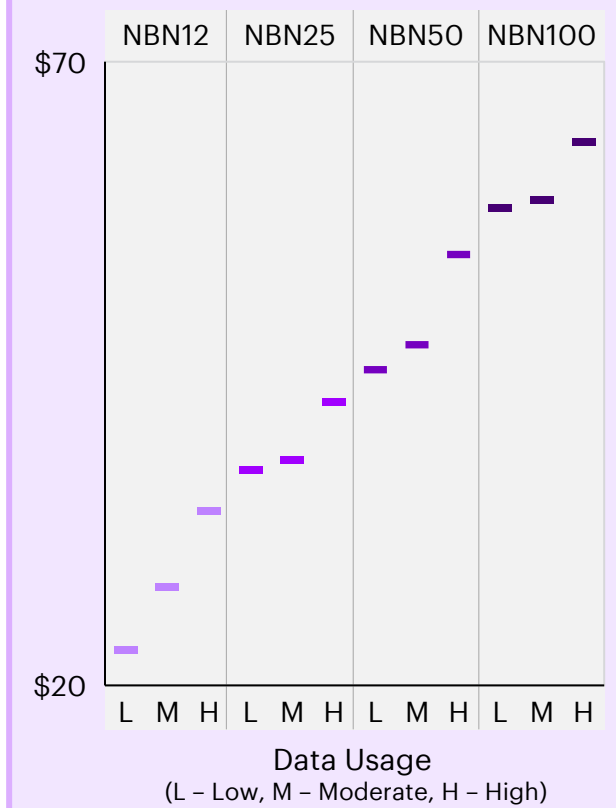
Prices do not vary by speed tier

AVC-only Price Model Some price differentiation



Prices vary by speed tier

AVC and CVC Price Model Enhanced price differentiation



Prices vary by speed tier
...and by network usage

Advantages of CVC

More choice: CVC generates a broader range of choices for consumers who can select products best aligned to their willingness to pay and preference for speed and data.

Affordability: A lower minimum wholesale price is achieved as the price varies by speed tier enabling more affordable products.





Fairness: Users who derive the most value from the nbn™ network (i.e. those on higher speed tiers and those who use more data) contribute more to the cost recovery of the network.

Take-up: The range of choice and price points maximise uptake of the nbn™ network, reducing those priced-out of the market.

NOTE: Graphs above are high level summaries of market price points and are not precise reflections of markets in the real world. Wholesale price simulations are based on percentile data usage distributions; Data usage buckets are defined across low, moderate and high usage categories with the following percentile distributions: Low - 20th percentile, Medium - Average usage, High - 80th percentile. SOURCE: NBN Co pricing structure; NBN Co data usage distribution data; Accenture Strategy analysis

Two-part tariffs, consisting of fixed and variable charges, are an effective pricing mechanism commonly applied in infrastructure settings

Summary of two-part tariff pricing mechanisms in comparable infrastructure settings

Infrastructure setting	Two-Part Tariff?	Tariff Structure
 Electricity	✓	Fixed access charge + Variable per MWh charge
 Water Supply	✓	Fixed infrastructure access fee + Variable per ML use fee
 Waste Water	✓	Fixed service charge + Variable per KL charge
 Gas pipelines	✓	Fixed charge + Variable per GJ charge

Why use two-part tariffs?

Two-part tariffs are widely used across infrastructure settings because of four main reasons:

1. Variable pricing incentivises efficient use of limited resources
2. Economic efficiency and equity is maximised as high-use consumers are charged more
3. The value of the infrastructure asset is directly correlated with the level of utility being derived from it
4. Revenue variability is reduced through fixed cost components

Two-part tariffs used in other infrastructure settings such as electricity and gas markets are more complex than the NBN Co's approach.











It is common for variable charges in these settings to also vary by **usage** and/or **time of day**:

- **Usage Tiers:** Electricity and gas is often priced using tiered rates (Tier 1, Tier 2,Tier n) where the cost per unit increases is higher for each subsequent tier.
- **Peak and Off-Peak:** Different unit prices are often charged according to time of day (peak, shoulder, off peak etc), with volumetric prices being relatively more expensive in peak times.

Furthermore, these retail prices (both fixed and variable) can be changed by providers relatively easily in response to changes in raw costs or patterns of usage. NBN Co does not have the same level of flexibility nor sophistication of usage and peak/off-peak pricing.

The current pricing construct helps the nbn™ network balance the five pricing objectives

nbn™ network pricing construct alignment to five pricing principles

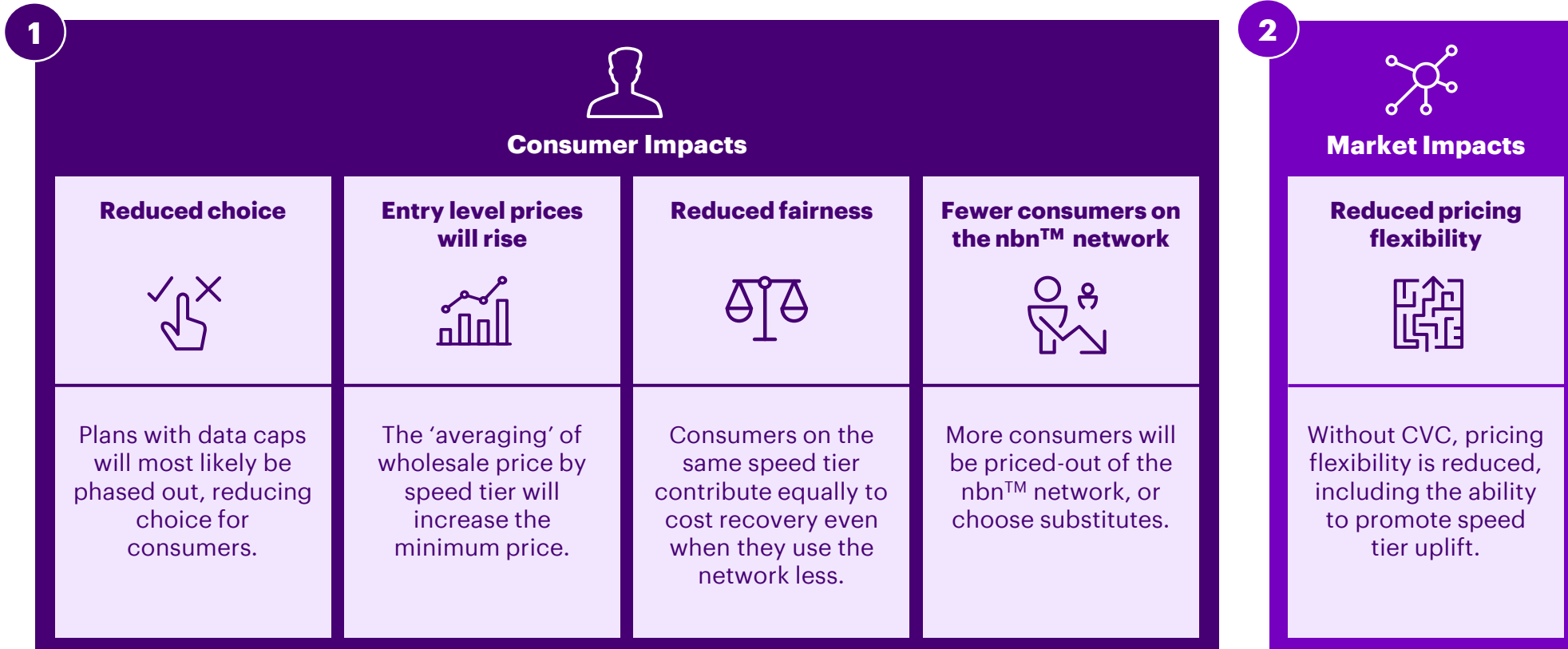
Pricing principle		The nbn™ network progress against these objectives	Source
 Maximise societal benefits		8 million households are currently connected to the nbn™ network, with average download volumes (GB per month) and download speeds (Mbps) increasing by 638% and 192% respectively since 2013	NBN Co data
 Maximise individual utility		The nbn™ network drives \$8.6 bn of consumer surplus per year, an increase of \$2.1 bn (32%) since 2017; On an individual basis, the average consumer realises \$87 of consumer surplus per month over what they pay for the nbn™ network.	Discrete Choice Experiment surveys conducted by CaPPRe
 Maintain affordability		7 in 8 households on the nbn™ network report no affordability concerns with the nbn™ network, and those surveyed were more likely to rate electricity, gas or water as more unaffordable than the nbn™ network. Of the households not currently on the nbn™ network, only 20% cite price as their main concern with the network.	Accenture Strategy survey of ~2,400 users on the nbn™ network; AlphaBeta (now Accenture) Household Survey.
 Maintain choice		Providers on average offer ~2 nbn™ network plans per speed tier; In total, ~200 nbn™ network plans are currently on offer in market, across 25 permutations of speed tiers and data cap limits	NBN Co RSP data ¹
 Balance costs		In 2021, NBN Co allocated \$4.5 bn to reinvest in upgrading the network.	NBN Co media release

NOTE: 1. Bundled inclusions are not included in analysis. Analysis is drawn from monthly third-party RSP market tracking data captured by the NBN Co
 SOURCE: NBN Co data; Accenture Strategy analysis



Proposal to remove CVC

Removing CVC will likely have adverse implications on consumers, particularly those with low data consumption (on data-cap plans), and the overall market



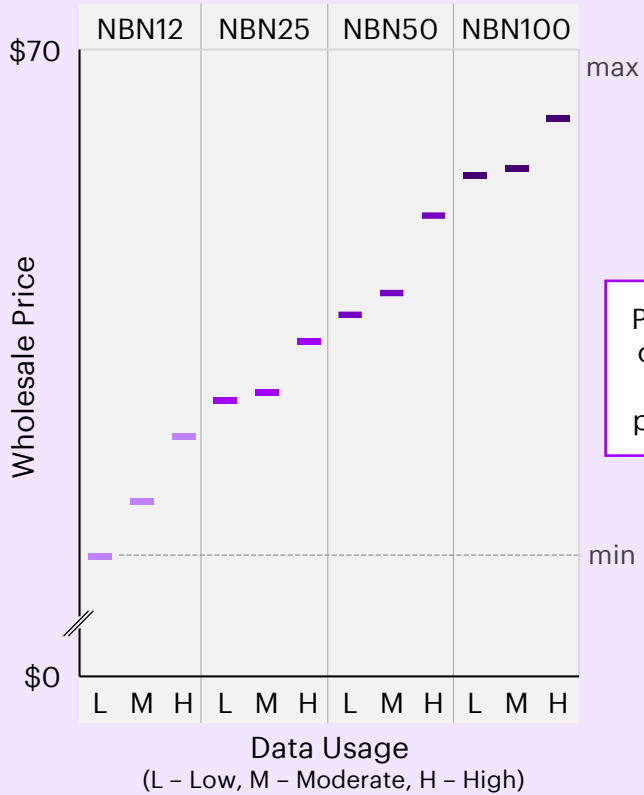
Households with **low data usage** will likely be most adversely impacted. Low data users are some of the most vulnerable in our community.



Consumer impacts

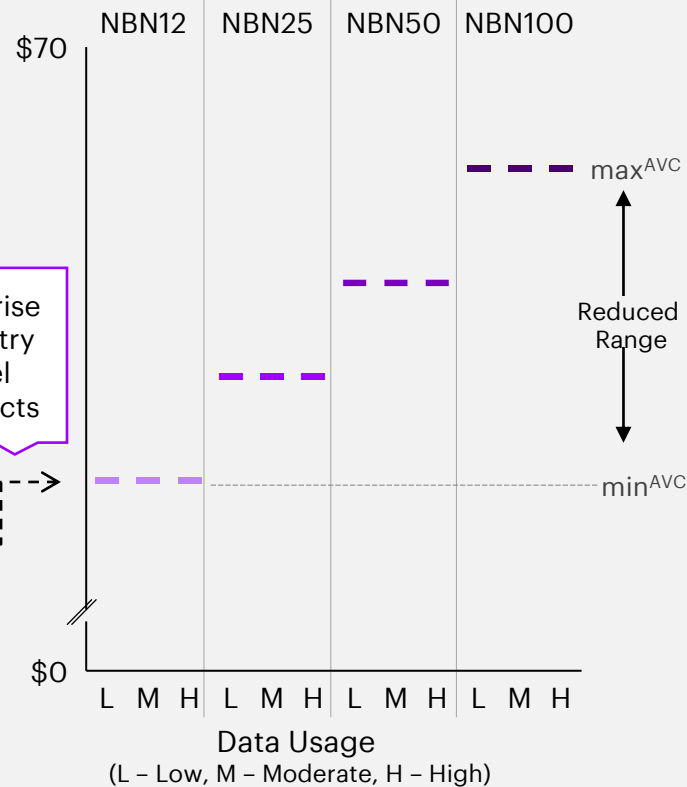
Removing CVC would reduce retail plan diversity, decrease consumer choice, increase the minimum price per speed tier and likely result in fewer premises on the nbn™ network

AVC and CVC Price Model Enhanced price differentiation



**Prices vary by speed tier
...and by network usage**

AVC-Only Price Model Reduced price differentiation



**Prices vary by speed tier
...but not by data usage**

Price rise on entry level products

Impacts of removing CVC on consumers

Reduced choice



Plans with data caps may be phased out, reducing choice for consumers. This is subject to the response of the RSPs, who will no longer have a cost-minimising-incentive to sell data cap plans.

Reduced fairness



Consumers on the same speed tier pay the same price regardless of network usage and any future price increases will be indiscriminate. Lower data users are disadvantaged.

Entry level prices will rise



The minimum price for each speed tier will rise due to the 'averaging' of wholesale prices at each speed tier. For example, the minimum price for NBN12 increases ($\text{min} \rightarrow \text{min}^{\text{AVC}}$). Lower data users are disadvantaged.

Fewer consumers on the nbn™ network

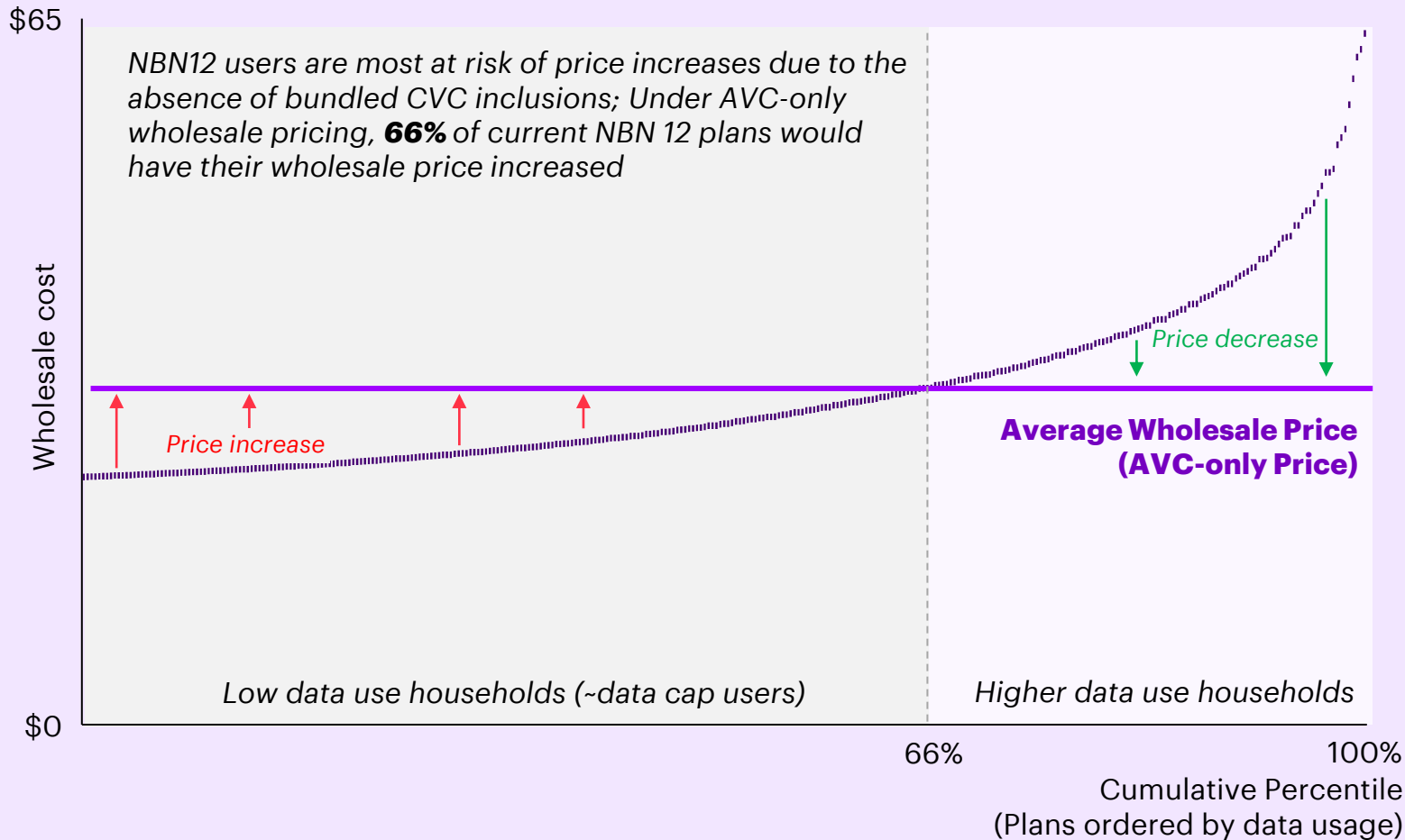


Due to the price rise on entry level products, ($\text{min} \rightarrow \text{min}^{\text{AVC}}$) more consumers will be priced out of the nbn™ network. Further, the reduced range of price points may increase leakage of nbn™ network users to substitute products.

Wholesale prices for low data use households will increase in an AVC-only scenario where data cap plans are phased out, reducing entry level affordability

Removing CVC will increase wholesale prices for entry-level customers

Cumulative distribution of NBN12 plans by wholesale cost (\$)



Consumers on data caps are the losers in an AVC-only scenario

AVC-only wholesale prices will be 'averaged'

- The wholesale price will **rise** on plans with lower data use.
- The wholesale price will **fall** on plans with higher data use.

RSPs likely to phase out data caps

- There is no cost incentive for RSPs to offer data capped plans, as the same wholesale price will be incurred regardless of the consumers use of the network.

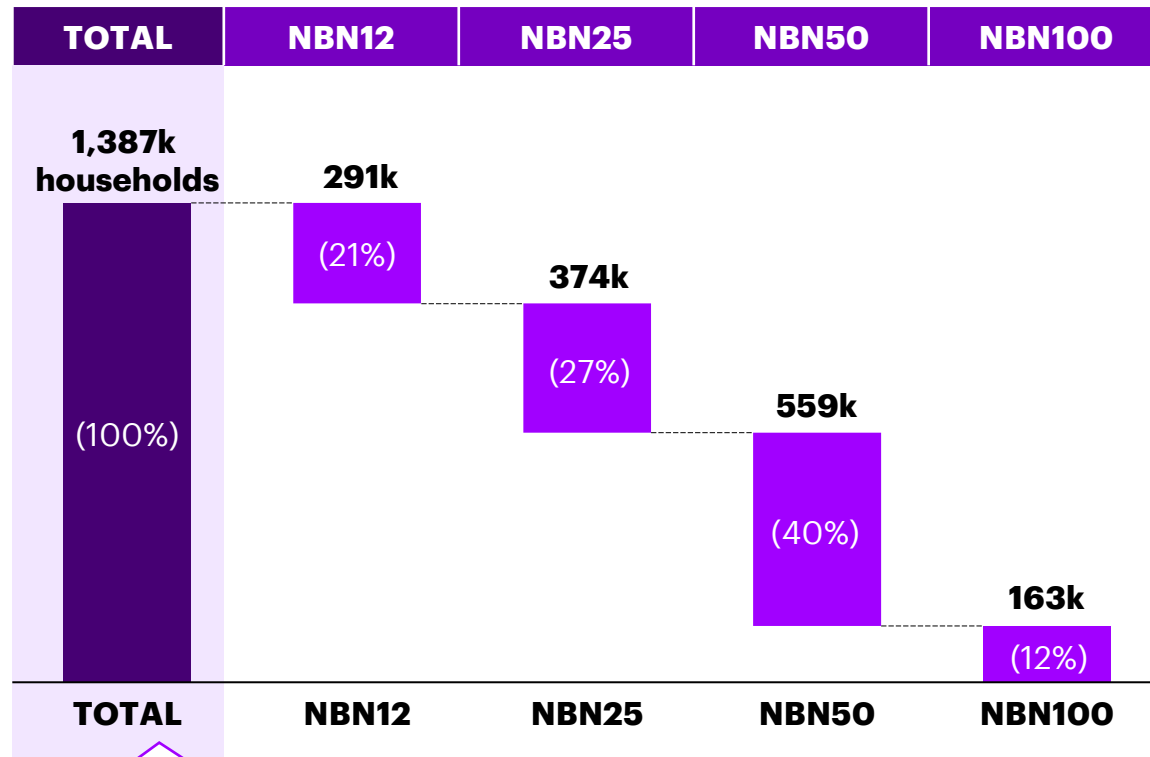
Low data users are disadvantaged

- Low data users on caps will face a price rise; some choosing to absorb the price rise or drop speed tiers, others choosing to leave the nbn™ network.

An estimated 1.4m low data households are on data cap plans with limits of up to 500GB

1.4m households have data cap plans, primarily from the NBN50 speed tier

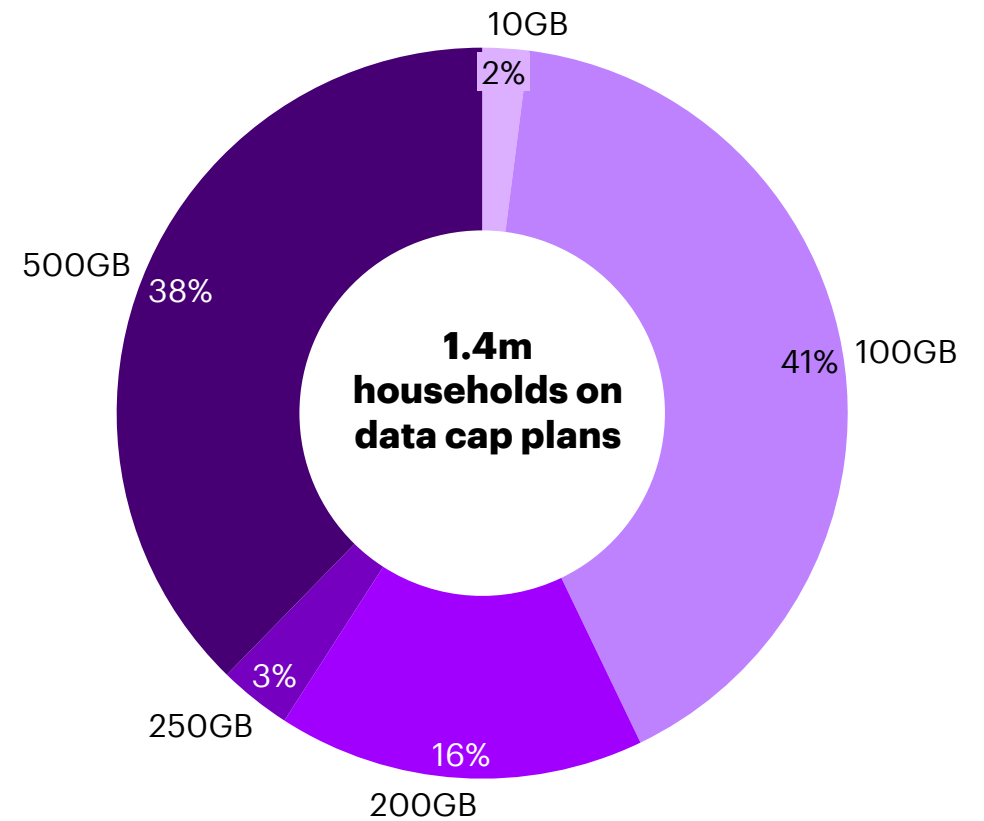
'000s of customers on data capped plans, Mar 2021



17% of all nbn™ network households are on data caps

The majority of data cap plans have limits of 100GB and 500GB per month

Data cap plans by common data limits, %



1.4m households on data cap plans

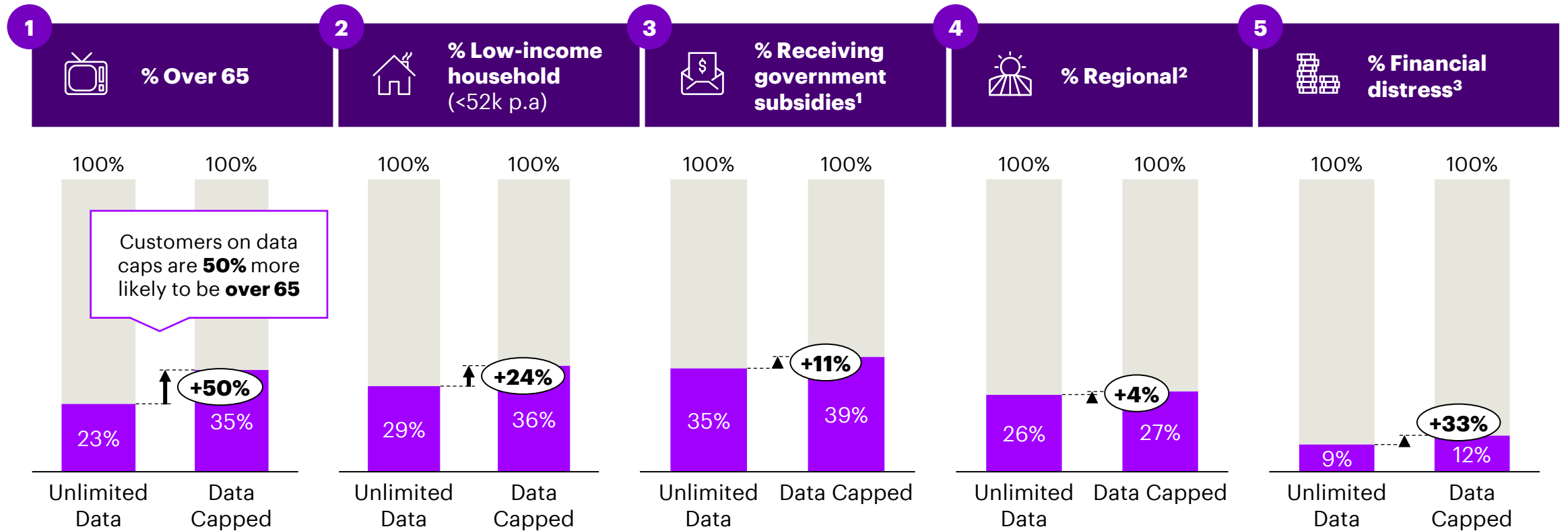


NOTE: Customers on data caps greater than 500GB and speed tiers above NBN100 will be unaffected by the price change because their wholesale costs are expected to stay the same or decrease under the new price scenario; Customers on speed tiers above NBN100 are assumed to be on unlimited plans; Data excludes satellite-only and legacy plans prior to March 2019
 SOURCE: NBN Co RSP tracker data; Accenture Strategy survey; Accenture Strategy analysis; ACCC Internet Record Keeping Rule (RKR) June 2020 Report.

Low data users on data cap plans are more likely to fall into specific segments of the population

Data cap households are more likely to come from vulnerable segments of the population, in particular from older and lower socio-economic cohorts

% of survey respondents, Mar 2021 – Apr 2021



NOTE: 1. Households that receive government subsidies are defined as survey respondents that answered "Yes" to "Q: Are you receiving some sort of government support (e.g age pension, disability support, family tax benefit etc.)?"; 2. Regional households are defined as survey respondents that answered "Regional" or "Rural" to "Q: How would you best describe the area you live in?"; 3. Households experiencing financial distress are defined as survey respondents that answered "Large/Overwhelming financial distress" to "Q: What do you feel is the level of your financial stress today?"

SOURCE: Accenture Strategy survey. NOTE: Survey results were confirmed to be sufficiently representative of the nbn™ network consumer base.

These vulnerable households, especially the elderly and those on low incomes, are reliant on the nbn™ network for their everyday needs particularly during times of crisis



Low-Income Households

Broadband is crucial for low-income households (those earning less than \$52,000 per year) to generate income, access government information, connect with family and friends and participate in education and learning.

- **55%** of low-income households were reliant on the nbn™ network to **work remotely** during COVID-19
- **73%** of low-income households were reliant on the nbn™ network to **access government information** during COVID-19;
- **56%** of low-income households were reliant on the nbn™ network to **video call friends and family** during COVID-19; and
- **66%** of low-income households¹ stated they were reliant on the nbn™ network for formal learning during COVID-19;



The Elderly

Broadband is vital for older Australians to access essential information, connect with others and connect with health professionals.

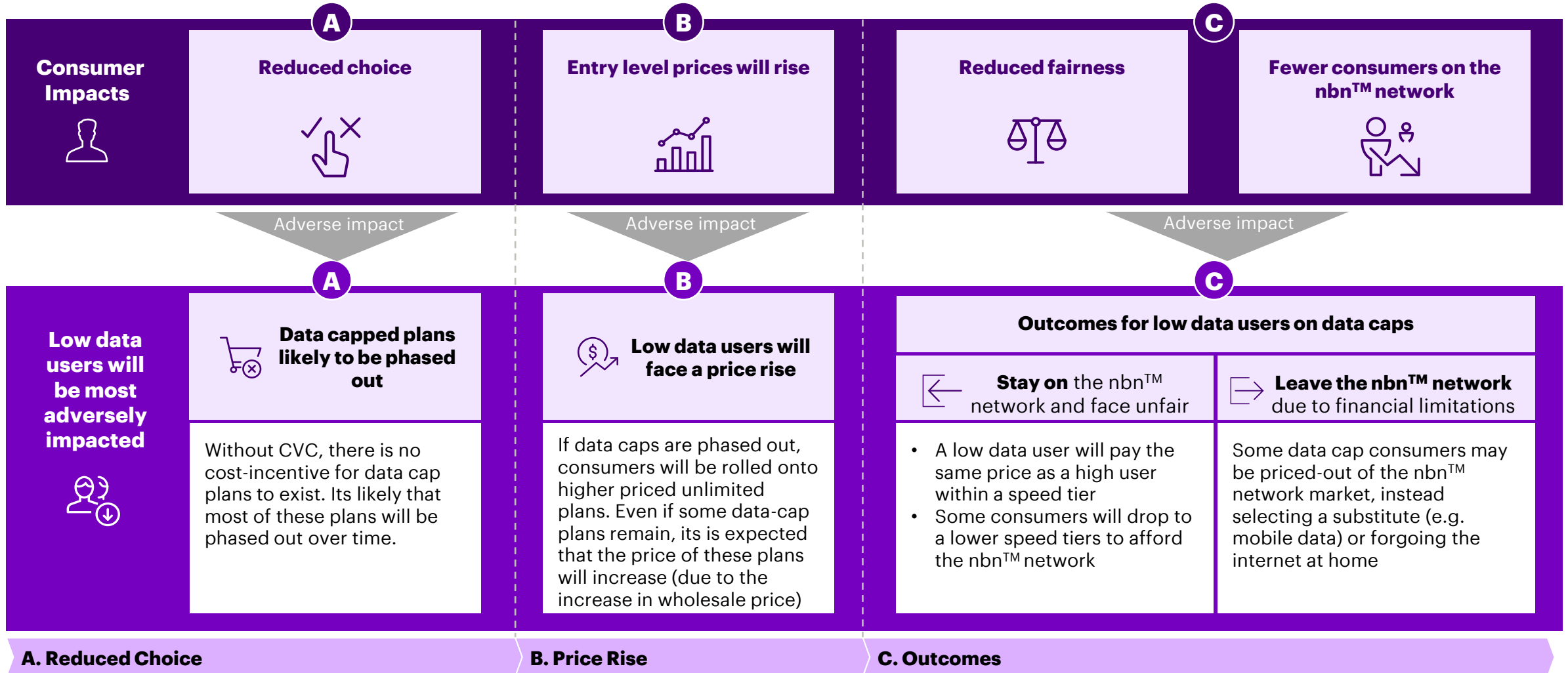
- **74%** of nbn™ network users aged 65+ reported reliance on the nbn™ network to access **government information** during COVID-19; and
- **51%** of these elderly users said that they were reliant on the nbn™ network to **video call family and friends** during the pandemic.
- **44%** of people aged over 60 used **telehealth services** during COVID-19 compared to 33% under 60, with 85% agreeing that the quality of care was of the same or better quality
- Broadband is estimated to create an additional **\$7,000** a year in benefits for elderly Australians across a range of dimensions such as **health, e-government services and increased independence²**

The nbn™ network is the preferred means to access the internet for low-income households (< \$52k)

80% of these households believe the nbn™ network is more affordable than other forms of internet (e.g. 4G/5G) and 83% agree that the nbn™ network is more reliable.



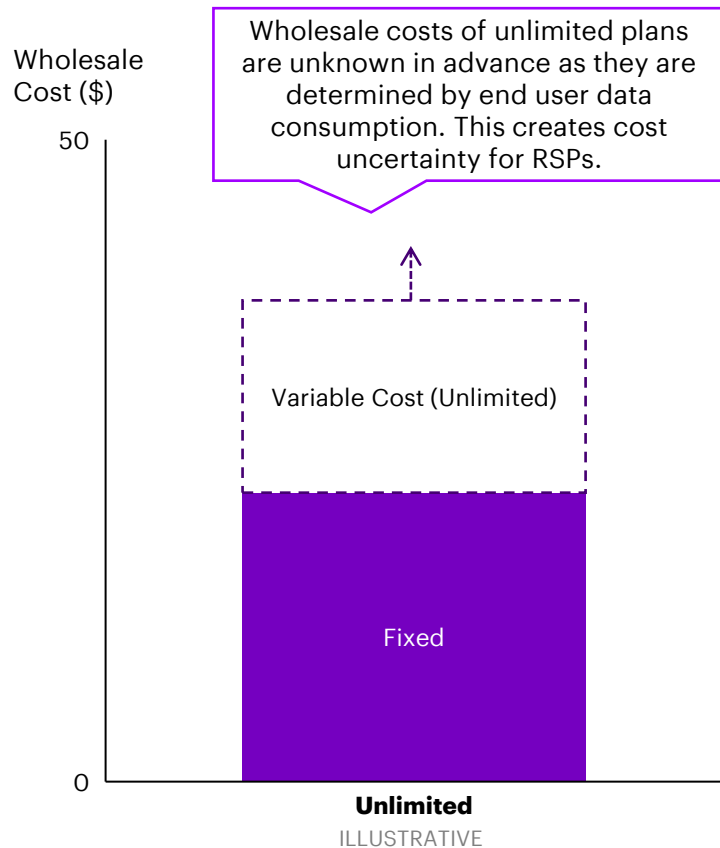
The consumer impacts of removing CVC will be most harshly felt by low data households



CVC is the primary reason RSPs design and sell data cap plans, which can be sold at a discount to consumers

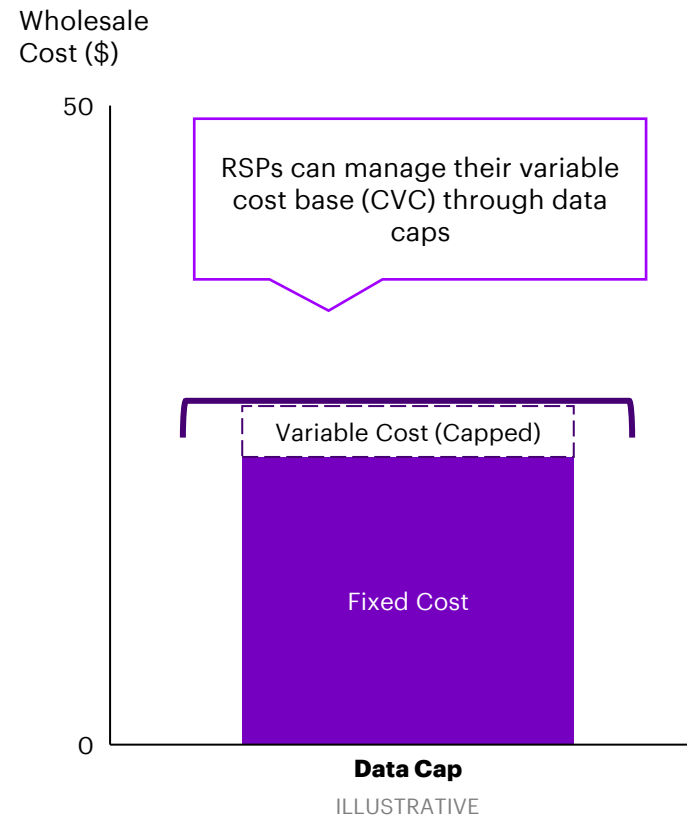
The wholesale cost of unlimited plans is uncertain

Wholesale cost, \$



Data caps increase RSP cost certainty

Wholesale cost, \$



The effective wholesale price is based off the peak hour usage of RSPs' customer bases since usage charges are pooled nationally.

Data cap plans help RSPs manage exposure to CVC cost by suppressing peak hour usage, and therefore total wholesale cost. Users with low data consumption will have lower network capacity requirements than those with higher data usage.

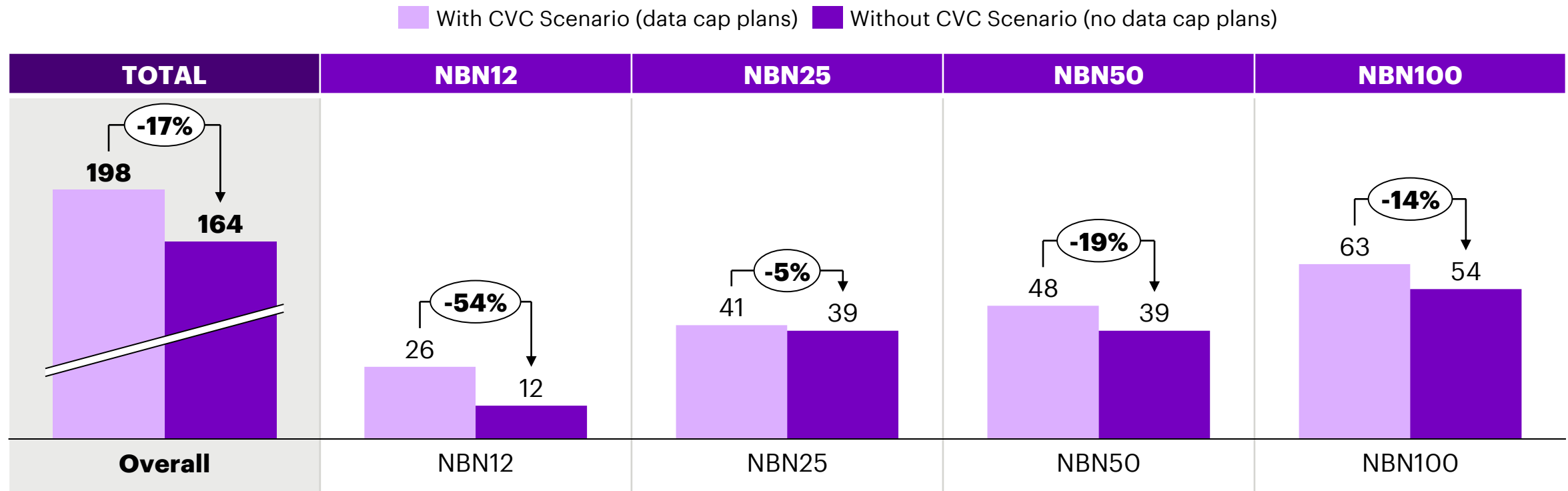
If CVC is removed, it is likely that data cap plans will be phased out, reducing choice for low data households.



Without CVC, the range of plans available for consumers could decrease by up to 17%, with lower speed tier users' choice reducing by up to 54%

Without CVC, it is expected the number of plans in market will decrease by up to 17%

Number of nbn™ network plans in market by speed tier, Mar 2021

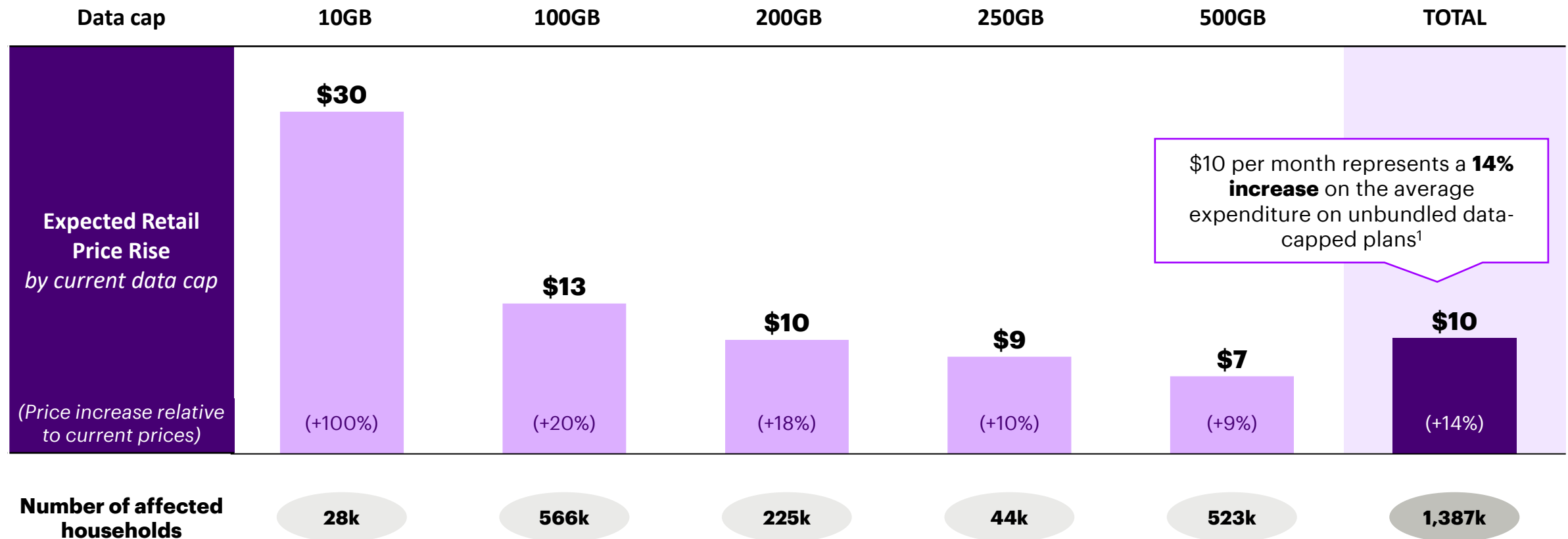


NBN12 users' choice in plans may **reduce by up to 54%**

Households on data caps could face price increases of up to \$30 per month if moved onto comparable unlimited plans in an AVC-only scenario

Comparison between data capped plan prices and unlimited plan prices in the same speed tier

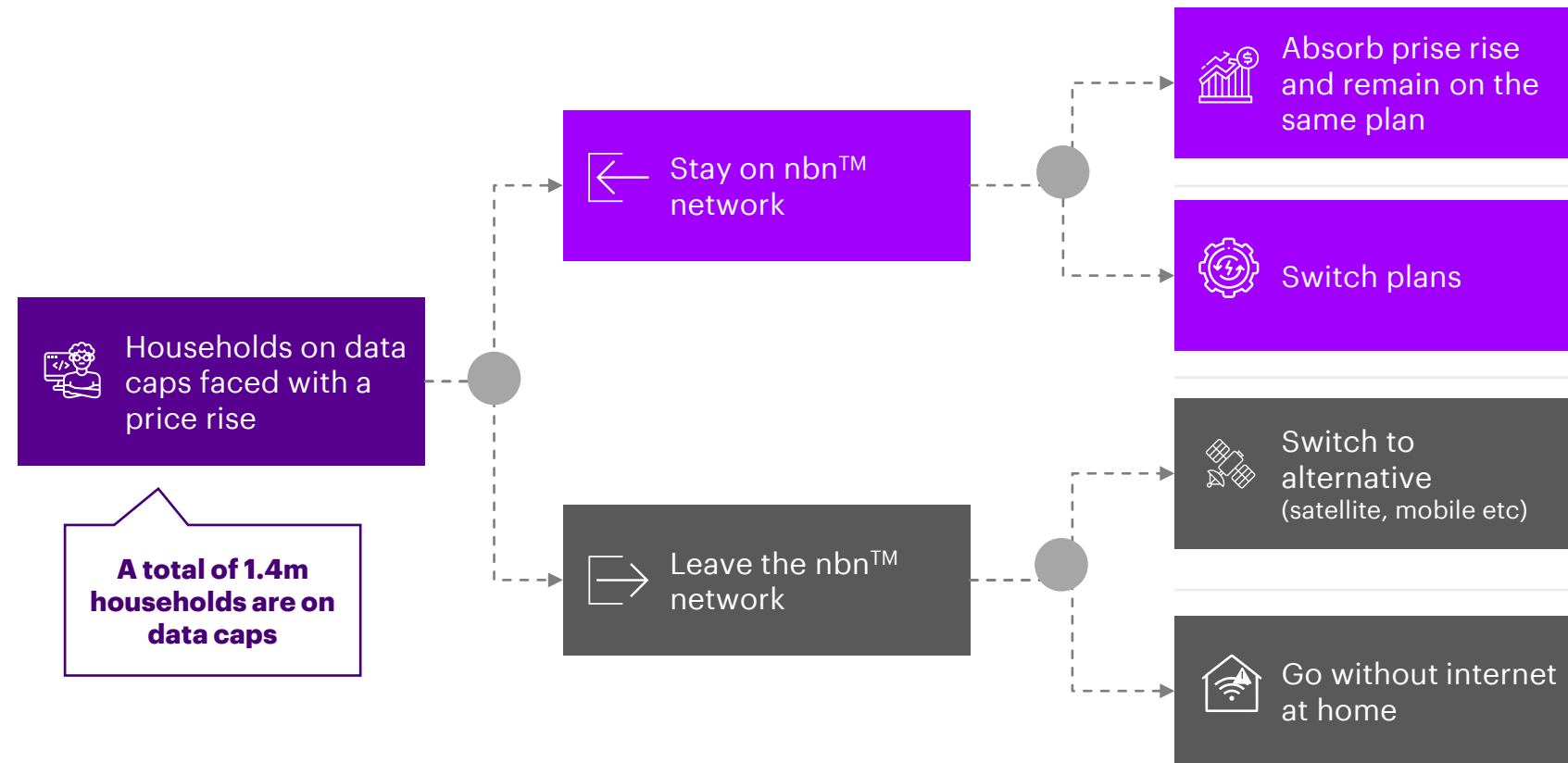
AUD\$ per month, Mar 2021



NOTE: 1. The average price of all current unbundled data capped plans in market is \$73 per month; Data cap discounts across speed tiers have been averaged to increase the sample size per data cap and to account for variable brand effects across retail plan pricing; All residential fixed line and wireless market plans from March 2019 to Mar 2021 are captured in analysis (n=1,275); Satellite-only and legacy plans prior to March 2019 are omitted from analysis
SOURCE: NBN Co RSP tracker data; Accenture Strategy analysis

Phasing out data capped plans will reduce choice and fairness for low data users

Decision tree for households on data cap plans when faced with a price rise



Consumer impact

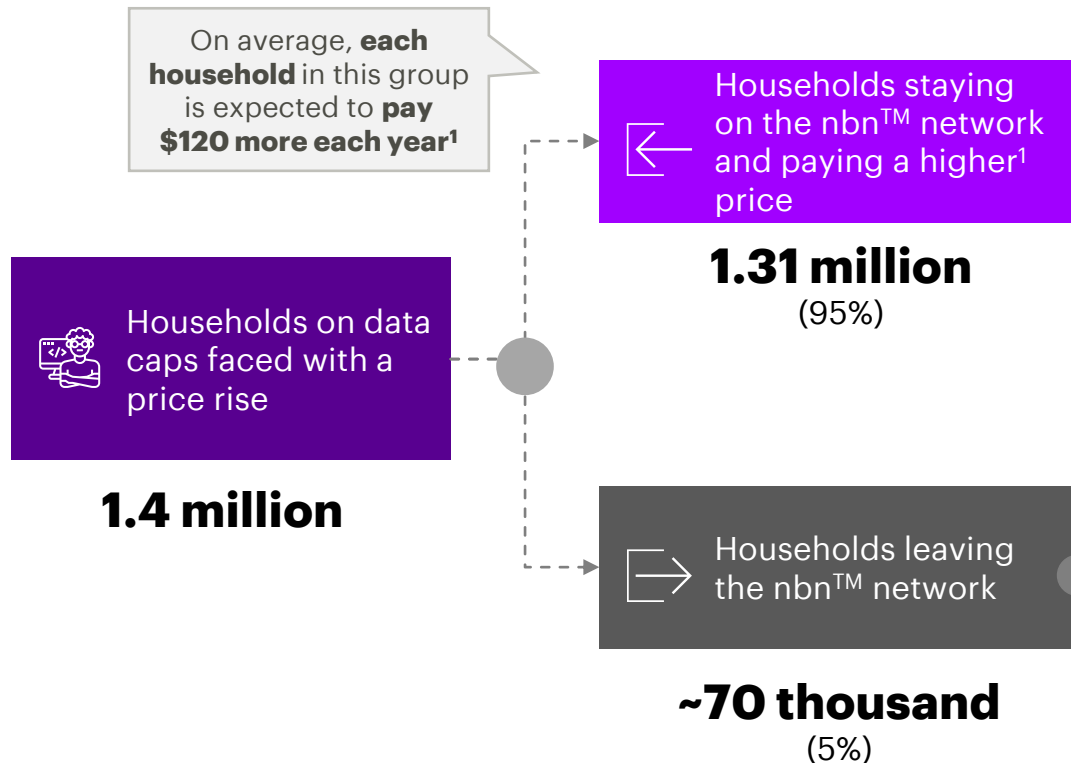
- **Reduced Fairness:** These data cap users will be paying more for similar usage of the nbn™ network. Within the same speed tier a low data user will be paying the same price as a high data user.
- **Reduced Fairness:** An unfair outcome for data cap users that can't afford the price rise on their current tier is that they will need to drop down to a cheaper plan on a lower speed tier¹.
- **Fewer consumers on the nbn™ network:** Some data cap users could be priced out of the nbn™ network market entirely and will move onto the next best alternative with potentially sub-optimal technology.
- **Fewer consumers on the nbn™ network:** For some data cap users priced out of the nbn™ network market, no other alternative might be a viable option financially. These users will have to forgo the use of the internet at home.

NOTE: 1. Some consumers could potentially choose to move up to a higher tier plan, if the difference in costs between their current plan (post the price rise) and the higher tier plan is relatively small. This would also require them to value higher speeds more than or equal to having a cheaper plan. However, such scenarios are unlikely to occur for most data cap consumers that tend to have lower use and speed preferences.

When faced with the expected price rise, 5% of low data users are estimated to forgo the nbn™ network; the majority moving to home wireless

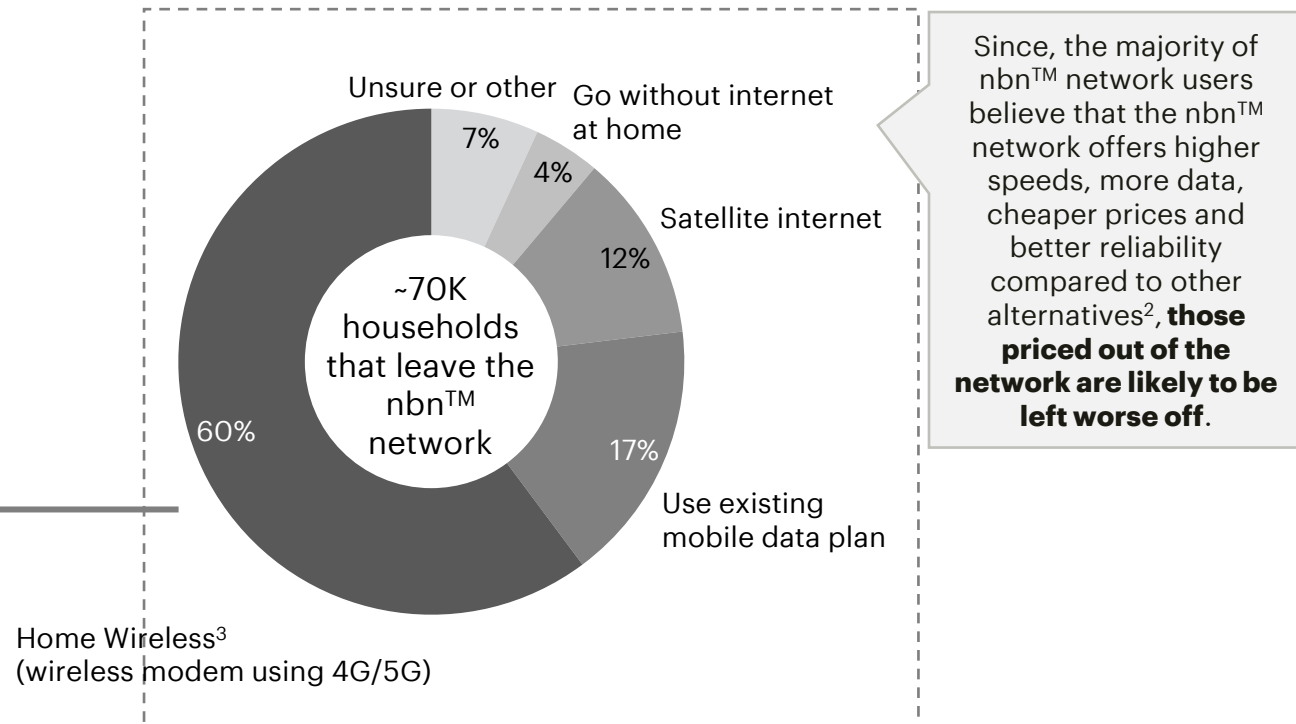
Expected reactions of data cap users when faced with a price rise

No. of households (% share)



Preferred substitutes for those leaving the nbn™ network

% of surveyed nbn™ network households



SOURCE: Discrete Choice Experiment surveys conducted by CaPPRE; Accenture Strategy analysis; Consumer sentiment survey of 2,420 respondents in March 2021, Accenture Strategy
NOTE: 1. For data cap consumers that absorb the price rise. Consumers that switch plans might even pay the same or less but would get worse value for their money 2. Respondents with both mobile plans and nbn™ network plans were asked – “I have the nbn™ network at home because it gives me access to [higher speeds/more data/better reliability/more data at cheaper price] compared to mobile data (4G/5G)”. The majority (52-58%) of users agreed with these statements, ~30% were neutral, and only 12-18% disagreed. 3. The option presented in the survey was worded as – “Mobile broadband in the home (wireless modem using 4G or 5G networks)” i.e. home wireless that uses a mobile or fixed wireless network but is only available at a fixed location

Removing CVC is estimated to reduce the consumer surplus that low data households derive from the nbn™ network by up to \$213 million per year



Low data households staying on the nbn™ network

Households

1.31 million

Low data users on caps are expected to stay on the nbn™ network after price rise (moving to unlimited plans)

Loss per user

↓ 14%

loss in consumer surplus for a data cap user that stays on the nbn™ network (loss of \$118 p.a.)

Overall Impact

\$155 million

p.a. of lost consumer surplus for 1.3m data-cap users who stay on nbn™ network



Low data households priced out of the nbn™ network

Households

69 thousand

Low data users are expected to leave the nbn™ network after price rise

Loss per user

↓ 100%

reduction¹ in consumer surplus derived from the nbn™ network from a data cap user that leaves (loss of \$844 p.a.)

Overall Impact

\$58 million

p.a. reduction¹ in consumer surplus derived from the nbn™ network from 70K data cap users that leave

The consumer surplus derived from the nbn™ is estimated to reduce by up to \$213 million per year for data cap users.



NOTE: 1. Consumers that leave the nbn™ network and move to an alternative may derive a consumer surplus from their new product. However, the consumer surplus they derive from the alternative is likely to be less than what they currently derive from the nbn™ network. If the consumer surplus offered by the alternative was better than what the nbn™ network currently offers, then they are more likely to already be using the alternative. SOURCE: Discrete Choice Experiment survey conducted by CaPPRe; Accenture Strategy analysis

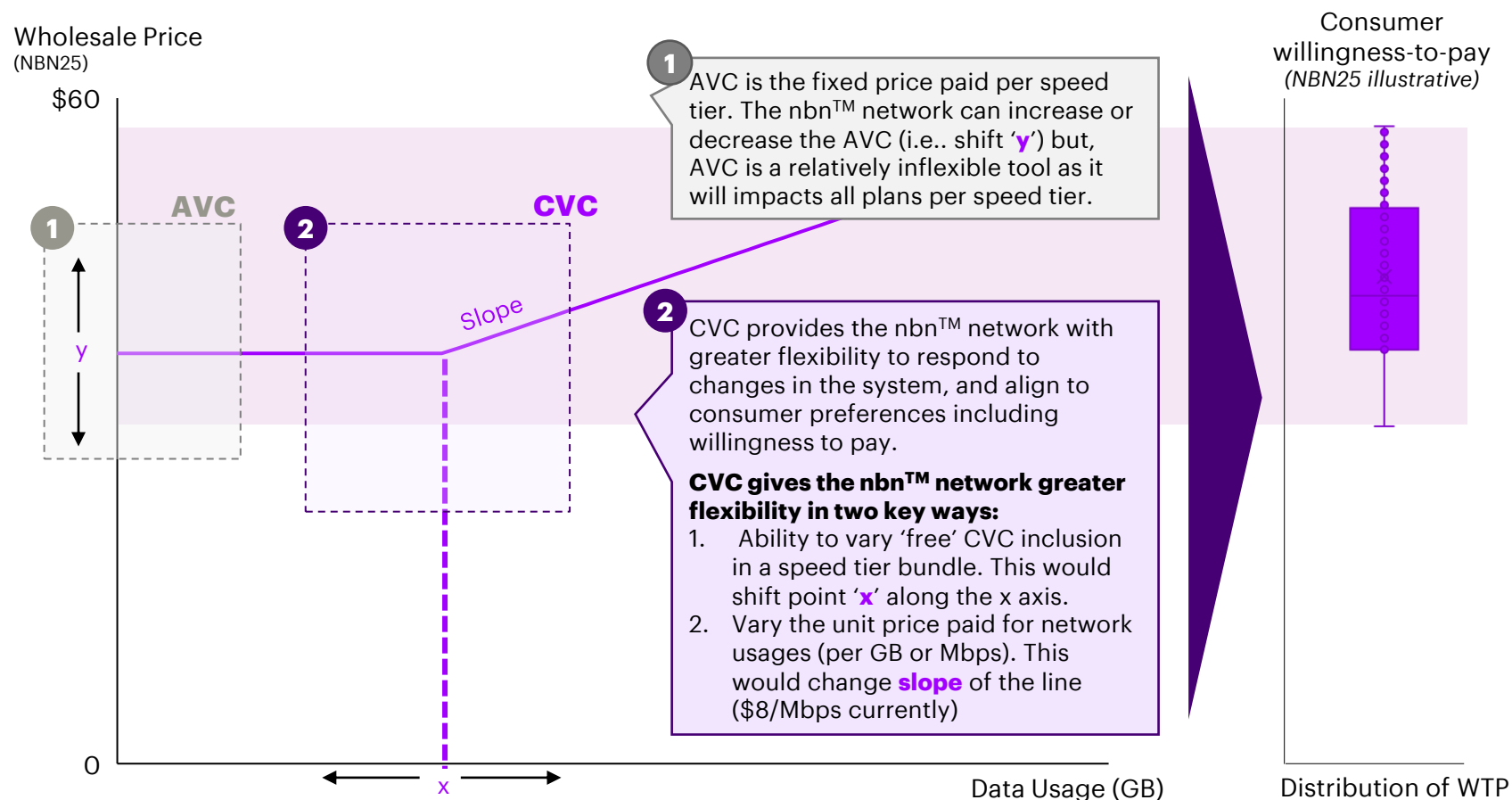


Market impacts

Access to two pricing levers (AVC and CVC) provides the nbn™ network with flexibility to align prices to consumer willingness-to-pay and respond to changes in the market

CVC provides an additional pricing lever; resulting in increased pricing flexibility to match to WTP

Wholesale price (NBN25 shown), \$ by data consumption, GB (a proxy for CVC utilisation); Willingness to Pay (WTP), \$ illustrative only



The advantages of multiple pricing levers over single pricing levers are well established. In economics, this idea is a theorem called is the 'Tinbergen Rule'.

The **Tinbergen Rule** states that the number of policy tools must be equal to or greater than the number of economic targets.

In the nbn™ network's case, the addition of CVC enables increased pricing and an increased ability to achieve NBN Co's multi-faceted objectives:

1. *Maximise*: individual utility and societal benefits derived from the nbn™ network;
2. *Maintain*: affordability and choice;
3. *Balance*: equitable cost recovery.

AVC-only will reduce the nbn™ network's ability to manage these objectives successfully, with the only lever being the ability to vary the fixed price per speed tier.

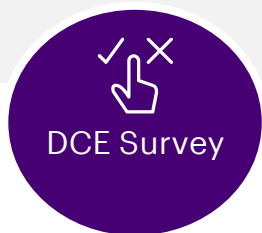
This pricing flexibility, which is greatly enhanced via CVC, enables the nbn™ to cater to the range of consumer price preferences (WTP) in the market, improving efficiency.

Appendix

METHODOLOGY &
ASSUMPTIONS



Methodology: Data sources used for this report



DCE Survey

Source:

Discrete Choice Experiment (DCE) survey

Information:

- Consumer surplus derived from the nbn™ by consumers (sample size = 1120)
- Sensitivity to price rises for consumers to estimate people opting out of the network (sample size = 1120)

Detailed methodology described on next slide



NBN Co

Source:

NBN Co

Information:

- nbn™ wholesale pricing model
- Retail plan information by speed tier
- nbn™ network usage information (data downloads)
- nbn™ activations over time



Accenture Survey

Source:

Survey of consumers on the nbn™ network

Information:

- Alternatives consumers would go to if they opted out of the nbn™ network
- Demographic characteristics of customers on data caps
- Per cent of customers on data cap plans by limit
- Sample size: 2420
- Date: March 2021



Secondary research

Source:

Public data sources and reports

Information:

- Impact of broadband on vulnerable segments of the population
- Two-part tariff efficacy in infrastructure settings
- Tinbergen rule application in regulated markets

Methodology: Estimating consumer surplus

What is consumer surplus?

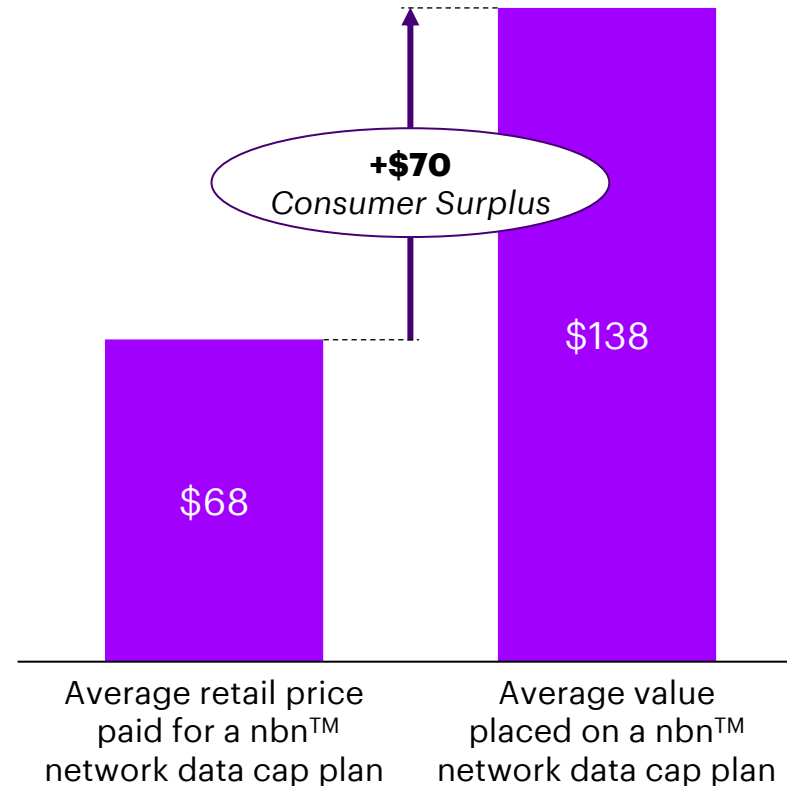
- Consumer surplus of the nbn™ network is the value that consumers place on their internet plans above what they actually pay
- For example, if a user pays \$40 for their internet and they “value” it at \$60, their consumer surplus is \$20
- It is a measure of the “intangible” benefits to consumers that are not captured in GDP.

Methodology for measuring consumer surplus

- Consumer surplus was estimated using an online Discrete Choice Experiment (DCE), where consumers are surveyed and asked to choose between different internet plans at different price points. Consumers’ sensitivity to different attributes (e.g. price, speed, data & brand) can then be measured.

The average consumer surplus derived from the nbn™ network for a data cap user is \$70

\$ per month per nbn™ network household



The 1.4m data cap users currently on the nbn™ network, derive \$1.2b in annual consumer surplus

\$b p.a.



\$1.2 billion

p.a. of consumer surplus derived from the nbn™ network by 1.4m households currently on data cap plans

Methodology: Estimating consumer surplus and consumers leaving the nbn™ network



Measuring Consumer Surplus derived from the nbn™ network

- **Conducted an online Discrete Choice Experiment (DCE)**, where consumers are surveyed and asked to choose between different internet plans at different price points. Consumers' sensitivity to different attributes (e.g. price, speed, data & brand) can then be modelled.
 - Respondents could choose between three new hypothetical internet plans or bundles, and their current internet plan. Each plan was described by ten features – contract length, download speed, upload speed, price, data cap, peak/off peak limits and four bundle inclusions (home phone, pay tv, mobile and Wi-Fi modem)
 - A latent class model ('LCM'), a variant of the multinomial logit model, was used to analyse the results of the study. The LCM allows for preference heterogeneity (i.e. different respondents can have different marginal utility or parameter weights for each of the features), which is handled via discrete distribution. These discrete distributions are referred to as 'classes'. A LCM model with two classes was chosen for consistency with the 2014 and 2017 study.
- The experiment was conducted by CaPPRe which included the same personnel as the 2014 Independent Cost-Benefit Analysis using a similar method, and a subsequent study commissioned by NBN Co in 2017.



Estimating consumers opting out due to price rises

- **Conducted an online Discrete Choice Experiment (DCE)**, where consumers are surveyed and asked to choose between different internet plans or opting out of the nbn™ network at different price points. Consumers' sensitivity to different attributes (e.g. price, speed, data & brand) can then be modelled, to estimate the proportion of consumers who would opt-out of the nbn™ network under various scenarios.
 - Respondents could choose between plans with different features as described on the left, but also had the choice to opt out of the nbn™ network.
 - A mixed logit model (choice model variant similar to LCM) was used to analyse the results of the study. This model allows us to estimate parameter weights for each individual in a sample, which allowed us to focus on particular subgroups like data cap users to model their behaviour when faced with a price rise.
- The price of plans across speed tiers was then increased using estimates of price rises presented in this report, to model what proportion of consumers would choose to opt out of the nbn™ network. Brand loyalty was also accounted for by looking at how this differs across different retail providers

Methodology: Estimating the price increase faced by consumers on data cap plans

The price of data caps is estimated through matching of comparable data-capped and unlimited plans

Example of nbn™ network plan matching to isolate cost of data cap, April 2021

	Data cap plan	Unlimited plan	Matched	Difference
Data limit	10GB DATA ²	UNLIMITED DATA	✗	10GB to unlimited data
Retail price	\$29 ⁹⁹ /Mth	\$59 ⁹⁹ /Mth	✗	\$30 difference
Speed tier	Minimum Charge \$139.94 NBN12 12Mbps Basic Typical Evening Speed #	Minimum Charge \$169.94 NBN12 12Mbps Basic Typical Evening Speed #	✓	Same speed tier
Phone line inclusion	Phone Line Pay As You Go	Phone Line Pay As You Go	✓	Same phone line inclusion
Modem inclusion	Wi-Fi Modem Critical Information Summary (P) NBN Key Facts Sheet	Wi-Fi Modem Critical Information Summary (P) NBN Key Facts Sheet	✓	Both include a Wi-Fi Modem

The expected price increase for data cap customers is the difference between their data-capped plan price and the price of an otherwise identical unlimited plan. The following three steps are taken to estimate this difference:

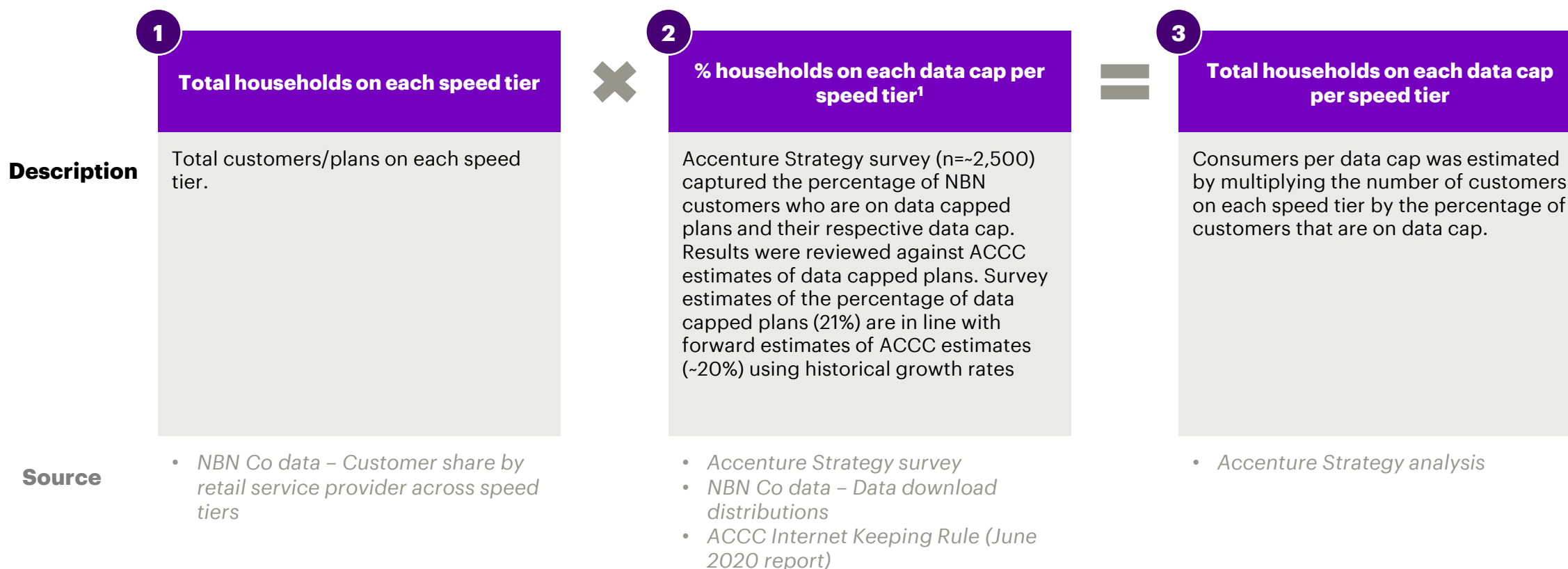
- (1) Using a dataset of retailer plans, data-capped plans were matched to otherwise identical unlimited plans
- (2) The price of the 'data cap' effect was isolated by calculating the difference in headline price for each matched pair.
- (3) The average 'data cap effect' was considered for speed tier and cap size to set an assumption for the expected price rise.

Note:

- Data cap prices across speed tiers do not materially differ and have therefore been averaged to reduce sample noise
- Only residential TC4 plans have been included in analysis

Methodology: Measuring the number of households on data cap plans

Data cap estimate methodology



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