



AUSTRALIAN COMPETITION
& CONSUMER COMMISSION

Communications Sector Market Study

Draft report

October 2017

Australian Competition and Consumer Commission
23 Marcus Clarke Street, Canberra, Australian Capital Territory, 2601
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Opportunity for comment

You are invited to examine this draft report for the communications sector market study and comment on it by written submission to the ACCC. Submissions are due by **5 pm Friday 8 December 2017 and can be lodged on the [ACCC's Consultation Hub](#) or by email to commsmarketstudy@acc.gov.au.**

To foster an informed and consultative process, all submissions will be considered as public submissions and will be posted on the ACCC's website. If interested parties wish to submit commercial-in-confidence material, they should submit both a public version and commercial-in-confidence version of their submission. Any commercial-in-confidence material should be clearly identified, and the public version of the submissions should identify where commercial-in-confidence material has been removed.

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The final market study report will be prepared after submissions have been received and will be published in early 2018.

Key dates

5 September 2016	Issues paper released and submissions opened
14 October 2016	Issues paper submissions closed
3–4 July 2017	Stakeholder forum
30 October 2017	Draft report released and consultation period opens
8 December 2017	Draft report consultation period closes
Early 2018	Final report to be released

Further information about this market study can be found at www.accc.gov.au/about-us/market-studies/communications-sector-market-study.

Questions or queries can be directed to commsmarketstudy@acc.gov.au.

ACCC communications sector market study draft report

Consumers are getting better value, however the key consumer markets show considerable concentration.

MOBILE PHONE



2.8% ▼
real decline in prices in 2016-17

49% ▲
in data quotas in 2016-17

91%
of services supplied by **three providers** in 2016

FIXED BROADBAND



10% ▼
real decline in prices in 2016-17

41% ▲
in data quotas in 2016-17

96%
of services supplied by **four providers** in 2016

The NBN is more than half way through its roll out, but faces challenges with consumer experience and future competition.

AVAILABILITY AND EXPERIENCE



NBN available to **6.2 million** with **3 million** migrated (Oct 2017)

84% on 12-25 mbps
16% on 50mbps +
(June 2017)

79% ▲
in NBN complaints to TIO on per premise basis (H2 2016 to H1 2017)

POTENTIAL SUBSTITUTES



20%
used mobile broadband only in 2016

100GB+
large wireless plans could meet needs of up to 50% of NBN users (Estimated median usage 2017: 95GB)

While smaller providers have captured a higher share of NBN connections compared to legacy, wholesale conditions may make it difficult to further increase this share.

SMALL PROVIDER SHARE



3% of legacy broadband connections
6% of NBN connections (2016)

NBN AGGREGATION

4 large aggregators - all vertically integrated



Only **4%** of NBN connections provided via aggregation (May 2017)

INTERNET INTERCONNECTION

Peering group unchanged since 1998



While declining, transit prices remain significantly higher than overseas

There is rapid growth and development of emerging services.



80% of businesses used cloud computing in 2016



\$1.1bn data centre market in 2016



Content delivery networks predicted to carry **71% of all traffic** by 2021



Internet of Things predicted to provide **1-2%** uplift to GDP by 2025

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Glossary

3G	3 rd generation mobile communications technology
4G	4 th generation mobile communications technology
5G	5 th generation mobile communications technology
ACCAN	Australian Communications Consumer Action Network
ACCC	Australian Competition and Consumer Commission
Access seekers	Telecommunications companies that seek access to the declared services (that is, the right to use the declared service)
ACL	Australian Consumer Law
ACMA	Australian Communications and Media Authority
ADSL	Asymmetric digital subscriber line
ARPU	Average revenue per user
AVC	Access Virtual Circuit
AVOD	Advertisement funded video on demand
B2B	Business to business
BPMR	Broadband performance monitoring and reporting program
CCA	<i>Competition and Consumer Act 2010 (Cth)</i>
CDN	Content delivery network
CIS	Critical Information Summary
Data centre colocation service	Data centre where a business can rent space for servers and other hardware and connect them to network service providers
CSG	Customer Service Guarantee
CVC	Connectivity Virtual Circuit
Dark fibre	Uncontended, unlit point-to-point fibre optic cable that requires connecting equipment and management system to supply a transmission service
DBD	Dimension Based Discount
DSLAM	Digital Subscriber Line Access Multiplexer
DTCS	Domestic transmission capacity service
ESAs	Exchange Service Areas
FTA	Free-to-air
FTTC	Fibre to the curb

FTTB	Fibre to the building
FTTN	Fibre to the node
FTTP	Fibre to the premise
FTTx	Fibre to the x, where 'x' refers to any or all of the above
Gbps	Gigabit per second
GHz	Gigahertz
HFC	Hybrid Fibre Coaxial
HHI	Herfindahl-Hirschman Index
IaaS	Infrastructure as a Service
IP	Internet Protocol
IoT	Internet of Things
IoTAA	IoT Alliance Australia
ISP	Internet service provider
IXPs	Internet exchange points
Layer 2	The data link layer of the open systems interconnection model. The data link layer provides a connection between two fixed end points in a network to facilitate the transmission of data traffic.
Layer 3	The network layer of the open systems interconnection model. The network layer provides a switching function that enables the routing of traffic to its destination address.
LTIE	Long-term interests of end-users
LSS	Line Sharing Service
LPWA	Low-power wide-area, a type of wireless telecommunications that allows a low bit rate signal to be transmitted over a large area
M2M	Machine to machine
Mbps	Megabits per second
MIMO	Multiple-input and multiple-output
MNO	Mobile network operator
MVNO	Mobile virtual network operator
NBN	National Broadband Network
NBN Co	NBN Co Limited
NNI	Network to Network Interface

Ofcom	Office of Communications, UK communications regulator
OECD	Organisation for Economic Cooperation and Development
OTT	Over-the-top content/services
PaaS	Platform as a service
POI	Point of Interconnection
POP	Point of Presence
RBS	Regional Broadband Scheme
RKR	Record keeping rule—under 151BU CCA, the ACCC has the power to make an RKR and require that carriers and carriage service providers comply with it. The rules may specify what records are kept, how reports are prepared and when these reports are provided to the ACCC.
RSP	Retail Service Provider
SaaS	Software as a Service
SAU	Special Access Undertaking
SBAS	Superfast Broadband Access Service
SME	Small and medium enterprises
STV	Subscription TV
SVOD	Subscription video on demand
SMS	Short Message Service
TC1	NBN Traffic class 1—highest priority traffic class, suitable for voice
TC2	NBN Traffic class 2—enterprise grade traffic class used for delivering high speed symmetrical internet (supports video conferencing, IPTV, gaming)
TC3	NBN Traffic class 3—designed to give priority to transactional data such as business applications running on WAN
TC4	NBN Traffic class 4—standard traffic class used for delivering residential and small business broadband services
TCP Code	Telecommunications Consumer Protection Code
TCPSS Act	<i>Telecommunications (Consumer Protection and Service Standards) Act 1999 (Cth)</i>
Tier 1 provider	Large service providers who are vertically integrated and supply wholesale and retail NBN services
Tier 2 provider	Service providers that intend to directly connect to the NBN and are using NBN wholesale aggregation services prior to reaching the scale at which this is commercially viable

Tier 3 provider	Service providers that do not intend to directly connect to the NBN and will use NBN wholesale aggregation services on an ongoing basis
TIO	Telecommunications Industry Ombudsman
TTOV	Telstra, TPG, Optus, Verizon
TVOD	Transactional video on demand
UNI-V	User Network Interface—Voice, connects the user voice interface to the voice network over the NBN
ULLS	Unconditioned Local Loop Service
USO	Telecommunications Universal Service Obligation
VoIP	Voice over Internet Protocol
WBA	Wholesale Broadband Agreement
WiMAX	Worldwide interoperability for Microwave Access
WLR	Wholesale Line Rental

1 Executive summary

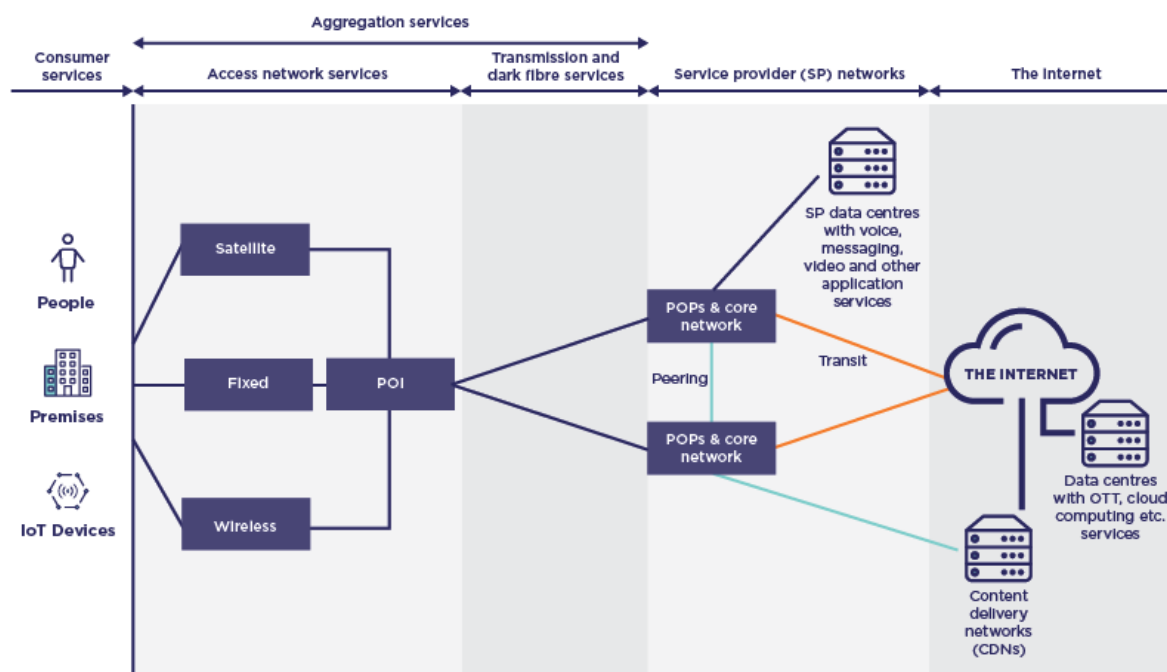
1.1 Communications sector market study

Communication underpins the social and commercial fabric of society. It is essential for all Australians to enable them to undertake daily activities, including maintaining contact with family and friends, and accessing commercial, government, medical and education services. And communication services can be a matter of life and death when medical or other emergencies arise. Further, and very importantly, communications services are the key foundation for the digital transformation of the economy and the productivity, innovation and efficiency gains that it will bring.

The Australian Competition and Consumer Commission (ACCC) uses market studies as a tool to improve our understanding of specific sectors and to help promote effective competition in markets. We are undertaking this market study to provide a wide ranging stocktake of how Australian communications markets are evolving in the face of recent and prospective changes. This will enable us to determine how we can best ensure that economic regulation is responsive to changing market circumstances and that only regulations necessary to address market failure, promote competition and protect consumers are in place. This includes ensuring that over the longer term innovation and investment are not stifled, competition is encouraged and the interests of consumers are well served.

We have considered the state of competition in the supply of retail communications services to individual, residential and small business consumers and in the markets for intermediate inputs and other wholesale services. Figure 1.1 below depicts a generalised communications supply chain and illustrates the coverage of the market study.

Figure 1.1: The communications supply chain—how voice and broadband services are delivered to consumers over next generation networks



We have taken a five year horizon in considering likely competition and efficiency developments in communications markets. This time horizon covers the period of completion of the national broadband network (NBN) rollout and the expected initial deployment of 5G wireless technology.

1.2 Key points

- The Australian communications sector has been undergoing a period of significant change that is affecting how supply chains function and the nature and extent of competition in retail and wholesale markets. This change includes both structural reform, as a result of policy initiatives, at the centre of which is the rollout of the NBN, and the rapid pace of technological advance and product innovation that is occurring globally.
- We consider that the economic regulatory framework for the communications sector has proven to be capable of accommodating major changes to the sector and has allowed for appropriate responses during the transition to the NBN. We do not find that there is currently a need for significant changes to this regulatory regime.
- Notwithstanding considerable concentration in both fixed and mobile retail markets there is evidence of competition between the major service providers of broadband and voice services. Smaller providers and new entrants have the potential to provide additional competitive tension by constraining the larger providers.
- The rollout of the NBN is a major investment in communications infrastructure and is having a significant impact on the Australian communications sector. The changes within the supply chain and consequential impacts on consumers and retail service providers have inevitably been a key focus of the market study.
- The NBN rollout is now well advanced with three million premises activated and NBN Co progressing at a rapid pace to meet a commitment to complete its build by 2020.
- However, a number of competition and consumer issues related to the NBN transition have emerged and require immediate measures to resolve on the part of both retail service providers and NBN Co, some of which are already underway.
- We are undertaking measures to promote improved consumer and competition outcomes directed at ensuring availability of reliable and useful information to support consumer choice. These measures include:
 - broadband speed claims guidance for service providers
 - introduction of the broadband performance monitoring and reporting program
 - enforcement of the Australian Consumer Law (ACL) to address serious or systemic failures in advertising
- Other processes also underway to identify and address issues arising in the delivery of services over the NBN include NBN Co's consultations with its customers on its pricing construct and the Australian Communications and Media Authority's (ACMA) review of consumer experience on the NBN.
- The outcomes of these various initiatives, and extent to which issues of concern persist, will be an important factor in determining the need for further regulatory responses in the short term.
- 5G deployment could create significant opportunities for industry and consumers. It has the potential to accelerate the extent of fixed to mobile and fixed wireless substitution thereby disrupting existing business models. The degree of future substitution will in part depend on the performance of NBN services, both in terms of price and service quality.
- We have not identified any immediate competition concerns in relation to new and emerging communications services such as over the top content services, cloud services and the Internet of Things (IoT). We propose to address any future competition concerns that may arise in relation to these services through use of our competition law powers in the first instance.

- Our assessment makes draft findings on a range of issues, including some of immediate concern. We have examined the issues of concern in detail to develop our proposed actions and recommendations, including the urgency with which they should be addressed. These are presented in sections 5 to 7 of the report.

1.3 State of competition in the supply of voice and broadband services

Voice and broadband services are the essential communications services on which individuals and businesses rely. The retail provision of these services displays considerable concentration, with the four largest providers accounting for 96 per cent of services to residential premises. Telstra's fixed line dominance has not been significantly eroded so far in the transition to the NBN despite some losses in regional areas where its dominance has been greatest. Competition for mobile services is concentrated in the hands of the three mobile network operators that account for 91 per cent of mobile services.

Notwithstanding the high level of market concentration there is evidence of competition between the vertically integrated major service providers in the markets for voice and broadband services, over both fixed and mobile access technologies. This is particularly evident in the price competition between suppliers of both fixed and mobile services. However, while non-price competition extends across multiple product dimensions for mobile services with significant product differentiation, the same is less true for fixed services. To date there is less differentiation in the fixed services on offer and competition in the fixed segment of the market has not focused on quality of service dimensions, such as broadband speed.

While there are signs of retail price competition occurring, we have heard from many service providers, both in submissions to the market study and at the stakeholder forum held in July 2017, that the NBN wholesale pricing construct and level is constraining their ability to provision greater capacity given consumers' current willingness to pay. NBN Co has expressed another view, stating that it has undertaken research that indicates consumers have a greater willingness to pay and that service providers should be doing more to promote the adoption of higher speed services. These issues may affect efficient use of NBN infrastructure and NBN Co's ability to recover its investment costs.

In this regard, we note that an objective of the policy decision to build the NBN is to support retail competition. While we are observing some product differentiation and market segmentation in the retail plans currently in the market, there is scope for this to further develop.

We anticipate that competition in the supply of fixed line and mobile voice and broadband services will increase following the entry of Vodafone into the provision of fixed line services and TPG into the provision of its own mobile network. This will result in four major carriers providing both fixed and mobile services.

1.4 Transitioning consumers to the NBN

The challenges faced by NBN Co include provision of services over the NBN that meet consumer expectations and deliver an efficient use of the infrastructure being deployed as well as completion of the build. A significant number of consumers are reporting unsatisfactory experience with the NBN both during and after migration from the legacy networks. Two principal concerns arise in this regard.

The first concern relates to connection and activation problems at the time of migration and fault rectification after connection, including missed appointments and lack of reliable information and unsatisfactory complaint resolution processes. The primary concern is that current NBN service levels do not represent an appropriate basis to support a positive end-

user experience, and there is insufficient recourse to compensation where service levels are not met. Compounding these problems is ineffective communication and coordination in the supply chain resulting in consumer misunderstanding and confusion.

The second issue is the speed of services supplied over the NBN which is not always meeting consumer expectations. There are a number of aspects to this issue, the most significant of which are the choice of speed tier made by a consumer when migrating to the NBN and the provisioning of connectivity virtual circuit (CVC) capacity by service providers to deliver the speed and user experience appropriate to that speed choice during the busy hours. In addition, the capability of the fibre-to-the-node (FTTN) technology to deliver certain higher speed services can be limited.

These migration and experiential issues have gained significant attention, both within the industry and more broadly in the media, and in our view stem from failures in retail and wholesale markets that could largely be overcome through more accurate information, improved information flows and better coordination along the supply chain and to consumers.

In this regard, we consider the issue of consumer dissatisfaction with the speed of their NBN service can be addressed directly through the provision of improved retail plan information on speeds that supports consumers in making their purchase decisions, and through retailers ensuring their retail NBN services typically operate in the manner advertised.

We are introducing measures we consider have good prospects of bringing widespread improvements in the near term, via retailers implementing our 2017 broadband speed claims guidance, our introduction of a broadband performance monitoring and reporting program, and enforcement of the ACL to address serious or systemic failures in advertising practices.

We consider that this strategy can bring benefits without the potential risks associated with more intrusive measures, such as mandating minimum standards, which could curtail the offering of less expensive but slower plans over the NBN even where these plans would be sufficient to meet the requirements of many consumers.

1.5 The NBN supply chain

We acknowledge that the above measures will not resolve all of the poor outcomes that are being delivered by retail NBN markets, and also that there are significant concerns expressed by retailers regarding their upstream supply arrangements that are potentially contributing to these outcomes.

A potentially significant factor contributing to these outcomes is that current average revenues per user for NBN services may not be sufficient to meet NBN Co's long term cost recovery requirements. One factor is that we are not seeing the degree of risk sharing and alignment of incentives we would expect in a well-functioning wholesale market.

These issues are the subject of processes with the potential to improve outcomes for consumers. NBN Co is currently consulting with its customers on potential modifications of or alternatives to the current pricing model. In addition, in August 2017 the Government convened an industry roundtable to secure joint action to better support consumers during the NBN migration.

We welcome an industry led approach to improving the NBN experience of consumers and an outcome on NBN pricing that meets the objectives of NBN Co and service providers. We consider an industry resolution can be preferable to a regulatory outcome as it is likely to be more responsive to the immediate concerns of NBN wholesale customers and should be afforded reasonable time to reach that resolution. Therefore, we are watching developments

and; if needed, however, we will consider exercising our regulatory powers where this would support these market outcomes being realised sooner. In the meantime, to provide additional flexibility to the parties in negotiating pricing outcomes, we have deferred our decision on the Special Access Undertaking (SAU) variation that NBN Co has submitted. NBN Co's proposed SAU variation incorporates FTTN, fibre to the basement (FTTB) and hybrid fibre coaxial (HFC) access technologies into the SAU, to reflect the current NBN model. If approved, the SAU variation would extend the current SAU pricing arrangements to these access technologies.

Further, the ACMA is undertaking inquiries and research to provide a better understanding of the nature, extent and causes of the concerns regarding consumer experience before, during and after the migration of consumers to services provided over the NBN.

We propose to examine NBN service standards and their impact on consumer experience. In particular, we will examine incentives in place along the supply chain and whether they are sufficient to support appropriate consumer outcomes.

1.6 Key intermediate inputs

Smaller service providers have the potential to add to the competitiveness of communications markets by constraining the behaviour of the larger providers and increasing competitive tension. However smaller providers frequently rely on wholesale inputs, either of resale services (as in the case of mobile virtual network operators (MVNOs)) or of intermediate inputs such as transmission between NBN points of interconnection (POIs) and their own point of presence (POP), as well as internet interconnection services to reach the customers and the content hosted by the larger providers. In addition, some smaller service providers do not have the scale to make direct connection to NBN services at all 121 POIs and rely on wholesale services that aggregate this direct connection with other wholesale services.

The market study has looked at whether these wholesale markets upstream of retail markets are operating competitively to supply key intermediate inputs that meet the needs of smaller service providers, including to build scale. An area where we have identified some concerns is the NBN wholesale aggregation market where potential limitations with the NBN wholesale aggregation services being supplied may be impeding the ability of smaller service providers from entering markets or offering differentiated products over the NBN. We consider that the development of this wholesale market to date is not as advanced as might be expected given that the NBN rollout commenced over five years ago and passed its mid-point earlier this year. Complexity in retailing on the NBN during the network build and the effect this has on the business case for investing in the supply of wholesale aggregation services may be contributing to the slow development of the wholesale market. The market study has considered options to promote the wholesale aggregation market while it is still developing. These options include potential action by NBN Co to provide transitional products or pricing measures during the rollout period to facilitate the entry of smaller or niche service providers.

We have also identified concerns in the internet interconnection market where Telstra, Optus and TPG appear to hold some market power in relation to access to their networks. We intend to continue to assess whether access to these services is available at prices and terms that support competition in the range of downstream markets they support.

1.7 Network competition and convergence

The above issues need to be considered in the wider context in which the NBN is being rolled out. Relevantly, this context encompasses the increasing substitutability between and convergence in the use of alternative last mile access networks. Substitution of fixed line services for mobile services has been occurring for a number of years and is likely to

continue in response to the recent increase in the data inclusions offered in mobile network operators' plans as the capacity of their networks increases. The substitutability between mobile and fixed line has the potential to be boosted when deployment of 5G begins in two to three years. The extent to which this potential is realised will depend on relative costs of utilising the NBN compared to bypassing the NBN with fixed and mobile wireless alternatives, which is significantly influenced by NBN Co's pricing.

The NBN already faces some competition from non-NBN fixed line networks, particularly in large occupancy buildings and new estates. These networks are typically in low cost to supply areas and have consequently affected the NBN financing model which relies on a cross subsidy from services provided in low cost areas to meet the costs of providing NBN services in high cost regional and remote areas of Australia. The Government is intending to impose a charge on these networks under its Regional Broadband Scheme (RBS) to help fund the NBN's non-commercial fixed wireless and satellite services. We do not consider this charge should be extended to other substitute networks in the future; indeed, we have a preference that all non-commercial services be funded directly from the budget.

In the medium term, given the social objectives it is required to fulfil by supplying services to uneconomic parts of Australia, and depending on future developments, the Government could consider whether NBN Co should continue to be obliged to recover its full cost of investment through its prices via options that may provide it with greater flexibility regarding its cost recovery objectives. These could include direct budget funding arrangements for non-commercial services, debt relief measures or an asset revaluation. The latter step is consistent with that usually taken by private sector enterprises if and when business plans are not met.

1.8 Emerging services and issues

Beyond the large number of issues relating to the provision of voice and broadband services, the market study has considered the growth and development of services delivered over or using the internet, including IoT, and changes in supply chain structures and related services such as the use of content delivery networks and data centres. We have also considered the emergence of cloud based services which are transforming the way services traditionally provided locally to the user are consumed.

We consider that these markets are highly dynamic and seem to be operating competitively. These areas are diverse, subject to rapid innovation and change and, for the main part, do not give rise to immediate concerns regarding the competitive functioning of their associated markets. However, there are instances where incumbents in the communications sector may be able to exercise market power or where market power concerns could emerge due to strong network effects to the detriment of competition in these markets. Our intention is to keep abreast of developments in these markets to ensure that rigorous competition is sustained and take appropriate competition enforcement action if necessary.

1.9 Policy implications and priorities

Finally, the draft report sets out our views in relation to policy implications and priorities.

We consider that the current communications regulatory and competition arrangements that we administer have remained fit for purpose notwithstanding the evolution of the communications market to date and appear to be well suited to deal with the immediate and longer term issues we have identified in the market study.

The policy priorities largely relate to reviews that are currently being conducted or have recently been completed. These policy issues have interdependencies with competition in and the efficient operation of communications markets and include: spectrum management;

data availability and use; the proposed RBS; and the Government's Mobile Black Spots Program.

2 Draft findings, proposed actions and recommendations

The draft findings from our market study, together with actions that we propose to take forward and recommendations for action by others are set out below.

2.1 Current state of competition in communications services

2.1.1 Voice and messaging services

There is reasonably effective competition in the voice and messaging services market despite considerable concentration in the market, with consumers benefiting from ongoing price reductions, product innovation and differentiation in non-price terms and conditions.

Proposed action 1

We will review our competition and price monitoring activities to ensure that they appropriately capture the evolution of voice and messaging services and report on this in our annual telecommunications report.

Proposed action 2

We will examine the messaging services market to determine the need for ongoing regulation of SMS termination services in our next regulatory review of the mobile terminating access service.

2.1.2 Broadband services

Bundling can deliver positive outcomes for consumers and service providers. However, it can also lead to anti-competitive effects if a service provider has market power in one of the bundled products.

Limited consumer take-up of higher speed NBN plans may affect efficient use of NBN infrastructure if it continues in the long-term. It may also potentially have significant implications for NBN Co's ability to recover its investment costs.

Poor consumer experience on the NBN is, in part, resulting from the level of capacity provisioned by service providers and the inadequacy of information available to consumers to help them select the right plan with their preferred provider.

There is strong price competition in the fixed line and mobile broadband services market, particularly for broadband services on the NBN. While there is evidence of effective non-price competition for mobile broadband services, there appears to be limited competition at this stage on quality (speed and performance) on the NBN.

2.1.3 Access network technologies

The nature of competition between access network technologies is evolving as fixed line and wireless networks increasingly converge. Wireless networks are exerting greater competitive pressure on fixed line networks; however the extent of future competition will depend on the degree of substitution in downstream voice and broadband markets.

The price of NBN services has the potential to distort competition if it leads to poor consumer experience and encourages substitution away from the NBN to other access network technologies.

There are issues with current NBN service level standards, including risk allocation, ineffective coordination, poor risk management and limited compensation, which are likely to have flow on impacts for the consumer experience on the NBN if left unresolved.

Despite improvements to NBN rollout information for service providers, this information continues to be inaccurate and does not appear to be readily available to all service providers. This has important commercial consequences and may limit the ability of service providers to actively compete for customers during the migration period to the NBN.

2.1.4 Aggregation services

There is limited competition in the supply of wholesale ADSL services, with Telstra having a dominant position in the market.

NBN wholesale aggregation services are being used by some service providers as a stepping stone prior to directly connecting to the NBN, while other service providers are using them in an ongoing capacity to supply retail broadband services on the NBN. Under both possible models of use it is important for there to be competitive supply to promote competition in the supply of downstream retail broadband services.

Economies of scale at the NBN POIs do not appear to be a significant barrier to entry in metropolitan areas. However, this is less clear in regional and rural areas.

There appears to be some competition in the supply of wholesale MVNO services. However, it is currently unclear what ability MVNO customers have to differentiate services.

2.1.5 Transmission and dark fibre services

Competition in the supply of transmission services, including to NBN POIs, continues to develop, particularly as the rollout of the NBN progresses, and in metropolitan areas. However, there are some regional transmission routes where there is more limited competition.

The market for dark fibre services appears to be relatively concentrated with only two active larger suppliers and a small number of providers supplying more niche services, limiting competition in the supply of these services, including to NBN POIs.

2.1.6 Internet interconnection

Transit costs in Australia, while declining on a unit basis, appear to be relatively high compared to other jurisdictions such as Europe and the United States. Furthermore, domestic and international transit product prices are converging and we are observing small networks exchanging some domestic traffic at overseas interconnection points.

Telstra, TPG, Optus and Verizon (TTOV) are collectively relatively unconstrained in determining their price level and structure in the supply of transit services and appear to enjoy a degree of market power in relation to access to their networks. Australia's geographic isolation, which makes international transit an inferior substitute, is likely to be one reason for this.

2.1.7 Over-the-top content services

Over-the-top (OTT) services continue to grow in popularity and are necessitating continued investment in capacity by network operators and service providers arising from the broad complementarity between these services and broadband access. However, minor risks remain, including the potential for bottlenecks to emerge if capacity investment is not coordinated throughout the supply chain, and the potential for discriminatory traffic management to occur.

2.1.8 Content delivery networks

The provision of content delivery network (CDN) services in Australia currently appears to be reasonably competitive given the presence of global providers such as Akamai, and broadband service providers and large content providers who have also deployed their own CDN infrastructure. However, the market is rapidly growing and evolving, so at this stage it is difficult to assess whether competition issues may emerge in the future.

2.1.9 Internet of Things

The diverse and fragmented nature of different IoT applications is likely to create disparate service markets with different competitive dynamics, for example, specific sectors may tend towards concentration or vertical integration, and other IoT applications may involve more contestable supply chains. We will continue to monitor competitive dynamics as the downstream market develops.

2.1.10 Cloud computing

The collection, storage and use of data by cloud service providers and concerns about 'vendor lock-in' may raise potential competition and consumer protection concerns for cloud services.

2.1.11 Data centres

There currently appears to be strong competition in the provision of data centre services in Australia and this is likely to continue over the next few years as the industry is rapidly expanding. However, we expect that this market is likely to become more concentrated over time due to factors including large economies of scale, very low churn between data centres and the presence of considerable network effects.

2.2 Immediate issues requiring action to promote competition

2.2.1 Price and speed of NBN broadband services

Proposed recommendation 3

We strongly encourage NBN Co and service providers to continue to engage constructively to address issues raised about NBN wholesale access pricing within the existing regulatory framework. This is essential if there are to be improved outcomes for NBN Co, service providers and consumers. We have delayed our decision on varying NBN Co's Special Access Undertaking (SAU) in order to give NBN Co and service providers flexibility to continue their discussions in relation to pricing.

Proposed action 4

We will carefully examine any outcome of NBN Co's current pricing consultation, including the need for consequential changes to NBN Co's Special Access Undertaking (SAU) or other regulatory response to promote positive outcomes for consumers and the market generally.

Proposed recommendation 5

In the medium term, and depending on future developments, the Government consider whether NBN Co should continue to be obliged to recover its full cost of investment through its prices. We consider further work could be done by the ACCC and the Department of Communications and the Arts to examine this issue and in particular possible options that may provide NBN Co greater flexibility regarding its cost recovery objectives for example direct budget funding arrangements for non-commercial services, debt relief measures or an asset revaluation.

2.2.2 Service standards for fixed line broadband services

Proposed action 6

We propose to examine the non-price terms of access, particularly the service standards being proposed for access to NBN services, and the impact that these may be having on delivering positive consumer experiences on the NBN. The allocation of responsibility for connections and service faults between NBN Co and service providers is an issue that will affect consumer experiences, especially where consumers suffer detriment.

In particular, we will examine whether there are appropriate incentives for NBN Co to remedy service failures and consider the adequacy of compensation available to service providers to enable them to provide appropriate consumer redress. As NBN Co is moving from the rollout phase to delivery of services, risk allocation must also shift to ensure services are delivered to consumers that meet expectations of quality.

We will consider whether the proposed allocation of responsibility is appropriate and whether regulatory intervention is necessary, for example, by including service level terms within NBN Co's regulated terms of access.

2.2.3 Critical wholesale inputs for the supply of fixed line broadband services

NBN wholesale aggregation services currently support a small number of all retail broadband services on the NBN. The market for NBN wholesale aggregation services may not fully mature until after the network is built is completed but there remains the potential for this market to grow and provide competitive constraint in the provision of downstream services on the large service providers.

Proposed action 7

We will consult on the need to obtain information from industry via a record keeping rule to monitor the supply of wholesale aggregation services to determine whether regulatory intervention is required. To the extent the market does not evolve, and the information we collect points to a lack of competition, we will consider (following further consultation) the publication of competitive benchmarking information.

Proposed recommendation 8

In the absence of a genuinely competitive wholesale aggregation market NBN Co should consider provision of transitional products or pricing measures, for no longer than the NBN build period that facilitate the entry of smaller or niche service providers to provide a further competitive dynamic.

Proposed action 9

We will examine the supply of transmission services to NBN Points of Interconnection (POIs) as part of the Domestic Transmission Capacity Service (DTCS) declaration and Final Access Determination.

Proposed action 10

We will consult on the need to obtain information from industry via a record keeping rule to monitor the supply of dark fibre services to determine whether any regulatory intervention is required.

Proposed recommendation 11

Telstra, TPG, Optus and Verizon (TTOV) should maintain on their website a comprehensive set of criteria and any other relevant policies to which they have regard when assessing peering requests from other networks. This would provide prospective peering parties some guidance on the criteria they are required to meet with each of the TTOV networks.

Proposed action 12

We will assess and report on whether access to internet interconnection services is available on competitive terms to support effective competition in downstream markets, with a particular focus on the market for the supply of services to corporate customers.

2.2.4 Information and facilitating more informed consumer choice

Proposed recommendation 13

The Telecommunications Consumer Protection (TCP) Code review provides an opportunity to assess whether service providers meet their Critical Information Summary (CIS) obligations under the TCP Code and how this can be addressed.

There is scope to improve the disclosure of business models, commercial relationships, ranking methods and market coverage on comparator websites, as these may not always be sufficiently transparent and can mislead consumers as to the extent of the comparison service, the amount of savings that could be achieved and the impartiality of the comparisons.

Proposed action 14

We will review the scope, transparency, and ease of use of comparator websites for communications services and consider the need for further intervention in addition to our existing guidance for comparator websites. If intervention is needed, we will consult with industry and government to develop an appropriate course of action.

Early termination fees may be difficult for some consumers to understand and calculate. These fees may be an impediment to switching providers, particularly in relation to post-paid mobile phone services.

Proposed action 15

We will monitor consumer complaints about unfair terms in communications contracts. We will also work with industry and government stakeholders to ensure consumers are informed about the potential benefits of short-term or no contract options when migrating to the NBN. We will also consider whether service providers should be obliged to more clearly identify the contract end date to consumers.

Proposed action 16

We will review the email retention options that service providers offer to consumers and determine whether the charges they impose are reflective of the underlying cost of providing the standalone email service. As part of this review, we propose to consider the potential costs and benefits of introducing an email portability regime.

Proposed action 17

We will monitor consumer complaints about bundling and take enforcement action where necessary. We will also consider issuing guidance to consumers regarding bundled telecommunications products.

Proposed recommendation 18

We support the recent amendments to the Telecommunications Industry Ombudsman's (TIO) terms of reference which empower it to require all relevant parties in the supply chain, including NBN Co, to cooperate with the TIO in order to resolve consumer complaints. To further improve the effective operation of the TIO Scheme we recommend that the TIO collect and report on a clear data set of NBN-related complaints and collect NBN complaint data according to technology type.

Proposed action 19

We will work with the Telecommunications Industry Ombudsman (TIO), the ACMA and other government agencies to improve information provision to consumers, particularly complaints data.

Service providers are not presenting complete and accurate information to consumers when advertising broadband services. Consumers are at risk of being misled by service providers about expected speed and performance, and lack adequate information to make informed purchasing decisions.

Proposed action 20

We will address concerns about the performance of broadband services on the NBN through our broadband performance monitoring and reporting program, broadband speed claims guidance, and enforcement action in response to practices that contravene the Australian Consumer Law. We propose to review the broadband speed claims guidance in August 2018 to determine whether it has been effective in addressing consumer concerns about broadband speed claims.

2.3 Medium to longer term issues requiring monitoring and potential future action

2.3.1 Competition between technologies in the supply of broadband services

In addition to technical factors such as wireless capacity, the degree of future substitution to wireless technologies will in part depend on the performance of NBN services in terms of price and service quality.

Technological evolution, particularly the advent of 5G, creates considerable uncertainty for the telecommunications sector. There is potential for disruption to existing network operators and the opportunity for investment in new technologies and supporting transmission networks. This will enable greater competition, and therefore a reduction in prices, improved quality of services, and greater consumer choice.

For NBN Co there will be the threat from increasing substitution to wireless technologies but also the opportunity to use the new technology in its service provision.

Proposed recommendation 21

Regulation should not constrain competition with the NBN. Instead, NBN Co will require both greater pricing flexibility and continued technology flexibility to respond to market developments.

Proposed action 22

We will consider stakeholder views as part of this market study on whether we should assess the merits of open access to dense small cell infrastructure assets.

Proposed action 23

We will closely monitor the uptake of different broadband technologies, and continue to reassess relevant market definitions in the communications sector as we undertake our regulatory functions.

2.3.2 Potential competition concerns relevant to the supply of newer communications

The competitive relationship between OTT services and the traditional communications services they replicate is likely to be different for each type of service. To the extent that competition from OTT services acts as a constraint on pricing, there may be a case for reducing or removing existing economic regulation of traditional communications services. For example, consumers' use of OTT messaging services may have diminished the need for ongoing SMS regulation.

Proposed action 24

We will explicitly examine competitive constraints posed by over-the-top (OTT) services on traditional communication services as part of future access regulation inquiries.

In addition, we will pay close attention to:

- Any traffic and price discrimination of OTT services by broadband service providers (through blocking, throttling, prioritising and unmetering).
- The impact of traffic management practices by broadband service providers (in response to increasing traffic volumes), whether this is performed in a competitively neutral manner, and the adequacy of disclosure to their consumers. Should broadband service providers fail to fully disclose to new and existing customers how their traffic management policies may impact their services, we will consider the need to develop appropriate principles and industry guidance as well as consider enforcement action where appropriate.
- The development of key OTT service markets, which we propose to report on as part of our annual telecommunications report.
- Potential harm arising from the ability of OTT platforms to amass market power (which we have excluded from this market study).

Proposed action 25

We will:

- continue our involvement in relevant external processes in relation to Internet of Things (IoT) spectrum, NBN and consumer/data issues run by the ACMA, the Internet of Things Alliance Australia (IoTAA) and other government departments
- continue to work with IoTAA in its various work streams and engagement with NBN Co on IoT product issues
- explore concerns regarding restrictions associated with the e-SIM model which are impeding the ability of Mobile Virtual Network Operators (MVNOs) to compete with the mobile network operators
- more generally, periodically examine the development of competition in key IoT sectors for signs of concentration or conduct of concern. This would involve monitoring features of the market including the number of market participants and their market shares; the degree of interoperability at the network and service layers; and availability of suitable wholesale access products. We will consider the value of incorporating this monitoring activity as part of our annual telecommunications report.

Proposed action 26

We will follow developments in the market for Content Delivery Networks (CDNs), cloud computing and data centre services to ensure that competition is not undermined over time and take appropriate competition enforcement action if necessary.

2.4 Policy implications and priorities

2.4.1 Current regulatory and competition arrangements

The current communications regulatory and competition arrangements that we administer have remained fit for purpose despite the evolution of communications market to date and appear to be well suited to deal with the immediate and longer term issues we have identified in the market study.

2.4.2 Spectrum management

Spectrum allocation and management is increasingly important for communications markets. The value of spectrum lies in the economic and social benefits it supports, rather than in any revenue return to the Budget. The Government's proposed new radiocommunications regulatory framework does not explicitly recognise the impact of spectrum allocation and assignment on competition and efficiency in downstream retail markets.

Proposed recommendation 27

The ACCC strongly recommends that the radiocommunications regime explicitly recognise, and do more to promote, competition in relevant markets.

2.4.3 Data availability and use

Consumers do not have sufficient access to relevant data about themselves to facilitate better purchasing decisions and encourage service providers to make more tailored offerings to consumers.

Proposed recommendation 28

The proposals of the Productivity Commission's Inquiry into Data Availability and Use should be implemented to facilitate consumers having access to relevant data about themselves.

We support the roles recommended for the ACCC by the Productivity Commission in its Inquiry into Data Availability and Use.

2.4.4 Regional Broadband Scheme

Proposed recommendation 29

The Regional Broadband Scheme (RBS) is only applied to fixed line services. It is not applied to wireless services and should not be in the future. The extent to which wireless services constrain fixed line broadband services is evolving and should not be inhibited by policy or regulatory changes to assist NBN Co. Greater substitution across technologies would also bring into question the suitability of the RBS charge as a mechanism to fund non-commercial NBN services. Our preference is for direct budget funding as it would be the least distortionary alternative and not serve as a means of protecting the NBN from network competition.

2.4.5 Mobile Black Spots Program

We consider that government subsidies, like the Mobile Black Spots Program, are important in promoting investment in areas where there is no mobile coverage. However implementing open access requirements for such programs will deliver greater benefits to competition and consumers.

3 Introduction

3.1 The market study

3.1.1 Purpose of the study

The Australian communications sector is going through a period of significant change. In addition to global technological and business trends that are changing how communications networks are designed and used to supply services to consumers, there are significant developments specific to the Australian communications sector.

The purpose of the market study is to take stock of these developments and their implications for competition and the long-term interests of end-users. The findings and recommendations of the study are intended to inform the policy and regulatory framework within which the communications sector operates.

In contrast to other ACCC studies and inquiries into specific sectors, in addition to examining immediate issues of concern, this market study is looking forward over a five year horizon to form a view about the directions that policy and regulation should take. This reflects that significant segments of the communications sector will be affected by new and emerging technologies and product innovations such as the Internet of Things (IoT) and 5G.

Where there are emerging impediments to competition there may be a need for a regulatory response. Conversely, where market developments are leading to greater competition there may be an opportunity to reduce or remove existing regulation.

3.1.2 Context and environment for the study

In line with global trends, the communications market in Australia continues to evolve rapidly with technical and product innovations driving new connections to networks; growth in the demand for data and the prospect of greater convergence between fixed and mobile networks; and an increasing number of IoT applications for personal, household and business use.

The local developments of significance for the study relate to the deployment of the National Broadband Network (NBN) intended to provide all Australian households and businesses with connection to superfast fixed broadband. The NBN has recently reached the mid-point of its rollout.

Necessarily, this has meant much attention has been focussed on how industry is adjusting and responding to the changing communications landscape as NBN Co, the government owned business charged with the deployment, rolls out the infrastructure that is replacing the legacy networks.

A significant aspect of the NBN policy framework is the vertical separation between the network operator and the service providers accessing the network to supply broadband and voice services to consumers. This is intended to promote retail competition by providing wholesale broadband products on equal terms to all service providers.

Many of the challenges currently facing industry relate to the relationship between NBN Co and its wholesale customers and how that relationship is working to ensure outcomes that are in the long-term interests of end-users.

Some of the major concerns we have identified in the market study are: the migration experiences of many customers when moving to the NBN; the wholesale costs that service

providers incur to acquire NBN services, and the quality of services that service providers are delivering over the NBN.

There are a number of initiatives and processes currently underway that are intended to address the issues identified as being of concern. These include initiatives by both industry and regulators. In particular, NBN Co has recently proposed updates to the contractual arrangements with its wholesale customers and has an ongoing engagement with its customers on its pricing construct and levels.

In addition, the Australian Communications and Media Authority (ACMA) is undertaking inquiries and research to provide a better understanding of the nature, extent and causes of the concerns regarding consumer experience before, during and after the migration of consumers to the NBN. This work will help ensure that steps to improve the overall NBN experience are well targeted and effective. The ACCC is also active in addressing consumer concerns related to services supplied over the NBN. This includes our recently released broadband speed claims guidance¹, our broadband performance monitoring and reporting (BPMR) program which will be operational once the testing provider is appointed, and enforcement action where warranted in relation to breaches of the Australian Consumer Law (ACL).

In addition to consumer related concerns, we have identified concerns in relation to the availability and costs of wholesale inputs for the supply of fixed broadband services. These include concerns about the effective operation of the markets for fixed network aggregation services², transmission and internet interconnection, all of which will be subject to varying levels of action by the ACCC.

3.1.3 Scope of the study

In assessing the state of competition in the various communication markets, we have taken a service based approach focusing on voice, broadband and emerging services. This has enabled us to identify key interdependencies between services and inputs in the supply chain and to facilitate a holistic approach to consideration of the sector. Our framework for analysis is explained further in section 3.3.

We have focused on competition in the supply of services to residential and small business consumers who purchase 'off-the-shelf' communications services. This includes availability and competition in the supply of the intermediate inputs necessary to service these consumers with voice and broadband services.

The supply of communications services on a customised basis to larger enterprises has not been specifically assessed in the study. However, impediments to smaller service providers' ability to acquire critical inputs for the supply of services to their customers, including in the corporate market, are captured as part of a wider consideration of this issue.

We have also considered whether there are any potential competition issues in relation to emerging communications services such as OTT and IoT services. We have taken into account but not specifically examined issues that are the subject of other concurrent and recent inquiries in relation to specific communications issues, including our domestic mobile roaming declaration inquiry, the Productivity Commission inquiries into the future direction of the Universal Service Obligation (USO) and Data Availability and Use³ and the Government's consideration of the Spectrum Review Report.⁴ Similarly, we have not

¹ ACCC, [Broadband speed claims: Industry guidance](#), 21 August 2017.

² Aggregation inputs are explained and discussed in section 4.4 of this report.

³ Productivity Commission, [Telecommunications Universal Service Obligation public inquiry](#), 19 June 2017.

⁴ Department of Communications, [Spectrum Review](#), 26 May 2015.

examined regulation of the media sector, which has recently been the subject of reform proposals by the Government or examined in detail the role in Australian markets of the global communications platform operators (such as Google, Amazon and Facebook). However, this latter issue is to be the subject of a future inquiry by the ACCC.

3.1.4 Consultation and information gathering

In conducting the market study we have consulted extensively with industry, consumer and other stakeholders. Major consultations have included:

- release of an issues paper in September 2016 to which we received 64 submissions, as well as over 1000 responses to a consumer questionnaire
- a two-day stakeholder forum in Sydney in July 2017.

Availability of reliable information is critical to the market study reaching evidence based findings and recommendations. The study is not constituted under provisions of the *Competition and Consumer Act 2010* (CCA) that allow use of our enforceable information gathering powers. However, we already have a significant data set relating to the communications sector through the record keeping rules (RKR) in place to inform our regulatory and monitoring functions as well as data from other government agencies, including the Australian Bureau of Statistics.

A significant limitation to the information obtained through the RKR that we have in place is that it does not provide comprehensive retail market data. We consider that this information is important to our ability to reach findings in the market study and we have therefore used communications market consumer research from Roy Morgan Research to fill this gap.

In addition we have obtained information through discussions with individual stakeholders, issuance of voluntary information requests and a survey of wholesale customers acquiring aggregation services and related inputs from other service providers. We appreciate the valuable input that we have received from stakeholders to date and welcome further input in response to the draft report.

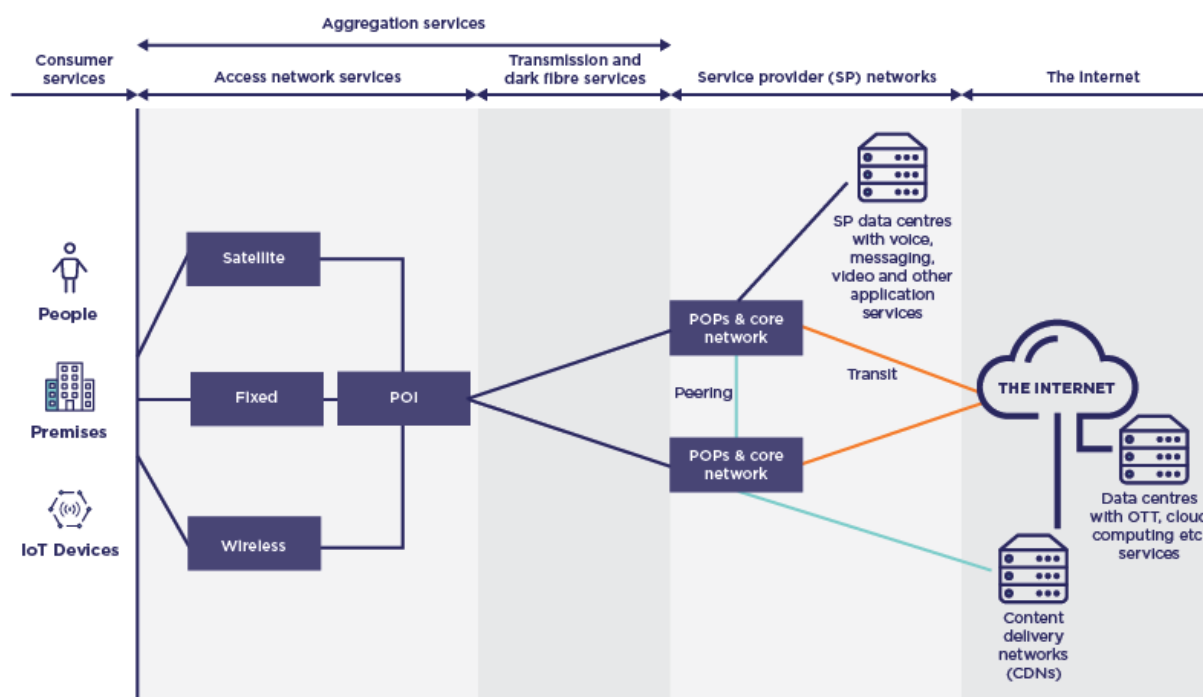
3.2 The communications sector

3.2.1 Communications sector overview

Since the early 1990s the communications sector has evolved from being dominated by Telstra as a vertically integrated fixed line voice service provider to now comprise of a variety of service providers offering fixed line and mobile voice and broadband services, operating at the wholesale and retail level.

Critical to providing services utilising the fixed line and mobile access networks, are the core and aggregation networks which enable routing and interconnection between networks and therefore consumers.

Figure 3.1: The communications supply chain—how voice and broadband services are delivered to consumers over next generation networks



A significant competitive development has been the emergence and proliferation of OTT services. These services run over-the-top of access, core and aggregation network services to provide a variety of applications and increasingly data intensive content services. Other major developments include the rise of cloud computing and the growth in the importance of data centres.

Some service providers currently operating in the communications sector are vertically integrated and have their own infrastructure, while others operate only at the retail level, purchasing wholesale inputs from infrastructure and network owners.

For example, many service providers supplying fixed line services purchase the relevant wholesale access inputs from either Telstra or next generation fixed line access network operators, such as NBN Co.⁵ As the NBN rollout is completed (currently forecast to be in 2020), Telstra’s fixed line access services will be phased out and NBN Co will become the predominant provider of wholesale fixed line access services.

In relation to mobile services, there are soon to be four mobile network operators (MNOs) (the existing networks Telstra, Optus and Vodafone and the new entrant TPG) and a number of mobile virtual network operators (MVNOs) that purchase wholesale end-to-end mobile services (including transmission) from the MNOs to provide retail services.

In some cases, service providers have their own transmission networks, and in other cases they seek wholesale supply. Most service providers have their own core network.

OTT services such as communication apps, content providers and social media platforms utilise these networks, with OTT service providers interacting directly with residential and

⁵ Next generation networks enable communication downloads at speeds of 25 Mbps or more, and include the NBN and other next generation fixed line access networks. They provide service providers with the declared Local Bitstream Access Service (LBAS) or Superfast Broadband Access Service (SBAS). Examples include the fibre to the basement networks and hybrid fibre coaxial (HFC) networks operated by TPG and the fibre to the premise networks operated by OPENetworks and OptiComm in new developments.

business consumers and in some circumstances forming relationships with communications service providers. While consumers will generally form a relationship with one service provider (or possibly one service provider for a fixed line service and another for a mobile service) they will often use multiple OTT service providers.

Beyond the supply chain in Figure 3.1, it is also useful to think of the sector as having a 'stack' of services with each layer depending on the others. These can be characterised as:

- the infrastructure layer comprising the wires, optical fibre, spectrum, etc.
- the communication network electronics layer comprising the electronics, switches, routers, etc. that provide the 'smarts' to enable transmission of communication and data storage services
- the application layer which supports the provision of voice, email, web browsing, and video streaming services as well as those provided over other applications. In some cases these applications will support access to content.

Devices such as fixed line and mobile phones and tablets operate across these layers and enable end-to-end communication.

3.2.2 Regulatory framework overview

The overarching framework for the regulation of communications in Australia largely dates back to 1997, when a number of legislative changes took effect with the objective of opening telecommunications markets progressively to full competition and privatising Telstra. Most economic regulation of telecommunications became the responsibility of the ACCC and technical regulation, spectrum management and administration of the USO became the responsibility of the Australian Communications Authority (now the ACMA).

The 1997 changes included the introduction of a third-party telecommunications specific access regime under Part XIC of the former *Trade Practices Act 1974* (now the *Competition and Consumer Act 2010*). This is designed to ensure that service providers have access to monopoly and other bottleneck infrastructure to supply competitive communications services to customers, where there are limited incentives for, or significant barriers to the development of, infrastructure-based competition.

Under the Part XIC access regime telecommunications services can be declared for third-party access by the ACCC where it is in the long-term interests of end-users to do so. Service declaration typically occurs following an inquiry by the ACCC. We have tended to declare services when a single or small number of vertically integrated networks serve as a bottleneck to downstream competition. Once a service is declared, we can determine regulated terms and conditions of upstream access in an access determination or binding rule of conduct that applies if parties are unable to agree commercially.

The telecommunications services that are currently declared for third party access and the current expiry dates of these declarations are listed in Table 3.1.

Table 3.1: Currently declared telecommunications services⁶

Services	Expiry date
Domestic transmission capacity service	31 March 2019
Mobile terminating access service	30 June 2019
Unbundled local loop service	31 July 2019
Line sharing service	31 July 2019
Wholesale line rental	31 July 2019
Local carriage service	31 July 2019
Fixed originating access service	31 July 2019
Fixed terminating access service	31 July 2019
Superfast broadband access service	28 July 2021
Local bitstream access service	Legislated not to expire
Wholesale ADSL service	13 February 2022
NBN access service, ancillary services and facilities access service	30 June 2040

As a result of the 1997 legislative reforms, telecommunications providers are also subject to specific anti-competitive conduct provisions under Part XIB of the CCA.⁷ In addition, Part XIB provides the ACCC with recording keeping, information disclosure and monitoring powers in relation to the telecommunications sector. The Part XIB provisions operate in addition to the general anti-competitive conduct regime set out in Part IV of the CCA.

Some other aspects of competition in the communications sector and some of our related functions are governed by the *Telecommunications Act 1997*. These include provisions governing access to particular telecommunications facilities, number portability and designated interconnection services. More recently they have included Telstra's Structural Separation Undertaking and Migration Plan (that provide a framework for safeguarding competition as services transition from Telstra's access networks to the NBN).

A number of additional communications-specific consumer safeguards are provided via the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (the TCPSS Act) and associated instruments. These include the customer service guarantee (CSG) that provides for minimum performance standards in the supply of telephone services and the payment of compensation if these standards are not met. The TCPSS Act also establishes an industry-funded independent Telecommunications Industry Ombudsman (TIO) Scheme to provide a dispute resolution service for residential and small business consumers of telephone and internet services.

⁶ ACCC, [Current declarations](#), 26 October 2017.

⁷ Section 151AJ of the CCA sets out the circumstances in which a carrier or carriage service provider is said to engage in anti-competitive conduct for the purposes of Part XIB. Section 151AK of the CCA is the competition rule, which prohibits anti-competitive conduct.

The communications sector is also subject to the Australian Consumer Law (ACL). Consumer protection in the sector is currently a priority in our Compliance and Enforcement Policy.⁸

Under the *Radiocommunications Act 1992*, the issuance of a spectrum licence is treated as an acquisition for the purposes of s. 50 of the CCA which prohibits acquisitions that would result in a substantial lessening of competition. When requested, we provide advice to the Minister on setting competition limits in new spectrum allocations.

3.2.3 Relevant NBN regulatory and policy settings

A key feature of the communications policy landscape is the delivery of the NBN being built by NBN Co, which was established in 2009 as a government business enterprise. NBN Co has a mandate to supply wholesale-only high-speed broadband access services to reach all Australians using a mix of access technologies and based on uniform national prices.⁹

A key objective of the establishment of NBN Co as a wholesale-only entity was to address the long standing competition concerns associated with Telstra's vertical integration and its ability and incentive to discriminate against competitors seeking access to its legacy copper network.

We regulate the NBN's wholesale broadband services via an SAU, which includes price and non-price terms for access by service providers. The SAU establishes a framework for the economic regulation of NBN Co under which it is provided with the opportunity to recover its prudent and efficient costs under a long-term revenue constraint methodology.

Price terms included in the SAU set initial prices for NBN access services which apply uniformly across Australia. This means that wholesale non-commercial fixed wireless and satellite services supplied to regional and remote areas of Australia are provided at prices below the high cost of supply. Consequently, cross subsidies from low cost to high cost services are in place and the prices of NBN high speed broadband services in metropolitan areas can be expected to be higher than if they were supplied on a purely commercial basis.¹⁰

To help maintain the NBN's cross-subsidy arrangements, the Government has put in place, or is in the process of introducing, a number of 'level playing field' measures that are intended to reduce the incentives for the provision of alternative broadband infrastructure in lower cost to supply areas. These have included requiring particular competing fixed line networks capable of supplying high speed broadband services to be operated on a wholesale only open-access basis.

More recently, the Government has moved to impose a levy, known as the Regional Broadband Scheme (RBS) charge, on other fixed line suppliers of high speed broadband services as a contribution to help fund the NBN's non-commercial fixed wireless and satellite services.¹¹

⁸ The ACCC's approach to enforcement and compliance activities is guided by the ACCC's Compliance and Enforcement Policy. A copy of the ACCC Compliance and Enforcement Policy is available [here](#).

⁹ Uniform national prices are no longer a government objective of the NBN, however they were incorporated into the regulated prices of the NBN via the accepted SAU.

¹⁰ We note that the NBN has stated that it set its entry level prices (for 12/1 and 25/5 Mbps services) to match pre-existing broadband offers.

¹¹ Telecommunications (Regional Broadband Scheme) Charge Bill 2017, Explanatory Memorandum.

3.2.4 Legislative reform

A number of legislative amendments are proposed or have been recently passed. In addition to the NBN related measures noted above, these include:

- the Competition and Consumer Amendment (Misuse of Market Power) Bill 2017, which passed the Parliament in August 2017 with an amendment to retain the anti-competitive conduct provisions in Part XIB
- a legislative reform package to implement the Government's program of red tape reduction
- an exposure draft of the new Radiocommunications Bill 2016, which is intended to implement significant reform to spectrum management following the spectrum review by the ACMA.

In addition to this program, the Department of Communications and the Arts is currently developing a framework for consumer safeguards review in response to the 2015 Regional Telecommunications Review.¹²

3.3 Framework for analysis

Under the service based approach we have taken to examining competition and related issues in the supply of communications services, we look at competition in the supply of retail voice and broadband services, irrespective of the technology and networks used to deliver them.

This approach enables us to draw out interdependencies and to assess competition within a holistic framework for the sector. In undertaking this assessment, we give consideration to how competition is developing, where impediments exist or might emerge and where competitive constraints that might limit market power are emerging.

In undertaking this task we recognise the fundamental role of competition within communications markets in delivering outcomes in the best interests of consumers. However, effective competition (in the sense of markets having a number of actual or potential competitors, whose price and product offerings are constrained by each other and their customers) does not always result from allowing markets to operate without regulation. Regulatory intervention can be necessary to deliver competitive outcomes by addressing market power, such as under our powers provided by Part XIB and XIC of the CCA.

Using the service based and competition frameworks outlined above, we have examined issues in the market study using the following approach:

Step 1: Identify significant services and overarching trends.

- Identification of key services in the supply chain and how the demand for and supply of these services may be changing. As context, broader trends across services have also been examined in relation to technological and product developments, changes in consumer preferences and major structural changes.

Step 2: Examine the state of competition in the provision of these services.

- This includes examining the available substitutes and complements (taking into account underlying technologies, service functionality and relevant customer segments) to establish the boundaries within which competition is examined, as well as other sources of competitive constraints and identification of any market failures. Static measures are

¹² Regional Telecommunications Independent Review Committee, [Regional Telecommunications Review 2015](#), 22 October 2015.

considered (e.g. number of suppliers and market shares) as well as more dynamic 'process of competition' measures (e.g. changes in prices over time, barriers to entry such as switching costs for consumers and network economies of scale and scope for providers) and any regulatory and policy considerations which may be acting as constraints. The significance of other sources of market failure—such as, for example, issues associated with network externalities, are also considered, if relevant.

Step 3: Identify the issues for further examination and focus.

- This serves to prioritise those issues with significant and material concerns identified in the state of competition analysis (i.e. in step 2). These are characterised as immediate, medium or longer term issues, depending on the timeframes over which the issues are expected to emerge, using the service based focus.
- We also include discussion and conclusions in relation to those issues we do not consider require further consideration, either due to the issues being progressed in other contexts (e.g. the Spectrum Review) or as a result of them not raising significant competition issues (e.g. retail competition on non-NBN networks).

Step 4: For those issues identified for further examination and focus, examine what opportunities exist to help promote competition and efficiency in the immediate (as well as medium) term and longer term.

- This involves analysis of the issues that require addressing in the immediate (as well as medium) and longer term in greater detail and proposing solutions for addressing the identified concerns, including the entities best placed to respond to those issues. Consideration is given to regulatory options, and also potentially broader options including the policy framework. We have also identified proactive steps and processes to guard against unfavourable conditions arising for efficiency and competition in emerging services.

The following section outlines some overarching trends within the communications sector before assessing the state of competition in the supply of the significant services identified in Step 3.

4 Current state of competition in communications services

The following sections examine the current state of competition for different communications services. It provides a baseline assessment against which we have identified potential competition, efficiency and consumer issues that will be examined further in section 5 (more immediate issues) and section 6 (medium to longer term issues).

We start by examining the current state of competition for retail communications services such as voice, messaging and broadband services.

We then examine competition across the wholesale elements of the supply chain that enable delivery of these services, including access networks, aggregation, transmission and dark fibre services.

Finally, we examine competition in relation to important wholesale inputs such as content delivery networks, cloud computing, internet interconnection and data centres.

4.1 Voice and messaging services

Voice services are provided by telecommunications service providers, typically in conjunction with broadband services, on fixed and mobile networks. OTT communications service providers also supply voice services through applications over the internet.

Messaging services (SMS) are provided by mobile phone service providers and OTT communications service providers who provide messaging services over the internet.

In this section we focus on voice and messaging services used by residential consumers.

There is significant structural and technological change occurring in the market for voice and messaging services. In particular, the move from Telstra's copper network to the NBN and other fibre networks will see all fixed voice services delivered as VoIP services using internet protocol rather than the public switched telephone network (PSTN).

Mobile technology and network improvements have seen mobile phone services reach near saturation point in recent years. Many consumers have effectively replaced fixed voice services with mobile. Further, the number of mobile phone-only users has been increasing at almost twice the rate of decline in use of fixed line telephony, likely influencing fewer voice-only fixed line services available in the market.

In addition, we note that the incidence of Australian households that have a home phone but no fixed broadband service, the 'voice-only' fixed consumers, has also been declining, falling from 25 per cent of total Australia households in 2013, to 18 per cent in 2016.¹³

The emergence and adoption of OTT voice and messaging services, such as Skype and WhatsApp, have also had a significant impact on this market, replacing traditional voice and messaging services for some consumer segments.

¹³ Roy Morgan Single Source (Australia), January to December 2016, n=17 489 and January to December 2013, n=11 178, Australian Households.

4.1.1 Market structure and service providers

There are a large number of service providers in this market supplying services on fixed and mobile networks with some providers vertically and/or horizontally integrated.

Telstra and Optus are both vertically and horizontally integrated in the supply of fixed and mobile voice services in some elements of the supply chain. For example, Telstra owns and operates the copper network, and Telstra and Optus both operate their own HFC, mobile and transmission networks as well as owning spectrum.¹⁴

TPG and Vocus operate their own transmission networks and are vertically integrated in the supply of fixed line voice services, back to their connection to NBN wholesale services to supply fixed voice services.

Vodafone is vertically integrated in the supply of mobile voice services, owning its own mobile network, spectrum and some transmission assets.

Both TPG and Vodafone are looking to expand horizontally with TPG acquiring spectrum to use in its deployment of a mobile network and Vodafone expected to start supplying fixed services on the NBN by the end of 2017.¹⁵

Smaller service providers acquire wholesale services such as transmission and/or wholesale end-to-end services, to enable them to provide fixed and mobile voice services.

OTT communications service providers offering both voice and messaging services (over fixed and mobile networks) include Facebook Messenger, WhatsApp, Skype, Viber, WeChat and Google Hangouts. Many other OTT social media apps, such as Instagram, SnapChat and LinkedIn, also offer messaging as an ancillary service.

4.1.2 Market shares

There is currently considerable concentration in the supply of voice and messaging services on both fixed line and mobile networks. This is particularly evident once the retail brands and subsidiaries are accounted for as:

- TPG Group includes iiNet, Internode, Adam Internet, AAPT, Westnet, TransACT, Pipe Networks, Netspace, Agile Communications and Chime Communications
- Vocus Group includes M2, Dodo, iPrimus, Eftel, Club Telco, NextGen Networks, Amnet, Commander, Engin and Southern Cross Telco
- Optus includes Virgin Mobile and Vividwireless
- Telstra includes Belong.¹⁶

According to Roy Morgan Research, in 2016 approximately 96 per cent of consumer fixed line voice services were supplied by four service providers (Telstra, Optus, TPG and Vocus)¹⁷ and 91 per cent of consumer mobile phone services were supplied by the three network operators (Telstra, Optus and Vodafone).¹⁸

¹⁴ Telstra is fully vertically integrated in the supply of fixed line voices services over the legacy copper network, reflecting its network ownership and control over all elements of the supply chain, from the access networks to retailing, and partly vertically integrated in the supply of fixed voice services over the NBN where it does not have its own access networks but does control all other elements in the supply chain. Optus is vertically integrated in terms of owning and supplying transmission.

¹⁵ Communications Day, *Behind TPG's audacious move into mobile market*, 13 April 2017 and Communications Day, *Vodafone reveals key plan of fixed NBN strategy: 4G backup to cover downtime*, 1 August 2017.

¹⁶ Belong is Telstra's budget retail brand which sells fixed line voice and broadband services (from 2013) and mobile phone services (from October 2017).

¹⁷ Roy Morgan Single Source (Australia), January to December 2016, n=31 727, Australian Households.

¹⁸ Roy Morgan Single Source (Australia), January to December 2016, n=42 961, 14+ Australian population.

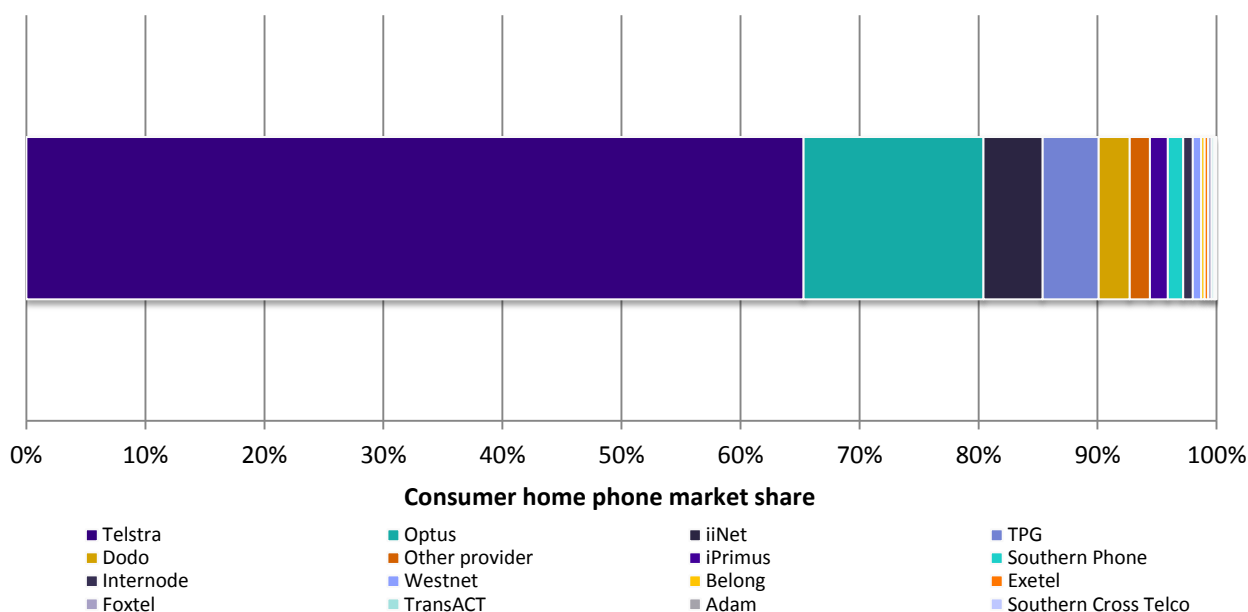
Telstra (including Belong) holds the largest share in the consumer voice services market for both fixed line (Figure 4.1) and mobile phone services (Figure 4.2) with 66 per cent and 41 per cent of the market respectively. Optus (including Virgin Mobile) is the second largest supplier of voice services with 15 per cent and 29 per cent in fixed line and mobile phone services respectively.

For fixed voice services, TPG captured the third largest share with 12 per cent of the market, followed by Vocus with four per cent market share in 2016.

In the market for mobile phone services, Vodafone has the third largest share with 19 per cent of the market.

The remainder of the mobile phone services market is supplied by MVNOs, with Amaysim and TPG having the largest number of subscribers.

Figure 4.1: Consumer home phone service provider market shares for 2016¹⁹

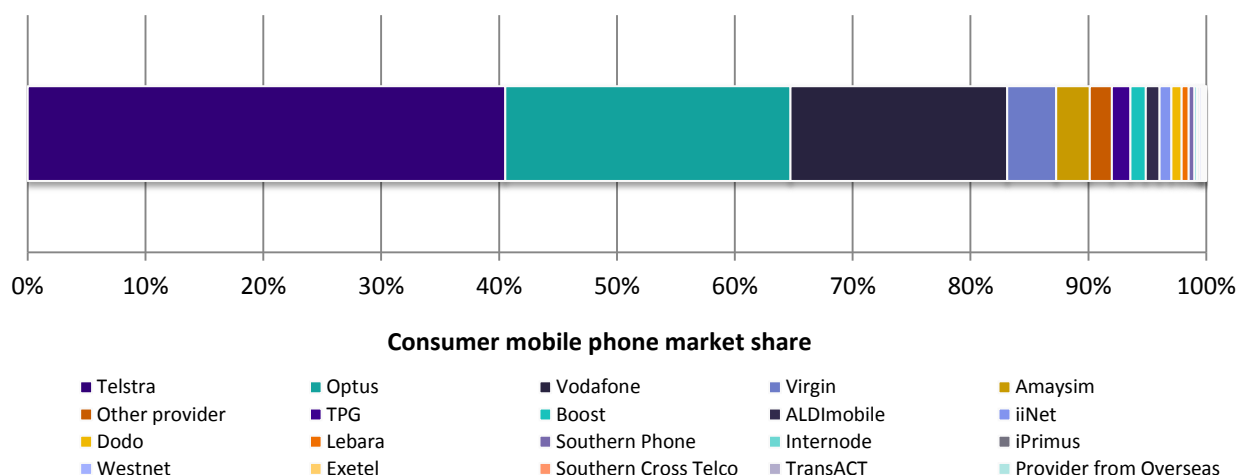


The fixed line market shares based on Roy Morgan Research are in line with the ACCC's 2015–16 reported market shares where the largest four service providers supplied 99 per cent of fixed voice services and the largest three service providers supplied 90 per cent of mobile services.²⁰

¹⁹ Roy Morgan Single Source (Australia), January to December 2016, n=31 727, Australian Households.

²⁰ Australian Competition and Consumer Commission (ACCC), [Telecommunications Report 2015–16](#), ACCC, 8 March 2017, p. 24 and p. 29.

Figure 4.2: Consumer mobile phone service provider market shares for 2016²¹



Using the market share data to establish Herfindahl-Hirschman Indexes (HHI)²² suggests that both the fixed line voice and mobile phone services market are relatively concentrated, with HHIs of around 4500 and 3100 respectively.

There are a large number of providers offering OTT communications services and as consumers typically use more than one app and provider, it is difficult to assess market shares. Furthermore, as these providers are typically international companies we do not have reliable information about the individual market shares of these service providers in Australia.

Market shares and concentration are one measure of the competitiveness of a market and may not reflect other features of competition such as price and non-price differentiation and choice for consumers. We discuss the extent of price and non-price competition in the following sections.

4.1.3 Price competition

There is strong price competition in the market with prices of both fixed line voice and mobile phone services declining in the last year.

Fixed line voice services

As previously reported by the ACCC, there has been a long-term decline in voice services prices with average real prices paid for fixed line voice services falling by 7.5 per cent in 2015–16²³, driven by a decline in the price of retail basic access services and fixed-to-mobile calls.²⁴

However, we note that there are few standalone fixed voice services available in the market as voice services are more commonly bundled with a broadband service, and often offer unlimited calls in these bundled plans. As a result, it is difficult to assess price competition for voice services where they are part of a bundled price given limited transparency about

²¹ Roy Morgan Single Source (Australia), January to December 2016, n=42 961, 14+ Australian population.

²² The HHI is a commonly accepted measure of market concentration, calculated by squaring the market share of each firm competing in a market and then summing the resulting numbers. The higher the market's concentration the less competition there is.

²³ ACCC, [Telecommunications Report 2015–16](#), p. 25.

²⁴ *ibid.*

the cost of each individual service. This is even more pronounced on the NBN where the focus is on broadband services rather than voice, with voice services most commonly offered as an add-on, whereas previously broadband services were sold as an add-on to voice.

An example of voice-only products available is shown in Table 4.1. These products include line-rental only plans with pay-as-you-go (PAYG) calls at various rates.

Table 4.1: Example of fixed line standalone voice plans²⁵

Service provider	Price	Call Inclusions	Call Prices			
			Local	National	Mobile	13/1300 numbers
Telstra	\$27.95	Nil—PAYG	30c/call	25c/min + 55c connection fee (\$3 call cap for first 3 hours—7pm to midnight)	36c/min + 55c connection fee (\$3 call cap for calls to Telstra mobiles for first 20 minutes—7pm to midnight)	40c/call
Optus	\$22	Nil—PAYG	30c/call	28c/min + 52c connection fee (\$2 call cap for calls up to 1 hour)	28c/min + 52c connection fee (\$2 call cap for calls up to 1 hour)	35c/call
Dodo	\$30	Nil—PAYG	25c/call	29c/min + 39c connection fee (\$1.95 call cap for calls up to 2 hours)	39c/min + 39c connection fee (\$1.95 call cap for calls up to 10 mins)	44c/call
Aussie Broadband*	\$29.95	Nil—PAYG	20c/call	20c/min + 39c connection (\$2 capped up to 20 mins)	36c/min + 39c connection (\$2 capped up to 20 mins)	40c/call
Southern Phone*	\$24.95	Nil—PAYG	25c	25c/min + 45c connection fee (\$1.98 cap for 1 hour)	37c/min + 45c connection fee (\$1.49 cap for 10 mins)	40c/call

* Plans for copper network only.

²⁵ Company websites, viewed on 22 September 2017.

Voice-only NBN plans

For consumers seeking a standalone voice service on the NBN there appears to be limited choice in terms of service provider and product options with the focus being on bundled services and standalone broadband.

Telstra and Optus offer voice-only plans for \$27.95 and \$22 per month, respectively, with pay-as-you-go calls. In contrast TPG only offers a bundled service on the NBN (12/1 Mbps) starting at \$29.99 per month with pay-as-you-go calls and 10 GB of data.

Telstra offers three other voice-only services with various call inclusions up to \$85 per month with unlimited local and national calls and calls to mobiles. This plan is at a similar price point to Telstra's bundled offers on the NBN (25/5 Mbps) which vary from \$80 (for 500 GB data) to \$90 (for 1000 GB data) with pay-as-you-go calls.

As a consequence of the decline in standalone voice products, the ACCC will be revising its price monitoring methodology for its future Telecommunications Reports to more accurately assess long-term price trends in the market.

Mobile phone voice and messaging services

Mobile phone services incorporate voice, messaging and broadband services, and as such prices discussed reflect all of these services.

The ACCC estimates that for 2016–17, average prices paid for mobile phone services decreased by 2.8 per cent in real terms and were accompanied by a 49 per cent average increase in data inclusions of mobile phone services.²⁶

This continued the long-term downward trend in the price of mobile phone services in Australia. Overall, the ACCC's mobile phone services price index has fallen by an average of 4.2 per cent annually since it commenced in 1997–98.²⁷

Price competition for mobile phone services is also reflected by the discounts offered by many service providers, for example, half price services for the first six months of a contract, first free month and/or bonus data inclusions.

As most mobile phone plans now offer unlimited national calls, price competition is increasingly focusing on international calls and roaming packages. For example, Vodafone currently offers a \$5 per day international roaming add-on with free international roaming in New Zealand, whereas Telstra and Optus currently offer international roaming services for \$10 per day. Telstra also includes roaming services in some mobile phone plans.

Price competition in SMS is also very strong and has seen most service providers move to offering unlimited SMS. In the past, SMS inclusions were typically limited by number of texts or dollar value (charged at 25 c/SMS).

Table 4.2 provides an example of current prices for mobile phone plans (SIM-only on a 12 month contract) to reflect the extent of price differentiation.²⁸

²⁶ ACCC estimates. Further price analysis will be made available in the ACCC Telecommunications Report 2016–17.

²⁷ ACCC, [Telecommunications Report 2015–16](#), p. 96.

²⁸ We have used SIM-only mobile phone plans as they reflect the cost of the voice and messaging service only, whereas other plans include the cost of a mobile phone device.

Table 4.2: An example of mobile phone plans (SIM-only on a 12 month contract)²⁹

Service provider	Price per month	Calls and SMS	Data Quota
Telstra	\$49	Unlimited calls and SMS nationally	10GB
Belong*	\$40	Incoming calls and SMS (Unlimited national voice and SMS—extra \$5 per month) (Unlimited national voice, SMS and international call pack—extra \$10 per month)	15GB
Optus	\$55	Unlimited calls and SMS nationally 400 minutes standard calls to selected countries	12GB
Vodafone	\$40	Unlimited calls and SMS nationally 150 minutes standard international calls to selected countries and 500 minutes to eligible countries	12GB
TPG*	\$24.99 (for 6 months, then \$39.99)	Unlimited calls and SMS nationally 100 minutes standard international calls	12GB
Virgin	\$40	Unlimited calls and SMS nationally \$200 standard international calls and texts	12GB
Amaysim*	\$40	Unlimited calls and SMS nationally Unlimited standard international calls to ten countries and 300 minutes to 22 countries	10GB

* No lock-in contract plans—12 month contracts not available.

OTT voice and messaging services

OTT voice and messaging services are typically free for a consumer to download but incur indirect ongoing costs of using the service. These include the cost of data used to deliver the service (which would likely be minimal given the current data quotas of plans) as well as the indirect cost of personal data being collected and sold by OTT service providers to advertising and other companies.

The entry of OTT voice and messaging services has provided some competitive pressure on traditional fixed and mobile voice and messaging services by providing consumers with a low cost alternative, and likely influenced the movement towards unlimited call and message inclusions for relevant services.

²⁹ Company websites, viewed on 2 October 2017.

4.1.4 Non-price competition

There is a degree of non-price competition in voice services, typically focused on call inclusions, contract length, bundle options, quality and coverage (for mobile services).

It is common for fixed voice services to be offered in a bundle with a fixed broadband service. Some fixed service providers also offer customers the option to include a mobile phone service and/or an entertainment/content service. For example, Southern Phone, offers consumers a choice of voice-only (fixed); voice and broadband bundle; voice, broadband and mobile; or voice and mobile. We discuss bundling further in section 4.2.

Mobile phone service providers compete on a number of different elements compared to fixed line voice services, for example, options for pre- or post-paid services, SIM-only (BYO mobile phone device), and options to bundle with a particular mobile phone device, which reflects the ability to differentiate with devices that is not possible for fixed line services. Some mobile voice service providers, such as Vodafone, offer consumers the option of customising their mobile phone plan and choosing a mix of inclusions they value the most, such as local and international call minutes, SMS and data, as well as Qantas frequent flyer points.

Mobile service providers also compete on service quality and network coverage. Telstra claims to reach 99.3 per cent of the population, followed by Optus which claims to reach 98.5 per cent and Vodafone which claims to reach around 97 per cent.³⁰ In 2017 all three MNOs announced further network investment to continue to improve their coverage, capacity and performance.

While MVNOs are able to differentiate on service quality and network coverage, this is dependent on their individual commercial agreements with one of the three mobile network operators. MVNOs may have access to either the 3G or 4G networks and in some cases their coverage may be less than that of the mobile network operator. For example, of the MVNOs that use Telstra's mobile network, only Boost Mobile has an agreement for equivalent 4G coverage to Telstra's retail customers.

4.1.5 Competitive constraints

There is some competitive constraint within the voice services market between fixed line and mobile voice services, as well as from other communications services such as messaging (SMS and OTT).

According to Roy Morgan Research, in 2016, 95 per cent of the Australian population had one or more mobile phones.³¹ In comparison, fixed line home phone ownership continued to decline, falling to 68 per cent of Australian households in 2016 from 74 per cent in 2013.³² However, there may be an even lower incidence of home phone ownership as we know that, anecdotally, many consumers only purchase a fixed home phone because it is bundled with a fixed broadband service, and rarely use the home phone.

The declining use of fixed line phone services is mirrored by an increasing number of Australians who rely only on their mobile phone for voice services. In 2016, 33 per cent of Australians relied only on a mobile phone, compared to 25 per cent in 2013.³³

³⁰ Australian Competition and Consumer Commission (ACCC), [Domestic mobile roaming declaration inquiry final report](#), ACCC, October 2017, p. 5.

³¹ Roy Morgan Single Source (Australia), January to December 2016, n=50 144, 14+ Australian population.

³² Roy Morgan Single Source (Australia), January to December 2013, n=25 830 and January to December 2016, n= 50 144, Australian Households.

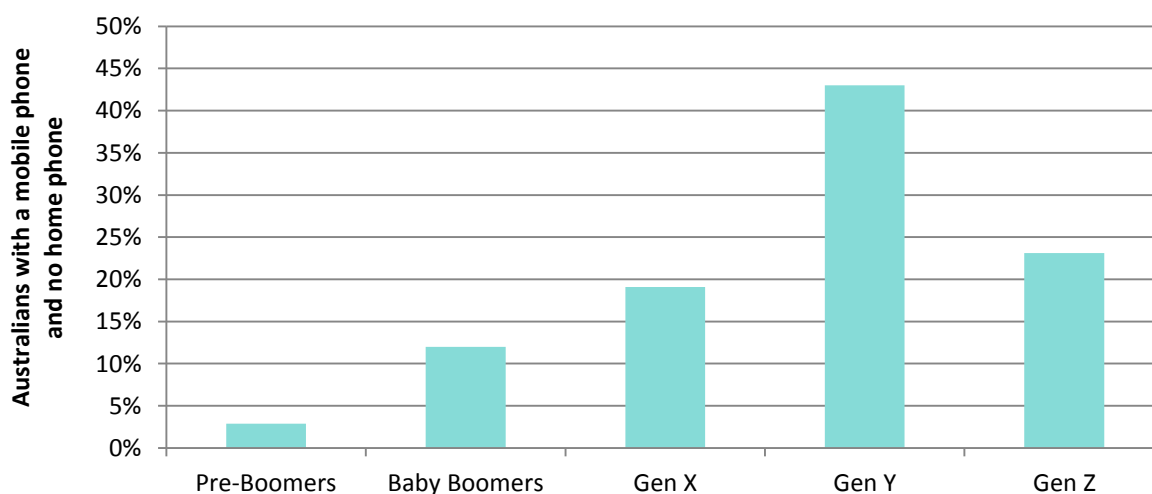
³³ Roy Morgan Single Source (Australia), January to December 2013, n=6568 and January to December 2016, n= 15 854, 14+ Australian population.

Voice services supplied over mobile networks are now of a comparable service quality to those on fixed line networks and satisfy consumer demand for continuous connectivity that fixed line services cannot. This, together with the reduction in price differences between fixed line and mobile services, has led to increasing substitution to mobile voice services from fixed line where the coverage is reliable.

However, substitution of mobile voice for fixed line voice varies amongst different consumer segments. For example younger generations are more likely to be mobile phone only users than older generations, as shown in Figure 4.3. Furthermore, full substitution from fixed line to mobile voice may also be influenced by the limited number of service providers offering reliable network coverage in regional and remote areas with Telstra the only MNO having coverage in some areas.

As noted in the ACCC’s *Domestic Mobile Roaming Declaration Inquiry Final Report*, consumers who require or value coverage in areas where only Telstra has coverage have limited choice of provider. However, they do benefit from competition in the national market through nationally consistent prices and can access Boost Mobile (an MVNO that uses Telstra’s network), as a cheaper alternative to Telstra.³⁴ Moreover, consumers that do have a choice of provider, they typically have regard to a range of factors other than geographic coverage, such as quality of service, when choosing their service provider³⁵ This is reflected in Roy Morgan Research, which shows that of those Australians who switched mobile phone service provider in the last 12 months (for 2016), the top two reasons for switching were related to price (cheaper rates—44 per cent) and data inclusions (bigger data allowance—34 per cent), rather than coverage.³⁶

Figure 4.3: Mobile phone only users by generation for 2016³⁷



OTT communications services

Fixed and mobile voice services face some competitive constraint from OTT voice services, such as Skype and WhatsApp, which offer voice services through an app and do not directly charge consumers for calls. We consider it is likely that these OTT offerings influenced the move to unlimited call inclusions on fixed and mobile voice plans, as well as contributing to

³⁴ ACCC, [Domestic mobile roaming declaration inquiry final report](#), p. 52.

³⁵ *ibid.*, p. 55.

³⁶ Roy Morgan Single Source (Australia), January to December 2016, n=1011, 14+ Australian population.

³⁷ Roy Morgan Single Source (Australia), January to December 2016, n=16 227, 14+ Australian population. Pre-Boomers (pre-1946), Baby Boomers (1946–1960), Gen X (1961–1975), Gen Y (1976–1990), Gen Z (1991–2005).

the ongoing decline in international call rates and increase in international minute inclusions. However, we note there are technical limitations such as the lack of any-to-any connectivity between different apps and the inability to call 13/1300/1800 numbers or make emergency calls (with the exception of Skype), that mean OTT voice services are unable to offer the same level of functionality as traditional voice services. Overall, we consider OTT voice services provide some constraint on fixed and mobile voice services but the variance in functionality may restrict substitution between these services for some consumers.

Voice services in general also face competition from non-voice services with some consumer segments increasingly substituting voice services for messaging services (OTT and SMS) (both fixed and mobile). For example, Deloitte reports that as of mid-2016, 27 per cent of mobile consumers claimed to have not made any standard voice calls in a given week, compared to 23 per cent in 2015. The majority of mobile consumers (88 per cent) preferred to use text messaging as their regular method of communication.³⁸

The degree of substitution between voice and messaging is highly dependent on consumer preferences for communication style (voice or text) and the urgency of the required response, where voice is a real-time response and messaging can be delayed.

The messaging services market itself has also been disrupted by the entrance of OTT communication service providers with most service providers now offering unlimited SMS and some international SMS inclusions in an effort to compete with OTT services.

4.1.6 Overall assessment of competition

There is evidence of reasonably effective competition in the supply of voice and messaging services to consumers, demonstrated by the ongoing price reductions, product innovation and differentiation in non-price terms and conditions.

Despite this competition, the market remains highly concentrated with large vertically and horizontally integrated service providers continuing to capture most of the voice services market across both fixed line and mobile networks.

Draft finding

There is reasonably effective competition in the voice and messaging services market despite considerable concentration in the market, with consumers benefiting from ongoing price reductions, product innovation and differentiation in non-price terms and conditions.

As set out section 3.2.2, there is regulation in place to promote competition in this market by providing access to Telstra's copper network infrastructure. Regulation of originating and terminating access services for fixed voice services and terminating access services for mobile voice services is in place to ensure any-to-any connectivity across networks and to prevent emergence of barriers to entry due to network effects of dominant service providers.

Regulation of access to Telstra's copper network will cease once the network is no longer used to supply services and is de-commissioned. However, the need for regulation of originating and terminating access services will continue. These regulations are independent of the underlying network technology and are needed to prevent large service providers from exploiting network effects. Similarly, the regulation of terminating voice access services for mobile networks will need to continue.

³⁸ Deloitte, [The rise of the data exclusive](#), TMT Predictions, 2016.

Proposed action 1

We will review our competition and price monitoring activities to ensure that they appropriately capture the evolution of voice and messaging services and report on this in our annual telecommunications report.

Competition from OTT communications services in both voice and messaging services has influenced price reductions and increased inclusions as traditional service providers seek to compete with 'free' OTT services.

However, the extent of substitution from traditional voice services to OTT voice services is limited by technical shortfalls, such as any-to-any connectivity, and consequently we do not consider OTT services to be full substitutes for voice services at this time. As a result, there is no basis for requiring equivalent regulatory treatment, particularly as generally there is no equivalent originating or terminating function.

We consider that OTT messaging services provide a competitive constraint on SMS messaging services, and in some cases they also have significant network effects, such as Facebook Messenger and WhatsApp. However, with the exception of the regulation of the SMS terminating service, SMS services have not been the subject of regulation and as such, there is no basis for requiring equivalent regulatory treatment of OTT messaging services at present.

Proposed action 2

We will examine the messaging services market to determine the need for ongoing regulation of SMS termination services in our next regulatory review of the mobile terminating access service.

4.2 Broadband services

Broadband services are now considered an essential rather than a discretionary service with consumers heavily reliant on the internet to carry out every day activities and access basic services. Broadband services also support a range of other services such as OTT communications and content services, the Internet of Things, cloud services and more, which are discussed in sections 4.8 to 4.11. This section focuses on broadband services supplied to residential consumers.

Broadband services are supplied over a number of different network technologies including legacy fixed line (copper and HFC), fibre (NBN and non-NBN), mobile, fixed wireless (NBN and non-NBN) and satellite (NBN). Broadband services are typically categorised as fixed line or wireless with fixed line broadband services delivered over legacy fixed line networks and fibre networks, and wireless broadband services delivered over mobile networks and fixed wireless networks.

As with voice services, the distinction between fixed line and wireless services is increasingly blurred as consumers demand seamless, ubiquitous internet connectivity, disregarding the underlying network technology.

Consumers are also downloading increasing amounts of data, driven largely by consumption of video streaming services and connecting more devices to the internet. Data use is expected to continue to grow exponentially as more bandwidth intensive applications and services are introduced and adopted.

In response to increasing demand, we have seen data inclusions for broadband services steadily increase, with many fixed broadband plans now offering unlimited data quotas.

The transition to next-generation fibre networks, predominantly the NBN, is also facilitating greater data downloads with higher speed broadband services available. This transition is part of a fundamental structural change in the industry as the incumbent vertically integrated service provider (Telstra) is replaced with a wholesale only network operator (NBN Co), creating a separated supply chain and encouraging a level playing field for service providers.

In the move to the NBN, we have seen both consolidation as some service providers such as TPG and Vocus seek to build scale by acquiring or merging with smaller providers, as well as the entry of new service providers, including international providers.

4.2.1 Market structure and service providers

The market structure and identity of service providers supplying broadband services are broadly the same as those for voice and messaging services.

At present, the majority of broadband services are supplied to consumers over the legacy networks, the NBN and the mobile networks. Some service providers supply broadband services over all of these networks. The different network technologies are discussed further in section 4.3.

The large service providers, Telstra, Optus, TPG and Vocus, are vertically integrated in the supply of fixed line broadband (excluding the NBN access network), as is Vodafone in relation to the supply of mobile broadband. Telstra and Optus are also horizontally integrated, supplying mobile services on their own networks.³⁹ TPG and Vodafone have announced that they will be entering the mobile and fixed line markets respectively, adding to the extent of horizontal integration in these markets.

As with voice services, many smaller service providers acquire wholesale services in order to supply fixed and mobile services, which are discussed in section 4.3 and 4.4.

The transition to the NBN has encouraged the entry of many new service providers with around 150 service providers listed on NBN Co's website as supplying broadband services on the NBN.

Wireless broadband services are provided by MNOs and MVNOs as well as fixed wireless service providers. These products include mobile phone broadband, mobile broadband on tablets, home wireless broadband with a modem, and fixed wireless broadband.⁴⁰

4.2.2 Market shares

As for the voice and messaging services market, there is currently a high degree of concentration in the supply of fixed and mobile phone broadband services, taking into account the ownership of retail brands and subsidiaries.

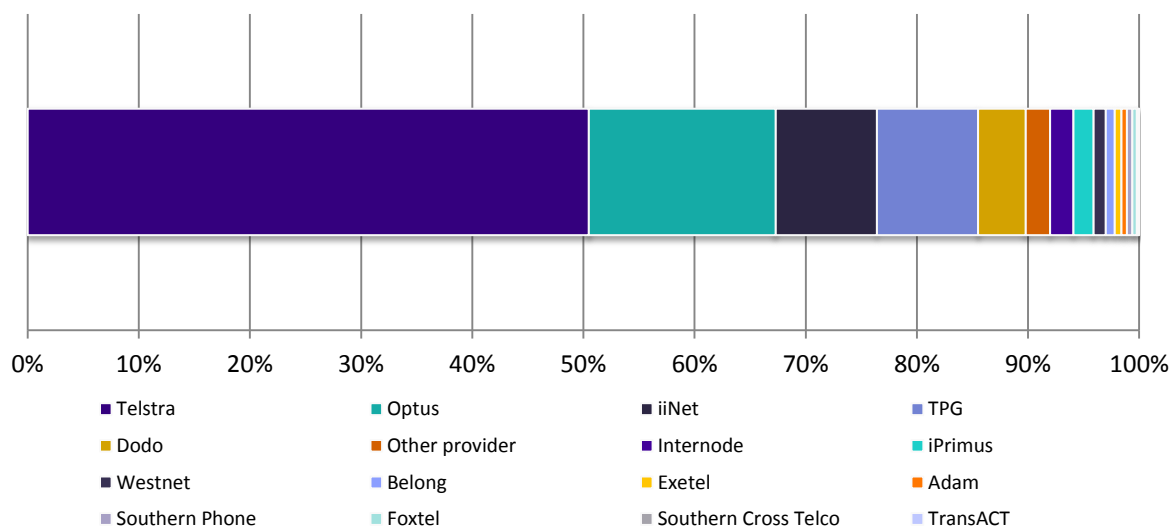
According to Roy Morgan Research, the overall shares for the consumer fixed broadband market in 2016 are similar to the consumer fixed voice services market, with four large service providers supplying around 96 per cent of the market. Telstra (including its low cost brand, Belong) has 51 per cent market share overall, as shown in Figure 4.4, followed by TPG with 22 per cent, Optus with 17 per cent and Vocus with six per cent market share.⁴¹

³⁹ Telstra and Optus both own and operate their own mobile networks and legacy fixed line HFC networks. Telstra also owns and operates the legacy fixed line copper network. On the NBN, Telstra and Optus are service providers and acquire wholesale services from NBN Co.

⁴⁰ Fixed wireless typically uses an antenna attached to a premise.

⁴¹ Roy Morgan Single Source (Australia), January to December 2016, n=43 317, Australian Households.

Figure 4.4: Consumer fixed broadband service providers market shares for 2016⁴²



Roy Morgan Research shows a slight difference in market shares between the different fixed networks—NBN, ADSL and HFC—as shown in Table 4.3 and Figure 4.5.⁴³

Table 4.3: Consumer fixed broadband market shares by group for 2016⁴⁴

Network	Telstra (inc. Belong)	TPG Group ⁴⁵	Optus	Vocus Group ⁴⁶	Others
ADSL	51%	25%	13%	7%	4%
NBN	51%	22%	15%	6%	6%
HFC	55%	6%	37%	1%	1%
Overall	51%	22%	17%	6%	4%

⁴² Roy Morgan Single Source (Australia), January to December 2016, n=43 317, Australian Households.

⁴³ Noting that over time consumers are transitioning off legacy ADSL and HFC networks onto the NBN or other networks.

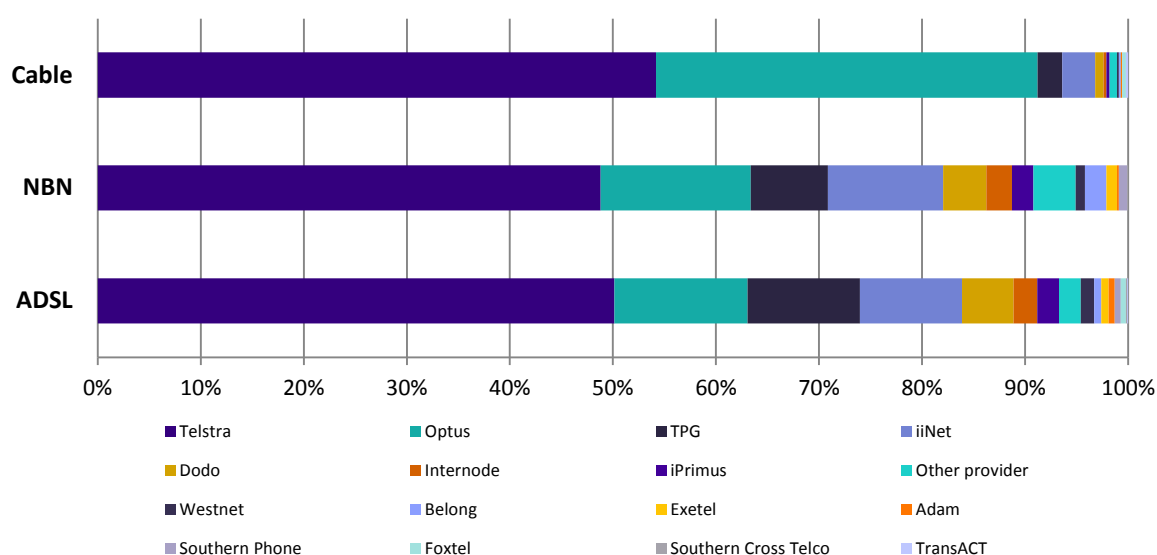
⁴⁴ Roy Morgan Single Source (Australia), January to December 2016, n=30 025, Australian Households.

⁴⁵ TPG Group includes Adam Internet, iiNet, Internode, TPG, TransACT and Westnet.

⁴⁶ Vocus Group includes Dodo, iPrimus and Southern Cross Telco.

In 2016, the market for broadband services on the NBN was slightly more competitive than the ADSL or HFC networks in terms of retail market distribution.

Figure 4.5: Market shares for fixed broadband services by network for 2016⁴⁷



On the NBN, Telstra, TPG Group, Optus and Vocus Group accounted for approximately 94 per cent of the market compared to 96 per cent on ADSL and 99 per cent on HFC.⁴⁸ Accordingly, the ‘other’ service providers accounted for six per cent of market share on the NBN, compared to four per cent on ADSL and one per cent on HFC. These other service providers include Exetel, Foxtel, Southern Phone, Active8me, SkyMesh, Aussie Broadband and MyNetFone.⁴⁹

At a high level, the Roy Morgan Research market shares are similar to those previously reported by the ACCC for 2015–16 where the four large service providers had 90 per cent market share.⁵⁰ There are, however, some differences in individual market shares due to the different methodologies employed. We consider that Roy Morgan Research provides useful additional information about the overall retail fixed line broadband market.

Using these market shares to establish HHIs suggests there is a degree of concentration in the supply of fixed broadband services with a HHI in the range of 2700 to 3500 depending on the data source for the market shares.⁵¹

Market shares for mobile phone broadband services are based on the mobile phone market shares and consequently are the same as the voice services market given these services are sold together (see Figure 4.2 in section 4.1).

In 2016, according to Roy Morgan Research, Telstra captured the largest share of the market with 44 per cent, Optus had 29 per cent and Vodafone had 19 per cent. Overall, these three mobile phone service providers accounted for 91 per cent of the mobile phone

⁴⁷ Roy Morgan Single Source (Australia), January to December 2016, n=30 025, Australian Households.

⁴⁸ We note that the HFC market is predominantly supplied by Telstra and Optus using on their own networks.

⁴⁹ Some of the ‘other’ service providers listed by respondents to Roy Morgan Research survey for 2016.

⁵⁰ ACCC, *Telecommunications Report 2015–16*, p. 4.

⁵¹ The lower HHI reflects the previously reported ACCC market shares, given Telstra has a relatively lower market share compared to that from the Roy Morgan Research data.

services market. The remainder of the market is supplied by MVNOs, of which Amaysim and TPG have the largest shares.⁵²

As noted in section 4.1, these market shares are very similar to those reported by the ACCC for 2015–16 and result in a HHI of around 3100, suggesting a relatively concentrated market.

We do not have sufficient information about mobile broadband, non-NBN fixed wireless and non-NBN fixed line broadband services to comment on market shares of relevant service providers.

4.2.3 Price competition

We have considered the level of price competition in the supply of different broadband services to compare like-for-like products, including broadband services on the NBN, legacy fixed line services and wireless services.

Broadband services delivered on the NBN

There is currently a significant degree of price competition in the market for broadband services delivered on the NBN. However, this level of price competition may not be sustained over time as service providers are currently competing for market share during the transition to the NBN. The market is also relatively immature with only half the NBN rollout complete. We will continue to monitor price competition on the NBN once the rollout is complete to better understand longer term price trends.

The ACCC estimates that the average prices paid for broadband services on the NBN in 2016–17 decreased by six per cent. Overall, for all fixed internet services, the ACCC estimates that data inclusions increased by 41 per cent.⁵³ At present there are many new entrants seeking to attract customers on the NBN with special offers and discounts. For example, Amaysim, a previously mobile-only service provider, currently advertises a broadband plan on the NBN with 12/1 Mbps and unlimited data for \$40 per month for the first six months, discounted from \$60 per month.

Figure 4.6 further illustrates the spread of current prices for various service providers supplying broadband services on the NBN for different data quotas and speed tiers. As shown, most of the product offerings fall within the \$40 to \$80 per month range. Interestingly, across the different speed tiers (12/1, 25/5, 50/20 and 100/40 Mbps) there are small and unlimited data quota plans offered at similar price points. We also note that the majority of base level NBN plans include 12/1 or 25/5 Mbps with higher speeds available for an additional monthly surcharge.

⁵² Roy Morgan Single Source (Australia), January to December 2016, n=42 961, 14+ Australian population.

⁵³ ACCC estimates. Further price analysis will be made available in the ACCC Telecommunications Report 2016–17.

Figure 4.6: NBN plans from various service providers for 12/1, 25/5, 50/20 and 100/40 Mbps⁵⁴

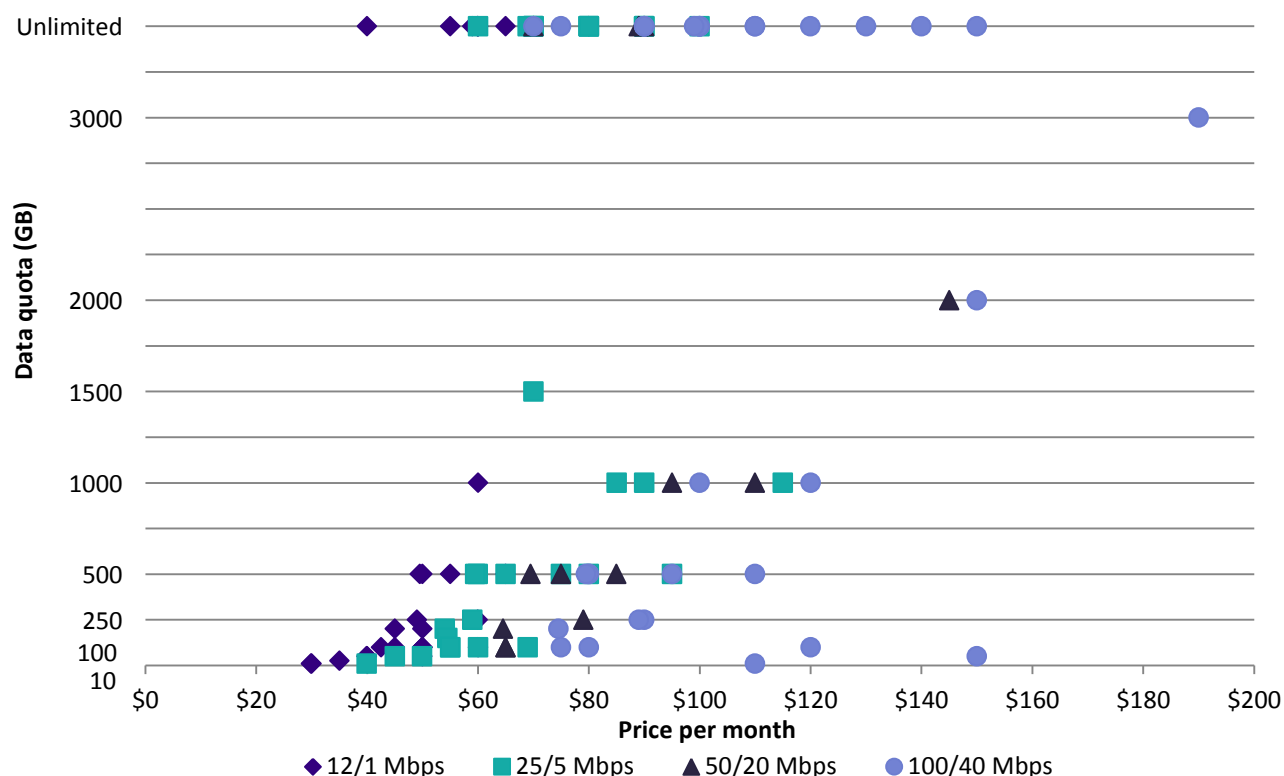
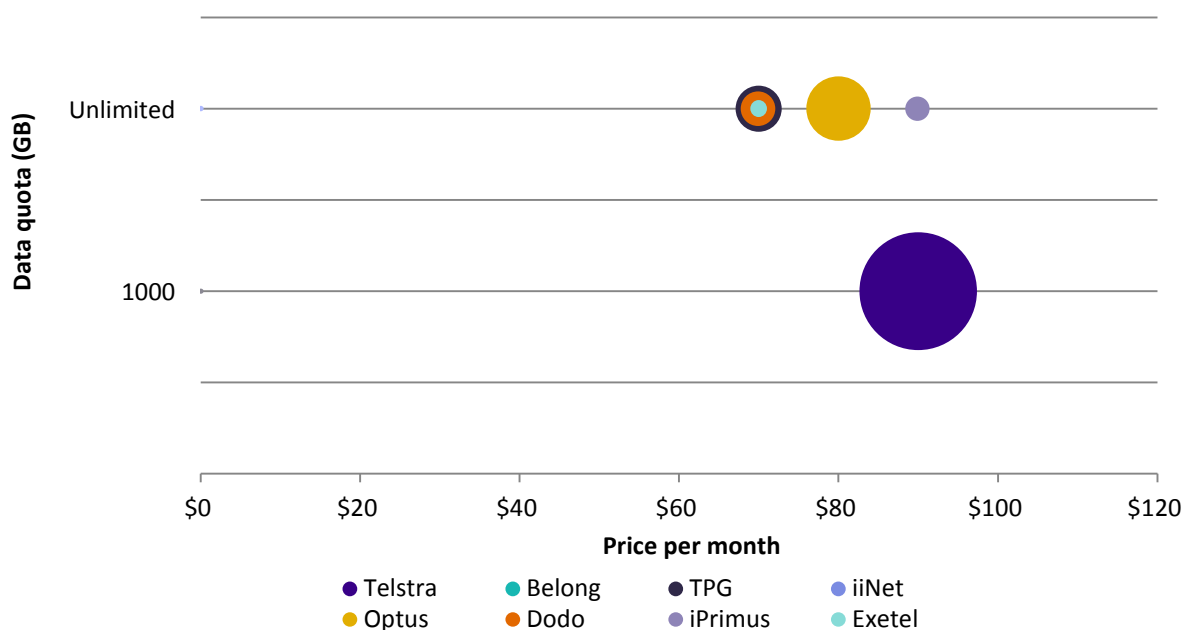


Figure 4.7: Example of market segmentation in the supply of NBN broadband services⁵⁵



Legacy fixed line broadband services

The ACCC estimates that average prices for ADSL and HFC services fell in real terms in 2016–17 by 11.2 per cent and data inclusions for all fixed internet services increased by 41 per cent.⁵⁶ This continued the long-term decrease in these prices which has reflected the concurrent fall in the average cost of supplying the services over the copper network.⁵⁷

Most service providers are now offering ‘NBN-ready’ broadband plans, with equivalent price terms and inclusions irrespective of the underlying fixed network (ADSL or NBN). As a result, current price competition for ADSL broadband services is increasingly mirroring that for broadband services on the NBN at lower speed tiers.

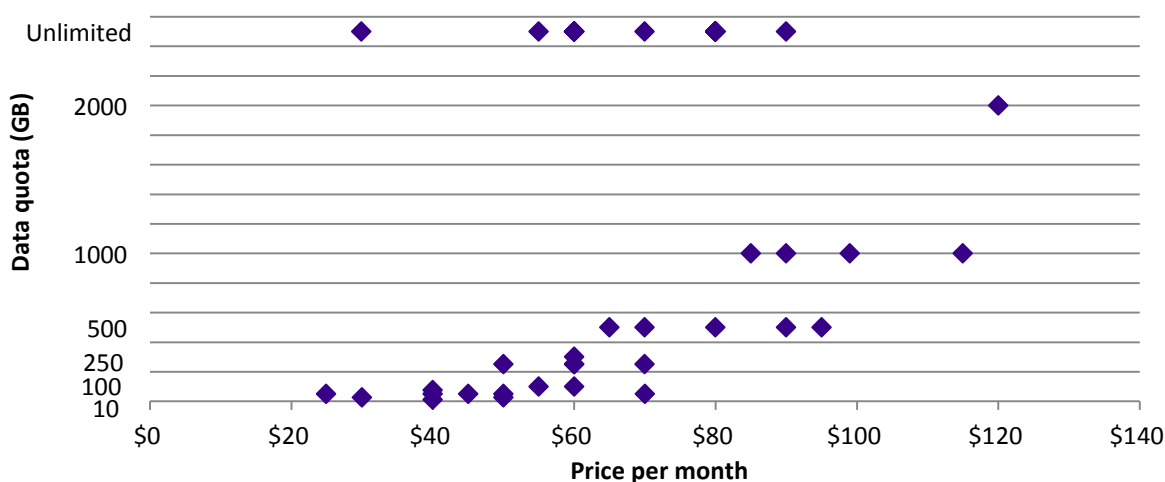
Figure 4.8 shows a comparison of current prices for ADSL services for various service providers.

⁵⁵ Company websites, viewed on 2 October 2017 and Roy Morgan Single Source.

⁵⁶ ACCC estimates. Further price analysis will be made available in the ACCC Telecommunications Report 2016–17.

⁵⁷ ACCC, [Telecommunications Report 2015–16](#), p. 5.

Figure 4.8: Example of current ADSL broadband plans and prices⁵⁸



Non-NBN fibre broadband services

Non-NBN fibre broadband services are supplied to consumers by service providers using networks built and owned by network operators such as OptiComm, OPENetworks, RedTrain or LBN Co, typically in apartment buildings or new housing estates or developments. TPG also supplies wholesale and retail services using its own FTTB network to some apartment buildings.

For service providers who use both the NBN and non-NBN fibre networks, such as Exetel, retail non-NBN fibre broadband services are typically offered for the same price as retail broadband services supplied over the NBN, with equivalent speed tiers and data inclusions.

Wireless broadband services

In this section we discuss price competition for mobile phone broadband, mobile broadband (tablet and modem), and fixed wireless broadband services.

Price competition in mobile phone services is strong, as discussed in section 4.1, with the average prices paid for mobile phone services (including both voice, messaging and broadband services) decreasing in 2016–17 by 2.8 per cent in real terms, continuing a long-term downward trend in prices.⁵⁹

However, there is a notable variance in prices offered by the three mobile network operators and dominant mobile service providers—Telstra, Optus and Vodafone. For example, for SIM-only mobile phone plans, Telstra has five different plans on offer, Optus has seven and Vodafone has 15 plans. Each of these contain different inclusions and special offers, for example, Vodafone currently offers Qantas frequent flyer points with some of its mobile plans whereas Telstra and Optus offer unmetered live sports viewing such as AFL, NRL and netball (Telstra) and English Premier League (Optus).⁶⁰

Table 4.4 shows an example of mobile phone SIM-only plans for these service providers at different data levels and the price premium over the cheapest plan. The cheapest plan for each data inclusion is highlighted.⁶¹

⁵⁸ Company websites, viewed on 22 September 2017.

⁵⁹ ACCC estimates and ACCC, [Telecommunications Report 2015–16](#), p. 96.

⁶⁰ Company websites, viewed on 10 October 2017.

⁶¹ We note that some of these plans may be discounted or include bonus data and they also have various other inclusions such as international minutes and entertainment offers that differ by service provider.

Despite the price competition in the market, Telstra is able to maintain a price premium over its competitors while also capturing the greatest market share. We note that Telstra has also recently launched mobile services targeting price conscious customers through its budget brand Belong.

This reflects similar market segmentation that is occurring in the market for broadband services on the NBN with Telstra being able to charge a premium for its mobile phone products compared to its largest rivals.

Table 4.4: Example of price premium in mobile phone services for 12 month SIM-only plans⁶²

Service provider	Price per month	Price premium on cheapest offer
2GB		
Telstra	\$39	56%
Optus	\$25	
Vodafone	\$30	20%
15GB		
Telstra	\$59	48%
Optus	\$40	
Vodafone	\$50	25%
20GB		
Telstra	\$79	32%
Optus	\$70	17%
Vodafone	\$60	
30GB		
Telstra	\$99	24%
Vodafone	\$80	

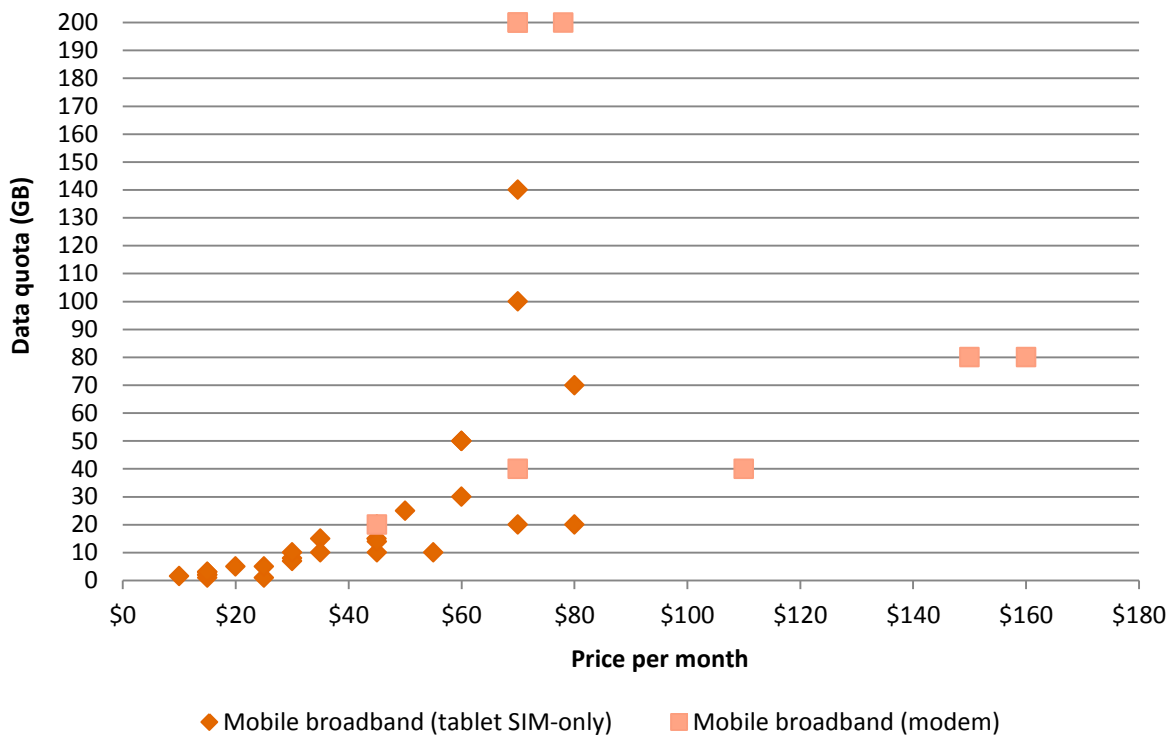
For mobile broadband the average prices paid decreased by 7.8 per cent in real terms, accompanied by an 82 per cent increase in the average data inclusions in 2016–17.⁶³

Figure 4.9 shows current prices for mobile broadband plans for tablets (SIM-only) and home mobile broadband services that use modems. Both of these products use mobile networks to supply broadband services.

⁶² Company websites, viewed on 22 September 2017.

⁶³ ACCC estimates. Further price analysis will be made available in the ACCC Telecommunications Report 2016–17.

Figure 4.9: Example of current mobile broadband plans (tablet SIM-only and modem)⁶⁴

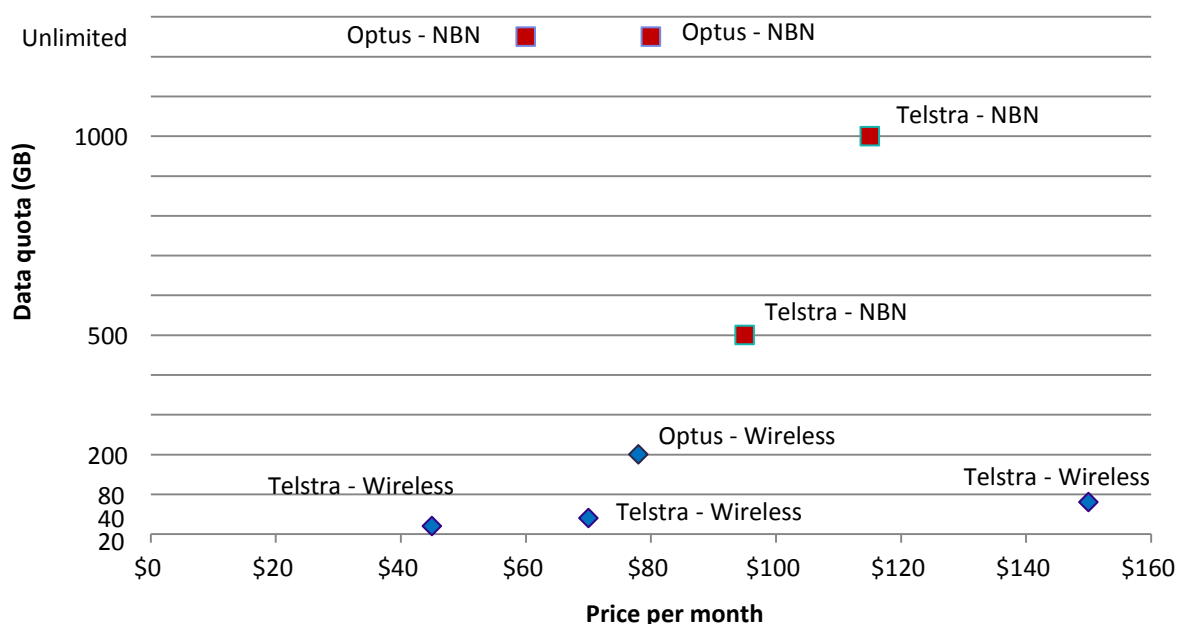


We have observed increasing alignment of wireless broadband services with fixed line services, particularly for mobile broadband services that use a modem.

As shown in Figure 4.10, the price of wireless home broadband services for Telstra and Optus is comparable to their current offerings of broadband services on the NBN. However, in general the amount of data included for wireless offerings continues to be significantly less than the typical data inclusions for fixed line plans. As shown in Figure 4.10 wireless plans typically provide less than 200 GB per month, whereas fixed line plans typically provide 500 GB or more, with many now offering unlimited data. This variance in data quota may limit the substitutability of wireless for fixed line broadband at present for most consumers.

⁶⁴ Company websites, viewed on 22 September 2017.

Figure 4.10: Home wireless and NBN broadband plans offered by Telstra and Optus⁶⁵



Wireless broadband services are also supplied using fixed wireless networks, which use a point-to-point signal transmission through the air rather than through copper or fibre. Fixed wireless services typically require an antenna or dish to be installed at a customer premises and proximity to a fixed wireless tower. Fixed wireless services can operate using licensed spectrum bands or using class-licensed spectrum for Wi-Fi networks. Fixed wireless services are often deployed where fixed line infrastructure is not yet available or is not cost effective to deploy given low population density.

NBN Co uses fixed wireless technology as part of its multi-technology mix to service customers in regional and rural areas. Up to 6 per cent of premises will be connected to NBN fixed wireless services, which could be up to 720 000 premises.⁶⁶ Service providers supply fixed wireless broadband services on the NBN for the same price as NBN fixed line broadband services, and as such, these prices are captured in the discussion above about price competition on the NBN.

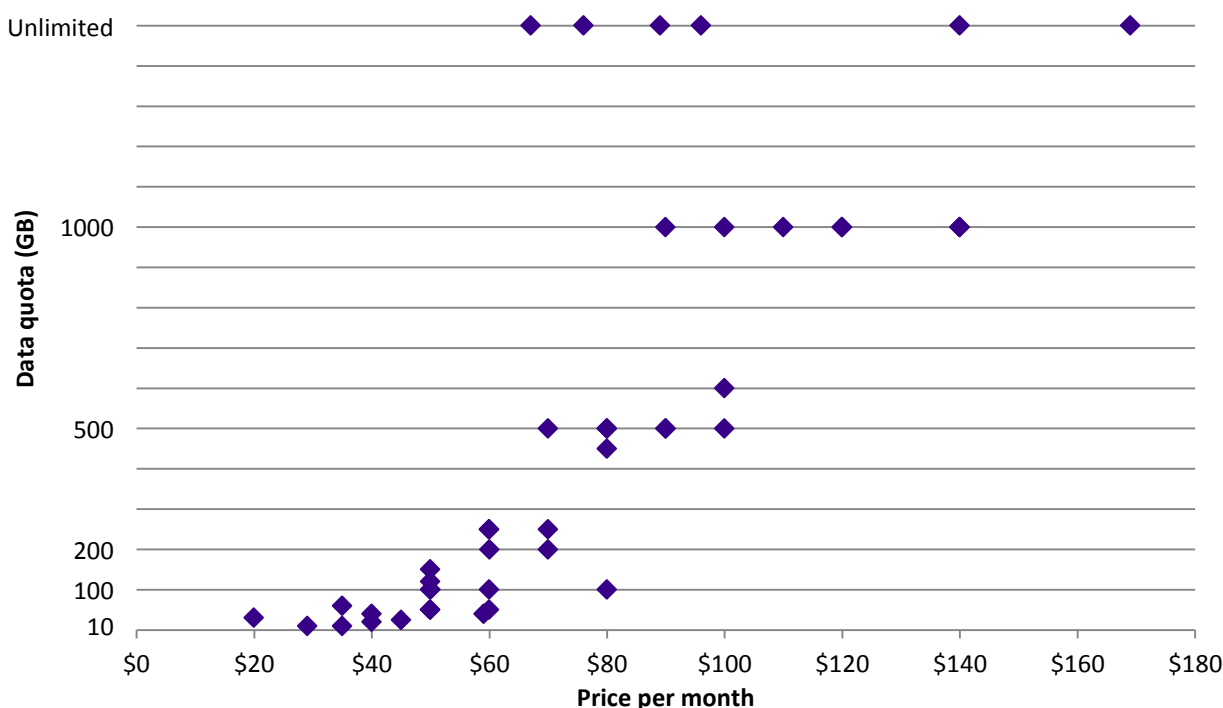
Fixed wireless services are also supplied by non-NBN network operators who are typically vertically integrated and operate in specific geographic areas.

A comparison of current fixed wireless broadband services supplied over non-NBN networks is shown at Figure 4.11. These services are largely offered at similar prices to fixed line broadband services for various speeds but there are fewer plans available with larger data quotas.

⁶⁵ Company websites, viewed on 22 September 2017.

⁶⁶ Whistle Out, [NBN Fixed Wireless: Everything you need to know](#), 1 August 2017, viewed on 22 September 2017.

Figure 4.11: Comparison of current prices of non-NBN fixed wireless broadband services⁶⁷



4.2.4 Non-price competition

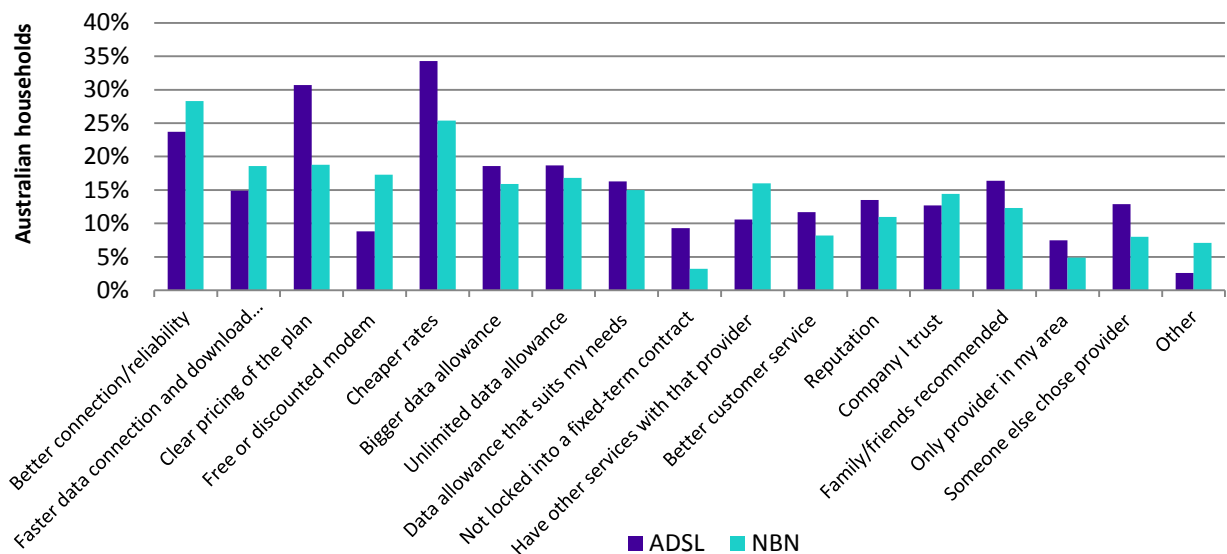
Non-price competition for broadband services across all network technologies continues to focus on data quotas, bundling, coverage and contract length, with some service providers seeking to further differentiate on factors including speed, service quality and options for consumers to customise their service. We discuss each of these factors below.

At this stage, there appears to be limited focus on differentiation by speed, service quality and performance despite the enhanced technological capabilities offered by the fibre networks. However, Roy Morgan Research suggests that consumers may be starting to value these features more when choosing a fixed broadband service provider. As shown in Figure 4.12, of those Australian households who entered the fixed broadband market for the first time in the last 12 months, in 2016, for broadband services on the NBN, ‘better connection/reliability’ was the most common reason for choosing a service provider. Whereas for households with ADSL services, ‘cheaper rates’ was the most popular reason, reflecting the focus on price competition over non-price factors.⁶⁸

⁶⁷ Company websites, viewed on 22 September 2017.

⁶⁸ Roy Morgan Single Source (Australia), January to December 2016, n=439, Australia Households.

Figure 4.12: Reasons for choosing current fixed line broadband service provider (new entrant consumers) in last 12 months for 2016⁶⁹



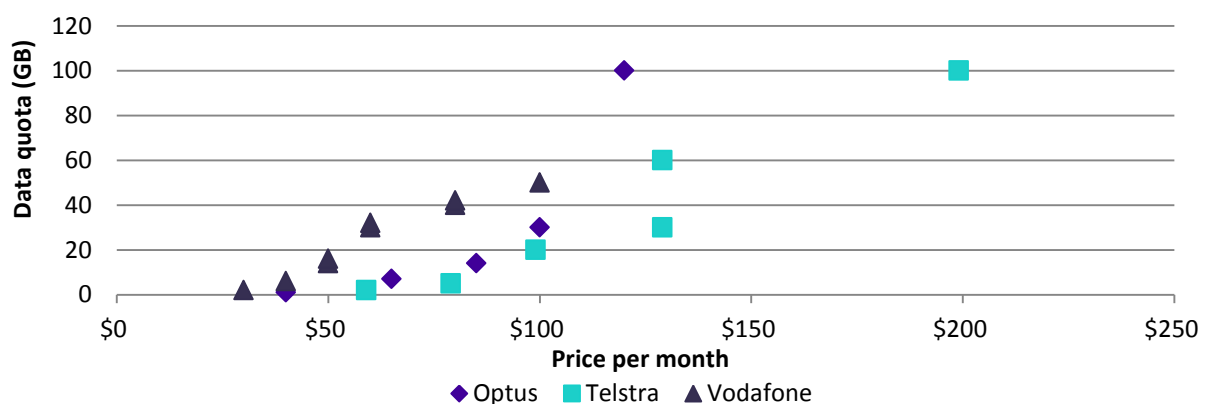
Data quotas

Across all broadband services, fixed and wireless, data quotas have increased substantially in recent years, with most fixed broadband service providers now offering unlimited data plans.

The ACCC estimates that data quotas on mobile phone services increased by 49 per cent in 2016–17, but they still remain significantly lower than those for fixed line broadband services and are significantly below average fixed line data usage of the majority of households.⁷⁰

However, this may soon change as the release of the iPhone 8 and X has prompted mobile service providers such as Telstra and Optus to offer mobile phone plans (with phone handset) with up to 100 GB of included data and Vodafone offering up to 50 GB, as shown in Figure 4.13. In comparison, most MVNOs offer data inclusions under 20 GB.

Figure 4.13: Comparison of mobile phone plans (with phone) for Telstra, Optus and Vodafone⁷¹



⁶⁹ Roy Morgan Single Source (Australia), January to December 2016, n=439, Australia Households.

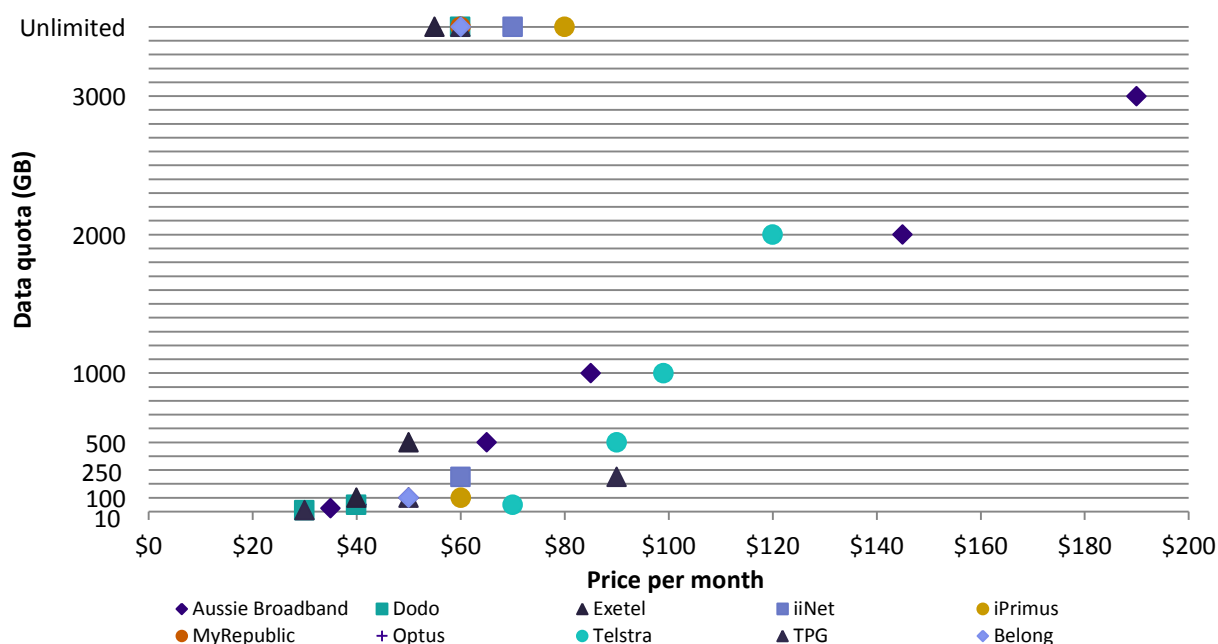
⁷⁰ ACCC estimates.

⁷¹ Company websites, viewed on 22 September 2017.

Competition around data quotas for fixed line broadband has focused on volume rather than variety, with many service providers offering only a few options of data quotas. For example, Optus and MyRepublic exclusively offer unlimited data on fixed line broadband plans. Where smaller data quotas are offered, in many cases they are at a similar price level to large data quotas, as shown in Figure 4.14.

It appears there may not be sufficient options in the market to meet a range of consumer needs at affordable prices, such as price conscious consumers who use little data. There may be some options for this consumer segment in terms of mobile broadband services; but these may not suit the needs of consumers seeking a product equivalent to current fixed line offerings.

Figure 4.14: Example of data quota variation for different fixed broadband service providers⁷²



Bundling

In recent years, multi-product offerings and bundling has intensified with a focus on bundling fixed broadband services with other communications services such as fixed voice services, mobile services and entertainment/content services.

According to Roy Morgan Research almost half of Australian households in 2016 used the same service provider for their home phone and fixed broadband, as shown in Table 4.5, a notable increase from 2013.

⁷² Company websites, viewed on 2 October 2017.

Table 4.5: Australian households with the same service provider for multiple services for 2016 and 2013⁷³

Services	Home Phone and Fixed Broadband (% of Australian Households)	Home Phone, Fixed Broadband and Mobile Phone (% of Australian Households)
2016	42%	23%
2013	38%	20%

Of those households that bundled their home phone and fixed broadband, 63 per cent are with Telstra, 18 per cent are with Optus, 13 per cent are with TPG/iiNet and 6 per cent are with Dodo.⁷⁴ In addition, almost a quarter of Australian households bundle their home phone, fixed broadband and mobile phone services, with 76 per cent being with Telstra, 19 per cent with Optus, 4 per cent with TPG/iiNet and 1 per cent with Dodo.⁷⁵

This reflects the competitive advantage that Telstra and Optus have from horizontal integration, currently being the only two service providers with their own mobile network and access to fixed line networks. However, this is soon to change with Vodafone (the third mobile network owner) planning to expand into the NBN market in late 2017 and TPG planning to deploy its own mobile network. This will likely provide greater competitive pressure on Telstra and Optus as Vodafone and TPG may seek to leverage their existing customer bases in respective markets to build market share in the bundle market.

These market developments should mitigate potential competition concerns in regards to multi-product bundling of fixed voice, broadband and mobile services.

The bundling of telecommunications services with entertainment and content services can present different implications for competition. In particular, as reflected in Table 4.6, some service providers have secured exclusive content deals for major sporting events such as AFL, NRL and English Premier League, as well as offering (typically limited) free access to music services including Apple Music and Spotify Premium, video streaming services, such as Netflix, Stan or Foxtel, or their own entertainment channels, such as Yes TV by Fetch (Optus) or Telstra TV.

Some service providers such as Amaysim and Dodo also offer consumers the opportunity to purchase energy services in conjunction with their telecommunications services, in selected areas. Dodo also offers car, home and contents, and travel insurance products.

Bundling can increase competition if it brings more choice, higher quality and/or lower prices to consumers. It can also be beneficial for consumers and the service provider if it allows service providers to exploit economies of scale and pass on savings to consumers in the form of lower prices or quality improvements. Bundling can also benefit consumers who prefer the ease of dealing with one service provider and receiving one bill for multiple services.

However, bundling can disadvantage consumers if the inclusions are not transparent and easily comparable or if they include services that consumers do not want or need. Bundling can also lock-in consumers to a particular service provider if they are the only provider with products and/or services that the consumer values, which may prevent or impede switching.

⁷³ Roy Morgan Single Source (Australia), January to December 2016, n=50 144, Australian Households.

⁷⁴ *ibid.*

⁷⁵ *ibid.*

Table 4.6: Example of bundled or multi-product offers from various service providers⁷⁶

Service provider	Home phone and broadband	Home phone, broadband and mobile	Content	Other
Telstra	Yes	Yes	For mobile customers—unmetered access to AFL, NRL, netball Live and 12 month free subscription to Foxtel Now For broadband customers—Telstra TV and Foxtel from Telstra	Apple Music
Optus	Yes	\$20 per month discount if a mobile service and fixed broadband with Optus	For mobile customers—Optus sport, EPL, national geographic For broadband customers—Yes TV by Fetch	Spotify premium
TPG/iiNet	Yes	Yes - TPG—own mobile services coming soon	iiNet offers Fetch TV	
Dodo	Yes	Yes	No	Car, home and contents and travel insurance

Bundling also has the potential to impede competition if some service providers are unable to match bundle offers or provide competitive alternatives.

We consider that although some service providers have exclusive arrangements with various content providers, there are currently other means of accessing this content which means that consumers are not compelled to purchase these bundles solely to access the content on offer. For example, while Telstra offers its mobile customers un-metered access to all AFL, NRL and netball games, some of these games are also available on free-to-air TV and Foxtel. Optus offers its mobile customers access to English Premier League games, which are less easily accessible to Australian viewers.

We will assess bundling conduct on a case-by-case basis where complaints arise, taking into account the specifics of the bundled package being assessed. In particular, there are two key elements that we take into consideration when forming a view on anti-competitive conduct in bundling. These are:

- whether the non-price effects of the conduct are anti-competitive, such as involving the leveraging of market power from non-competitive to competitive markets, or whether the conduct increases barriers to entry; and
- whether the price of the bundled service involves any elements of predatory pricing or a vertical price squeeze in the relevant market(s).

⁷⁶ Company websites, viewed on 2 October 2017.

Overall, bundling is only likely to raise anti-competitive conduct concerns when a service provider has market power in the supply of at least one of the bundled products.

At present we do not have significant concerns about the extent of bundling by different service providers. We consider that although service providers are able to offer different services and inclusions, there is sufficient variety and competition between these bundles.

Draft finding

Bundling can deliver positive outcomes for consumers and service providers. However, it can also lead to anti-competitive effects if a service provider has market power in one of the bundled products.

As there are a significant proportion of consumers who bundle telecommunications services, we have undertaken further analysis of potential issues for consumers in relation to bundling in section 5.4.

Network coverage

Network coverage relates to the availability of a network in different locations as well as the quality of the coverage for use of services.

The NBN is intended to provide national coverage and deliver wholesale headline speeds of at least 25/5 Mbps speeds to all Australian premises by the end of the rollout. These services will be delivered primarily using fixed line technologies (FTTx and HFC) as well as fixed wireless and satellite services in low density areas, mainly in regional and remote Australia.

Non-NBN fibre networks are typically only available in apartment buildings and new housing estates or developments, largely in metropolitan areas. Some fibre networks also supply services to student or community housing estates or aged care residences.

Non-NBN fixed wireless broadband services generally operate in specific geographic areas that may be a blackspot for fixed line services and where they are a cost effective option.

Table 4.7 identifies the different locations where various non-NBN fixed wireless service providers currently operate.

These services need favourable geographic conditions, such as facilitating line-of-sight and consequently may not be available to all consumers. However, where they are available they play an important competitive role. For example, we understand there are currently instances where non-NBN fixed wireless services are being used to provide broadband services prior to NBN based broadband services being deployed in an area. These networks may also provide some competitive pressure on the NBN and other network technologies, as further discussed in section 4.3.

Table 4.7: Available locations of some non-NBN fixed wireless service providers⁷⁷

Service Provider	Available locations
Uniti Wireless	Parts of Adelaide and Melbourne
Node1 Internet	WA—Geraldton, Walkaway, Dongara, Perth

⁷⁷ Company websites, viewed on 2 October 2017.

Service Provider	Available locations
NuSkope	Adelaide
Clear Networks	Parts of Qld, NSW, Vic, Tas, SA and WA
Red Broadband	WA—Perth to Yallingup
Yourhub	Qld—all Townsville suburbs
Adam Internet/iiNet (owned by TPG)	SA only
Vividwireless (owned by Optus)	Sydney, Melbourne, Adelaide, Perth, ACT, Central Coast (NSW)

For mobile broadband services, depth or quality of network coverage and geographic coverage are both important points of competition and product differentiation. As noted in section 4.1, in 2016 Telstra’s 3G network was estimated to cover 99.3 per cent of the total Australian population, Optus’ 3G network was estimated to reach 98.5 per cent, and Vodafone’s 3G network was estimated to cover approximately 97 per cent.⁷⁸ The MNOs have undertaken significant investments to strengthen and expand their network coverage, reflecting the importance of coverage to remain competitive. However, there are differences in geographic coverage of the three MNOs networks and quality of coverage continues to differ between regional and urban areas. This means that regional consumers may experience more black spots in their coverage and in some areas they have limited choice of service provider.

The ACCC’s views in relation to possible avenues to address these issues are outlined in section 7.

Contracts

There are a variety of contract options available to consumers, providing a level of flexibility and choice to suit different consumers’ needs. For example, many service providers, particularly smaller providers and new entrants are offering products with no lock-in contracts, for both fixed and mobile broadband services. Most large service providers continue to offer services on 12 or 24 month contracts, but also provide the option of no lock-in contracts for an additional monthly cost. Some service providers also waive their set-up or establishment fee if a consumer chooses to take a contract.

While contracts have the ability to lock-in consumers and impede switching, we do not consider that in general contracts are impacting competition as there are sufficient options (contracts and no-contracts) available to suit different consumers’ preferences. However, in the context of the transition to the NBN, we have some concerns that long-term contracts may be contributing to limited switching between service providers during this key migration period, which may have implications for future competition on the NBN. We discuss this further in section 5.4.

Speed

Fibre networks owned and operated by NBN Co, OptiComm, OPENetworks, LBN Co and RedTrain, for example, offer different broadband speeds to consumers. In comparison, the legacy networks and mobile networks typically only offer one maximum line speed. For all

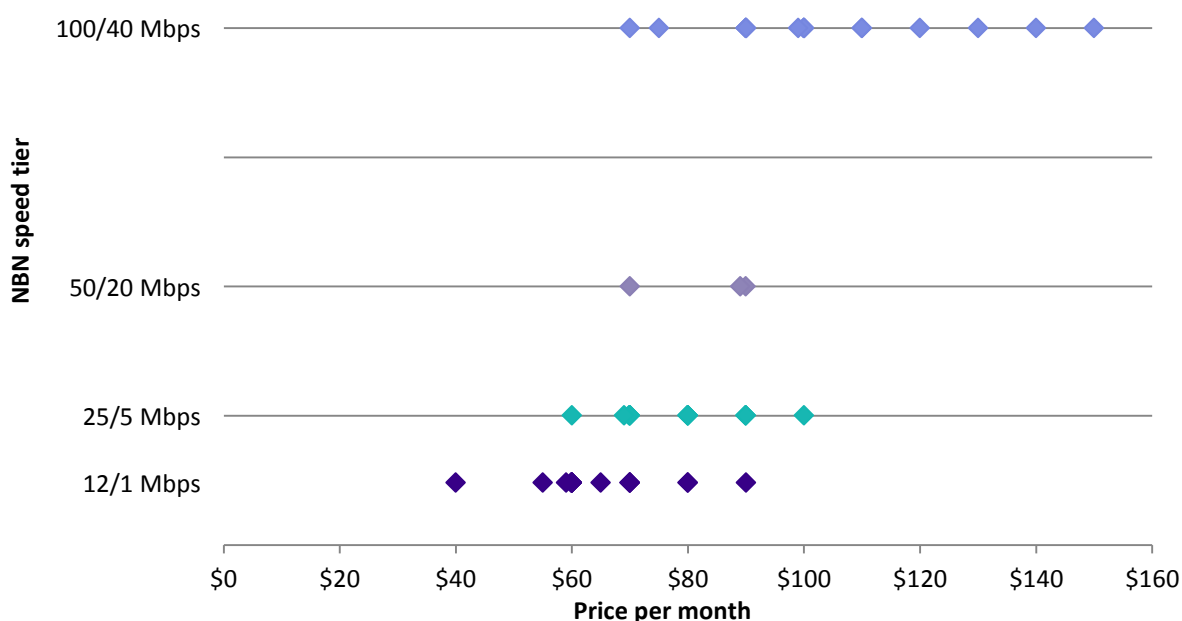
⁷⁸ ACCC, [Domestic mobile roaming declaration inquiry draft decision](#), p. 7. Vodafone’s coverage includes that enabled through its agreements with Optus.

networks, the actual speed a consumer receives is the product of a variety of factors including the maximum line speed available, the number of other users on the network, the consumer’s personal equipment and distance from the network, and the capacity provisioning of the service (for some networks).

The ability to offer different speed options on fibre networks affords these service providers another opportunity on which to differentiate and compete. At present, the most common speed tiers offered to consumers are 12/1, 25/5, 50/20 and 100/40 Mbps. However, on the NBN, there has been limited focus on differentiating by speed with most service providers focussing on promoting the lower speed tiers (12/1 and 25/5 Mbps) over higher speed (50/20 and 100/40 Mbps). We do not have oversight of the speeds being taken up on non-NBN fibre networks, and as such our discussion focuses on broadband services supplied on the NBN.

As shown in Figure 4.15, there is little difference in the price of broadband plans on the NBN (with unlimited data) for the speed tiers of 12/1 and 25/5 Mbps. Most service providers do not appear to be actively offering 50/20 Mbps plans at this stage, instead focusing on the highest speed (100/40 Mbps), which is available for an additional monthly cost in most cases.

Figure 4.15: Example of unlimited data broadband plans on NBN by speed tier⁷⁹



The lack of product differentiation by speed and take-up of low speed services is also reflected in the ACCC’s NBN Wholesale Market Indicators Report, which showed that 84 per cent of NBN based broadband services⁸⁰ were 12/1 or 25/5 Mbps, with around 55 per cent being 25/5 Mbps services. In contrast only 4 per cent of services were 50/20 Mbps and 12 per cent were 100/40 Mbps.⁸¹

⁷⁹ Company websites, viewed on 22 September 2017.

⁸⁰ Traffic Class 4 services (best efforts broadband services).

⁸¹ ACCC, [NBN Wholesale Market Indicators Report](#), 30 June 2017, viewed on 11 August 2017.

Case Study: MyRepublic

One example of a service provider seeking to differentiate by wholesale headline speed is new entrant to the Australian broadband services market—MyRepublic.

MyRepublic only offers one plan with the highest NBN speed tier (up to 100/40 Mbps) and unlimited data on the NBN (available with/without a contract) at a price comparable to its competitors 12/1 Mbps or 25/5 Mbps products. However, we note that the actual speed and performance of broadband services during peak times depends on a range of factors.

Some service providers claim the low take-up of higher speed services on the NBN is due to uncertainty about retail margins on the NBN given the cost of provisioning sufficient capacity and retail price expectations. They argue this is causing them to actively drive customers towards lower speed NBN broadband plans, rather than promoting the NBN as an ultrafast broadband network.⁸² This low take-up may have consequences for efficient use of the NBN infrastructure, as well as for NBN Co's ability to cost recover its efficient costs of investment, which is reliant on assumptions of significant take-up of higher speed services.

Draft finding

Limited consumer take-up of higher speed NBN plans may affect efficient use of NBN infrastructure if it continues in the long-term. It may also potentially have significant implications for NBN Co's ability to recover its investment costs.

In addition to supply-side issues, there are a range of possible demand-side explanations for this low take-up, including that consumers may at present prefer lower speed broadband given its sufficiency for most current mainstream applications. Consumers may also:

- be uncertain about or perceive service quality issues with higher speed services (services not achieving the advertised/expected speed)
- lack awareness or understanding of what kind of experience different speed tiers can deliver (despite some service providers offering speed information on their websites), or
- be unwilling to pay for the additional cost of higher speed broadband services.

Mobile networks (4G and higher) and non-NBN fixed wireless networks can achieve comparable speeds to most fixed fibre networks. At present 4G is capable of delivering speeds between 2–100 Mbps, with 5G expected to deliver between 1–10 Gbps.⁸³ However, actual speeds will depend on several factors including the number of users on the network and usage activities. Mobile service providers may compete with fibre networks at comparable speed levels and attract consumers who value other benefits offered by these networks, such as on-the-go connectivity. However, at present the amount of data typically included in mobile plans is significantly less than typical data inclusions for fixed line plans.

Customisation

Some service providers now offer consumers the opportunity to customise their broadband services by selecting their own mix of inclusions rather than selecting from set options. For example, Exetel and Aussie Broadband allow customers to select their own mix of speed, data quota and contract length, with additional options for home phone and calls, and modem inclusions. Aussie Broadband also offers add-ons such as the 'Night-Owl'

⁸² Communications Day, *NBN margin uncertainty causing Vocus to drive customers towards lower speeds*, 15 June 2017, p. 3.

⁸³ Australian Communications and Media Authority (ACMA), [5G and mobile network developments – Emerging issues](#), ACMA, Occasional paper, February 2016.

(unmetered data between 1 am and 7 am for an extra \$10 per) as well as unmetered uploads for an additional \$10 per month.⁸⁴

Vodafone has announced a new series of month-to-month mobile phone plans that come with a mobile phone device available on interest-free monthly device repayment schedules spread across one to three years that are completely decoupled from the voice and data charges.⁸⁵

Service quality

Service quality encompasses service performance and reliability and in this case is distinct from customer service elements. These factors do not yet appear to be a significant area of non-price competition for fixed line broadband services.

On the NBN, service providers are able to influence the quality and performance of their broadband services (including reliability, speed and congestion) by purchasing different amounts of capacity from NBN Co (CVC).⁸⁶ While service providers have an opportunity to compete on service quality and performance, they do not appear to be actively doing so at present.

We have received significant feedback from service providers throughout the market study about the price level of CVC restricting their ability to provision capacity that meets consumers' expectations. We consider that service providers may be under-provisioning CVC at present to keep retail prices low (or at least competitive) and this is contributing to network congestion, leading to slow speeds, and poor consumer experience. As such, many retail NBN services may not be meeting consumers' expectations about service quality and performance.

The ACCC has implemented some initiatives, such as the broadband speed claims guidance and the broadband performance monitoring and reporting program, to help increase consumer awareness and understanding of NBN speeds, as well as increase the incentive for service providers to improve their peak hour speeds and performance.

However, the above measures will not resolve all of the poor outcomes that are being seen in retail NBN markets as upstream supply arrangements also appear to be contributing to these outcomes.

In this regard, we note that the TIO reports for 2015–16 and 2016–17 evidence an increasing number of complaints about broadband services supplied over the NBN. In 2015–16 some of the most common complaints were about faults such as slow data speeds (48 per cent increase), unusable services (19 per cent increase) and drop-outs (19 per cent increase).⁸⁷ In 2016–17 complaints about faults accounted for 59 per cent of NBN complaints received by the TIO.⁸⁸

As previously noted, poor consumer experience on the NBN is due in part to the amount of capacity (or lack thereof) purchased by their service provider. At the market study stakeholder forum, a number of service providers claimed that the cost of supplying enough capacity to meet consumers' expectations of service quality and performance is at odds with

⁸⁴ Aussie Broadband, [Residential Internet Plans](#), viewed on 2 August 2017.

⁸⁵ Vodafone Australia, [Mobile Plans](#), viewed on 2 August 2017.

⁸⁶ This capacity is known as the connectivity virtual circuit (CVC) charge and represents one of three wholesale access charges that service providers pay to NBN Co.

⁸⁷ Telecommunications Industry Ombudsman (TIO), [Telecommunications Industry Ombudsman 2016 Annual Report](#), November 2016, p. 15.

⁸⁸ Telecommunications Industry Ombudsman (TIO), [Telecommunications Industry Ombudsman 2017 Annual Report](#), October 2017, pp. 28–29

prevailing retail price expectations and consumer willingness to pay. These issues are discussed further in section 5.1 and 5.4.

Draft finding

Poor consumer experience on the NBN is, in part, resulting from the level of capacity provisioned by service providers and the inadequacy of information available to consumers to help them select the right plan with their preferred provider.

4.2.5 Competitive constraints

The large number of service providers supplying retail broadband services provides an important competitive dynamic in this market. However, despite the variety of providers, the market remains highly concentrated, particularly for fixed broadband services with a few large providers accounting for most of the market.

There also appears to be a large degree of market segmentation with most service providers competing for price conscious consumers and few seeking to provide a 'premium' product. While there is some competitive pressure on the edges, it appears that Telstra is relatively unchallenged at the higher end of the market with higher prices than its competitors and the largest market share. Telstra also appears to be winning market share in the price conscious segment through its budget brand Belong.

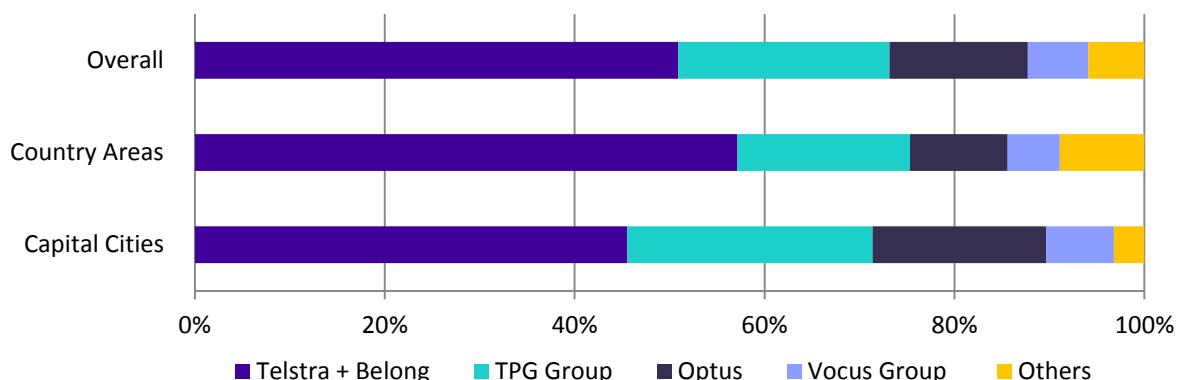
Telstra's large market share of fixed line broadband services is in part due to its incumbency advantage, brand recognition and customer loyalty with consumers of communications being generally very sticky. For example, according to Roy Morgan Research in 2016, 68 per cent of Australian households with a fixed broadband service said they had been with their current service provider for over two years.⁸⁹ Furthermore, of those Australian households that have been with the same fixed broadband service provider for ten years or more, 65 per cent are with Telstra compared to 16 per cent with Optus.⁹⁰

Telstra's market position may also reflect a lack of consumer awareness that there are other service provider options in the fixed line market, particularly in country areas where traditionally Telstra may have been the only provider. As such, Telstra's market share remains much higher than its competitors, as shown in Figure 4.16, when compared to that in capital cities.

⁸⁹ Roy Morgan Single Source (Australia), January to December 2016, n=14 330, Australian Households.

⁹⁰ Roy Morgan Single Source (Australia), January to December 2016, n= 8 674, Australia Households.

Figure 4.16: Fixed broadband market shares on the NBN for capital cities and country areas for 2016⁹¹



To ensure the benefits of retail competition are fully realised for consumers and suppliers, consumers must be able to easily access comprehensible and clear information about their options of service provider and product offerings so they can make informed purchasing and switching decisions, and ensure their needs are met. The importance of information and consumer choice in promoting competition is further discussed in section 5.4.

We consider that the extent of competitive constraint on fixed line broadband services from wireless broadband services (both non-NBN fixed wireless and mobile broadband services) is increasing as the quality of networks and product offerings begin to match those on fixed line networks in terms of price, data quota and speed. At present, however these alternatives are likely to only attract particular consumer segments such as those who highly value on-the-go connectivity, low-data users or where fixed line services are unavailable. Importantly, if poor consumer experience on the NBN continues it could influence a greater level of substitution to wireless broadband services. The potential evolution of substitution from fixed line to wireless networks is further discussed in section 6.1.

4.2.6 Overall assessment of competition

There is evidence of competition in the supply of broadband services to consumers with a large number of service providers in the market across various network technologies, a range of different products available and strong price competition, particularly on the NBN and mobile networks.

There is evidence of effective non-price competition for mobile broadband services with product differentiation of data quotas, network coverage and contract length options.

However, we consider that competition on the NBN appears to be occurring in a narrow manner, focusing primarily on price with little emphasis on differentiation on the basis of speed, service quality and performance at present. There also appears to be limited competition at the higher end of the market for 'premium' broadband services, with only Telstra supplying these offerings.

There is some competition between the different networks (fixed line and mobile broadband), with mobile broadband providing some constraint on fixed line services as data quotas and prices move closer to those offered for fixed line services. However, at this stage we consider mobile broadband services are likely to only suit some consumer segments and are not complete substitutes for fixed line services.

⁹¹ Roy Morgan Single Source (Australia), January to December 2016, n=28 839, Australian Households.

Draft finding

There is strong price competition in the fixed line and mobile broadband services market, particularly for broadband services on the NBN. While there is evidence of effective non-price competition for mobile broadband services, there appears to be limited competition at this stage on quality (speed and performance) on the NBN.

4.3 Access network technologies

Voice and broadband services can be supplied to consumers by service providers using the following fixed and/or mobile network technologies:

- legacy networks—copper and HFC
- next generation fibre networks—NBN and non-NBN
- mobile networks
- fixed wireless networks—NBN and non-NBN.

In this section, we discuss the state of competition at the network infrastructure level. Competition in the retail downstream market for voice and broadband services was discussed in section 4.1 and 4.2.

In this section, we will also discuss the implications of competition and conditions at the network infrastructure level for competition in voice and broadband services markets.

4.3.1 Network operators

Table 4.8 lists the different network operators and some of the service providers that acquire their wholesale services. Some service providers acquire services from multiple network operators in order to supply voice and broadband services to different parts of Australia and provide consumers with different technology options.

Table 4.8: Network operators, wholesale services and service providers⁹²

Network technology	Network operators*	Wholesale services	Service providers*
Legacy Copper	Telstra	ULLS LSS Wholesale ADSL	Telstra, Optus, TPG Group, Vocus Group and others.
Legacy HFC	Telstra	NA	Telstra
	Optus	NA	Optus
NBN	NBN Co	NBN access service	Telstra, Optus, TPG Group, Vocus Group, Aussie Broadband, Active8me, Bendigo Community Telco, Exetel, Harbour ISP, Macquarie Telecom, My Republic, SkyMesh, Australian National Telecom, Clear Networks, IP Star Australia and others.
Non-NBN fibre	OptiComm	Wholesale access	Activ8me, Commander, Exetel, Foxtel,

⁹² Company websites, viewed on 22 September 2017.

Network technology	Network operators*	Wholesale services	Service providers*
		services (access+capacity charge +possibly NNI charge)	FuzeNet, HarbourISP, iiNet, Internode, iPrimus, Leaptel, X Integration, 6YS, BigAir, Connected Australia, Occom, Oper8, Over the wire, Siptalk, Telarus, Telesurf, Clear broadband, Manage My, Origin Net, Vertel, Brennan IT, DCSI.
	OPENetworks		Exetel, Internode, Varsity Internet, HarbourISP, OCCOM, Connected Australia, FuzeNet, Clear Networks, LocalNet, Anittel, Club Telco, World Dial Point, Manage My, Valve Networks, Tozoom, Broadband Solutions, Polyfone, Pivit, Foxtel.
	Fibre Corp		Calix, Urmet, Fibaro.
	RedTrain		Advanced Future Technology, Ascensa, Clear Networks, Exetel, FuzeNet, Occom, SkyMesh.
	LBN Co		FuzeNet, Exetel, Active Utilities, AusBBS, Clear Networks, Varsity Internet, Activ8me, Activenet, Aptel, OCCOM.
	TPG (FTTB only)		TPG.
	iiNet (FTTH)		iiNet.
Non-NBN fixed wireless	Uniti Wireless Node1 Internet NuSkope Spirit Telecom Clear Networks Red Broadband Yourhub Adam Internet/iiNet (TPG Group) Vividwireless (owned by Optus) and others	NA	Vertically integrated service providers.
Mobile	Telstra	Wholesale end-to-end service	ALDImobile, Better Life, Lycamobile, Macquarie Telecom, Pivotel, Planet Mobile, Symbio, Inabox, Southern Phone, TeleChoice, Think Mobile, Woolworths.
	Optus		Amaysim, Barefoot Telecom, Bendigo Bank telco, ClubTelco, Coles,

Network technology	Network operators*	Wholesale services	Service providers*
			Commander, Community Telco, Dodo, Engin, E.Tel, Exetel, IF Telecom, iiNet, Internode, iPrimus, Jeenee Mobile, Live Connected, More Telecom, OVO Mobile, Southern Phone, SpinTel, Trinity Telecom, Truphone, Vaya, Virgin Mobile, Westnet, Yomojo.
	Vodafone		ACN, CMobile, E.Tel, Gotalk, Hello Mobile, KISA, Kiss Mobile, Kogan, Lebara, Living Networks, OwnFone, Pivotel, Reward Mobile, Revolution Telecom, Think Mobile, TPG.

*The list of network operators and service providers is indicative and not exhaustive.

4.3.2 Fixed line networks

Legacy networks—copper and HFC

The copper network is natural monopoly infrastructure that was built and operated by the government until privatised in the 1990s. The network is owned and operated by Telstra.

In 1991 the telecommunications sector was opened to retail competition when Optus was granted the second general carrier licence in Australia.

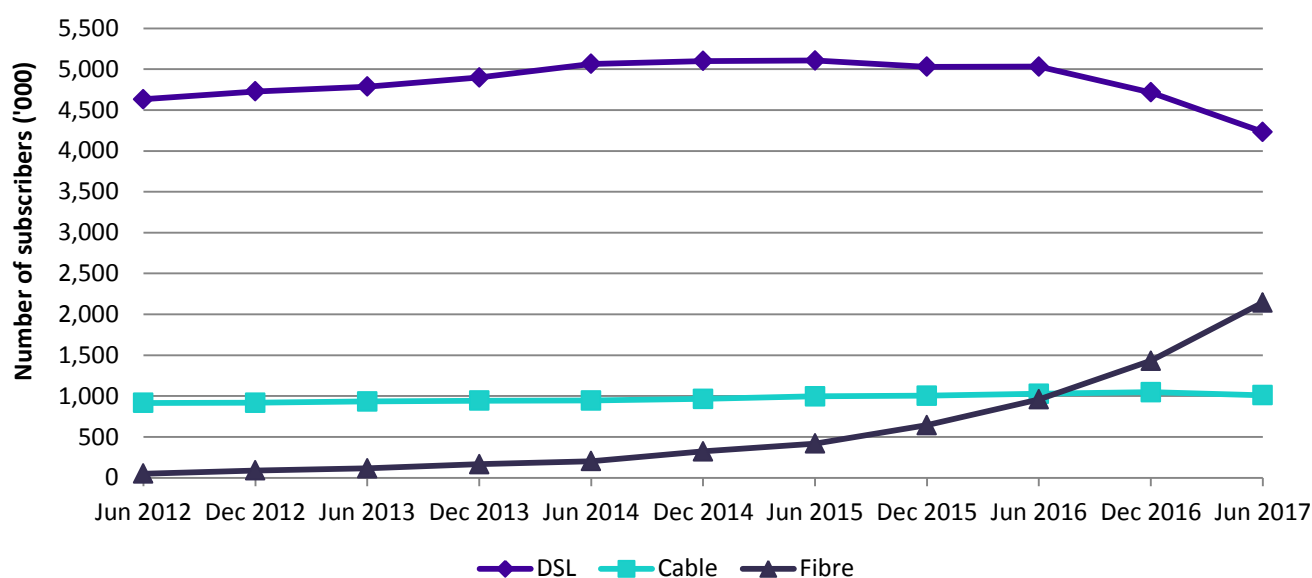
Service providers are able to provide on-net services to consumers by purchasing an unconditioned local loop service (ULLS) or a line sharing service (LSS) and installing their own equipment in the exchange. These are Layer 1 services and enable service providers to differentiate their voice and broadband services as they have full control over the line and are able to control the quality and specifications of the services. Service providers can also provide off-net broadband services by acquiring wholesale ADSL services from Telstra and re-selling under their own brand without the need to install equipment in Telstra exchanges. In these cases service providers have very limited control over the quality of service as capacity provisioning is controlled by Telstra. Wholesale ADSL services are discussed further in section 4.4.

Telstra first faced competition at the network level in the early 1990s with the rollout of Optus' HFC network. However, this was limited to specific, predominantly, metropolitan areas. Telstra also responded to this competition by constructing its own HFC network, initially to supply pay TV services.

As shown in Figure 4.17, according to the ABS, as at June 2017 there were 4 233 000 internet subscribers using DSL broadband services and 1 010 000 internet subscribers using HFC broadband services.⁹³

⁹³ Australian Bureau of Statistics (ABS), [8153.0 Internet Activity](#), June 2017, viewed on 29 September 2017.

Figure 4.17: Number of subscribers of fixed line services⁹⁴



Next-generation fibre networks

There are multiple next-generation fibre networks currently in operation in Australia with the largest network being the NBN, owned by the wholesale-only network operator, NBN Co. NBN Co has a mandate to design, build and operate a high-speed wholesale local access broadband network and ensure all Australians have access to fast broadband as soon as possible, at affordable prices and at least cost.

NBN Co utilises a number of different technologies in its network, including FTTP, FTTB, FTTN, HFC, fixed wireless and satellite services, and the NBN is currently available to approximately 6.2 million premises, of which approximately three million premises have an active NBN service.⁹⁵

Being a near monopoly operator, NBN Co is subject to a Special Access Undertaking (SAU), which sets out price and non-price terms that it can impose on service providers seeking to supply downstream voice and broadband services.

Other next-generation fibre network operators include OptiComm, OPENetworks, RedTrain, LBN Co, TPG and others. These operators typically compete to deploy networks in apartment buildings and new housing estates with NBN Co and each other, but tend to operate as local monopoly networks once installed. They are currently estimated to supply around 250 000 consumers in total.⁹⁶

As NBN Co's mandate means that it must build its network to all parts of Australia, even where it is uneconomical to do so, it has larger investment costs per customer to recover than its competitors, that make commercial decisions about where to build and tend to supply in lower cost to serve areas only. As a result, in order to ensure a level playing field for NBN Co, these non-NBN fibre network operators have a number of similar regulatory obligations imposed on them. If they supply or are capable of supplying services of 25 Mbps or more, they are required to be wholesale-only (for networks built after 1 January 2011) or

⁹⁴ ABS, [8153.0 Internet Activity](#), June 2017, viewed on 29 September 2017.

⁹⁵ NBN Co, [Weekly summary rollout progress](#), for week ending 12 October 2017, viewed on 18 October 2017.

⁹⁶ Bureau of Communications Research, *NBN non-commercial services funding options*, Final report, March 2016, p. 70.

provide wholesale access to other service providers (for networks built prior to 1 January 2011). The price of the 25/5 Mbps wholesale service supplied on these networks is regulated to be no more than that of the 25/5 Mbps service offered by NBN Co.⁹⁷

To connect to the NBN, service providers must acquire three product components from NBN Co, the access virtual circuit (AVC), the connectivity virtual circuit (CVC) and the network-to-network interface (NNI). Service providers may also acquire a wholesale end-to-end service from another service provider (at this stage Telstra, Optus, TPG (AAPT) or Vocus) known as an NBN wholesale aggregation service rather than acquiring inputs directly from NBN Co. This service is discussed further in section 4.4.

To connect to non-NBN fibre networks, service providers acquire wholesale services directly from the network operator in a similar manner to how they acquire NBN wholesale services.

4.3.3 Wireless networks

Mobile networks

There are currently three mobile networks in operation in Australia, owned by Telstra, Optus and Vodafone. These service providers are vertically integrated and supply both wholesale and retail mobile services. TPG (which currently re-sells mobile services on the Vodafone network) has announced plans to deploy its own mobile network to become the fourth vertically integrated provider.

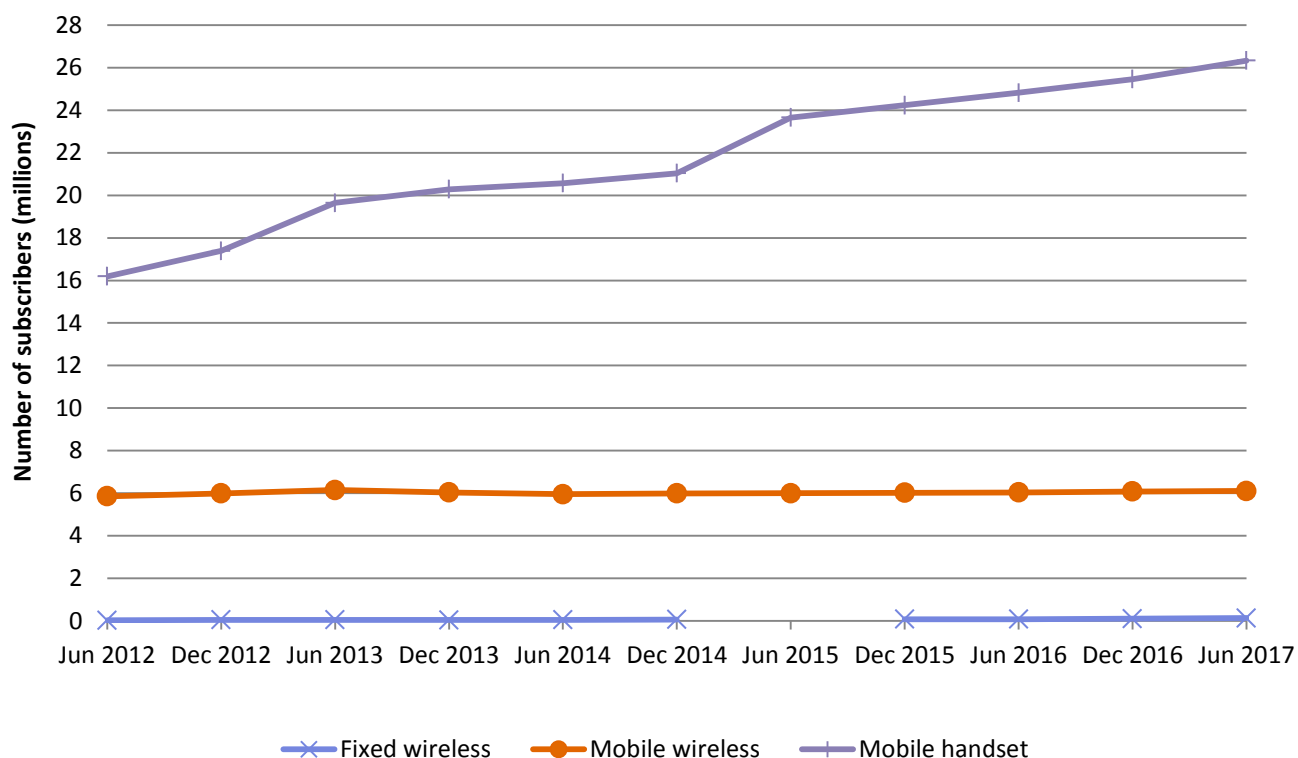
Other service providers are able to acquire wholesale end-to-end mobile services from one of these mobile network operators and re-sell the mobile service under their own brand. These service providers are known as mobile virtual network operators (MVNOs). Wholesale end-to-end mobile services supplied to MVNOs are discussed further in section 4.4.

Mobile networks can be used to provide mobile phone services and mobile broadband services both on tablets and mobile modems. As shown in Figure 4.18, according to the ABS, as at June 2017, there were 26 330 000 mobile handset subscribers and 6 107 000 internet subscribers using mobile wireless broadband services.⁹⁸

⁹⁷ ACCC, [Superfast Broadband Access Service and Local Bitstream Access Service. Final Access Determination joint inquiry – Final decision report](#), May 2017.

⁹⁸ The ABS defines mobile wireless as “An internet connection which provides short range, high data rate connections between mobile data devices and access points connected to a network. Examples include mobile WiMAX and 3G/4G accessed through a data-card, USB modem, tablet SIM card or any other device used to connect a computer to a cellular network (excluding a mobile handset). Mobile wireless internet subscriptions via a mobile handset are currently excluded from this category for the purposes of the Internet Activity Survey, and are counted separately in the mobile handset chapter.”

Figure 4.18: Number of subscribers of wireless services⁹⁹



Fixed wireless networks

NBN Co operates a fixed wireless network as part of its multi-technology mix to supply services to less densely populated areas.

There are also many small non-NBN fixed wireless networks that operate in specific geographic locations. These are vertically integrated and supply retail services to consumers.

According to the ABS, as at June 2017 there were 138 000 internet subscribers using fixed wireless broadband¹⁰⁰, an increase from 102 000 in December 2016.¹⁰¹ However, we note that this is only for service providers with more than 1000 subscribers and it is unclear whether this includes NBN Co’s fixed wireless services.

4.3.4 Competition between networks

Traditionally, competition at the network level occurred in a similar manner to competition in the downstream market, where fixed line networks competed with fixed line networks, and mobile networks competed with mobile networks. Network operators were able to operate and supply services in both fixed line and mobile markets without much concern of cannibalising their market share in either market.

⁹⁹ ABS, [8153.0 Internet Activity](#), June 2017, viewed on 29 September 2017. Note the June 2015 fixed wireless figure is not available for publication.

¹⁰⁰ The ABS defines fixed wireless as “A terrestrial point-to-point microwave or radio link, generally building to building or tower to building, which allows subscribers within the receiving building to access the internet. Sender and receiver must generally be within line-of-sight and no more than 22 kilometres apart, although newer generations of this technology have overcome some of these obstacles. An example of this technology is fixed WiMAX”.

¹⁰¹ ABS, [8153.0 Internet Activity](#), June 2017, viewed on 29 September 2017.

In contrast, we are now observing substantial convergence between the fixed line and mobile markets as network improvements and technology advancements mean mobile networks are capable of delivering downstream voice and broadband services at a comparable cost and service quality to fixed line networks, in terms of speed and reliability in areas where they have coverage.

As a result, there is now a greater opportunity for competition at the network level, as the dominant fixed line network—the NBN—faces competition not only from other fixed line networks such as non-NBN fibre networks, but also from wireless networks (predominantly mobile networks and to a lesser extent fixed wireless networks).

In particular, following the deployment of 4G+ networks, mobile networks are now a more credible threat to fixed line networks, with the ability to deliver broadband speeds between 2–100 Mbps on 4G networks. Further, the deployment of 5G mobile networks in the near future will see mobile services capable of delivering speeds between 1–10 Gbps, which will be equivalent to many fixed line broadband services with the added benefit of on-the-go connectivity.¹⁰²

This affords horizontally integrated mobile service providers the choice of acquiring fixed line services from wholesale network operators or bypassing these networks and using their own mobile networks to supply retail services. All three MNOs are investing billions of dollars to upgrade their networks, signalling the growing importance of mobile networks and potential desire to drive greater substitution for fixed line services in the future. These mobile networks are capable of servicing most of the population, with Telstra, Optus and Vodafone currently providing 3G coverage to 99.3 per cent, 98.5 per cent and 97 per cent of the total Australian population, respectively.¹⁰³

TPG has also announced plans to deploy its own mobile network, which will see three of the four largest fixed line service providers horizontally integrated with their own mobile network. This, in addition to TPG's FTTB network, will likely place sizeable competitive pressure on other next-generation fibre networks, particularly the NBN.

However, a key consideration for these horizontally integrated network operators will be potential additional investment costs and the extent to which they might risk cannibalising their market share on fixed line networks if they seek to bypass the NBN. These factors may potentially limit the degree of competitive pressure mobile network operators are willing to exert on NBN Co in the future.

NBN Co also faces some direct competition from non-NBN fibre networks, particularly in rolling out apartment buildings and new housing estates or developments. However, we do not have reliable information about the number of non-NBN fibre services in operation in different geographic locations. Once in place, these networks have tended to face limited competition.

We also do not have reliable information about the costs of services on non-NBN fibre networks, however, there is potential for these network operators to offer services at a lower price than NBN Co as they do not face the same policy requirements and only deploy networks where it is profitable to do so.

Non-NBN fixed wireless networks also compete with fixed line and mobile networks but tend to operate in only specific geographic locations, as reflected in Table 4.7.

¹⁰² ACMA, [5G and mobile network developments – Emerging issues](#), viewed on 10 October 2017.

¹⁰³ ACCC, [Domestic mobile roaming declaration inquiry - final report](#), p. 5.

Vodafone's coverage includes that enabled through its commercial roaming agreements with Optus.

These networks also tend to have large upfront set-up costs for consumers and small data quotas compared to fixed line services, which may deter some consumers from taking these services. As a result, we consider that non-NBN fixed wireless networks are providing limited competitive constraint on fixed line broadband services where these services are available and have similar technical capabilities.

Mobile and non-NBN fixed wireless networks may also compete with each other, where both networks are available and fixed line networks are not economical.

Overall, the extent and nature of future competition between access network technologies for the market will likely be significantly influenced by technological changes and consumer preferences and degree of substitution of fixed line for wireless services in the downstream market for voice and broadband services.

We explore different future scenarios in relation to substitution between fixed line and wireless services in section 6.1.

Draft finding

The nature of competition between access network technologies is evolving as fixed line and wireless networks increasingly converge. Wireless networks are exerting greater competitive pressure on fixed line networks; however the extent of future competition will depend on the degree of substitution in downstream voice and broadband markets.

4.3.5 Implications for downstream markets

Competition for the market at the network infrastructure level is closely linked to competition in downstream markets for voice and broadband services. In particular, the extent and nature of future competition between networks, particularly the NBN, non-NBN fibre and mobile networks will be influenced to a degree by substitution between these services by consumers in the downstream broadband services market.

As a result, we have identified several issues related to NBN services that could serve to encourage greater substitution to other networks. These issues relate to the price of NBN services, NBN service standards and NBN rollout information.

Price of NBN services

The price of NBN services may be contributing to poor consumer experience on the NBN, particularly during the rollout, and may see more service providers and consumers try to bypass the NBN than would otherwise have been the case, particularly where it is cost effective to do so.

The CVC charge has a direct impact on speed and service quality of downstream broadband services on the NBN. As discussed in section 4.2, service providers have raised concerns throughout the market study process, as well as other avenues, about the price level of CVC.

Some service providers have noted that consumer behaviour has changed significantly since the AVC-CVC construct was designed and the SAU prices were accepted by ACCC in 2013. Consumer demand for data has increased faster than anticipated, placing more emphasis on CVC sooner than originally envisaged. In particular, the introduction of on-demand video streaming services, such as Netflix, is considered a key reason for the exponential increase in data downloaded.

As a result, there are concerns that the current NBN pricing model may damage future downstream competition if it limits a service provider's ability to provide broadband

throughput speeds and service quality that meet consumer expectations at a price they are willing to pay. We observe that service providers appear to be provisioning minimal levels of CVC, which may be contributing to poor service performance experienced by some consumers on the NBN. Some service providers may also be encouraging consumers to take-up alternative network options, such as mobile wireless services, particularly if this is more cost effective to supply. We explore this issue in further detail in section 5.1.

Draft finding

The price of NBN services has the potential to distort competition if it leads to poor consumer experience and encourages substitution away from the NBN to other access network technologies.

NBN service standards

NBN service standards are contained in the Wholesale Broadband Agreement 2, which sets out the commercial terms and conditions between NBN Co and its wholesale customers (service providers).

The Wholesale Broadband Agreement 2 includes a Service Levels Schedule that sets out a number of service levels, performance objectives and operational targets that apply to the products and services that NBN Co supplies to wholesale customers. In certain circumstances, service providers may claim compensation or commercial rebates where NBN Co has failed to meet a service level or performance objective.

The Service Levels Schedule allows a service provider to claim compensation where the service provider owes a CSG payment and the fault is attributable to NBN Co. However, we note that the CSG standards were designed for legacy services and do not represent an appropriate baseline for all NBN services. For example, the CSG Standard only applies to standard telephone services and does not extend to broadband services.

At the market study stakeholder forum, service providers expressed dissatisfaction with a number of service standards. The primary concern being that current NBN service levels do not represent an appropriate baseline to ensure a positive end-user experience, and there is insufficient recourse to compensation where service levels are not met.

As a consequence of their limited ability to claim compensation or rebates under the Wholesale Broadband Agreement 2, service providers may be more likely to require consumers to waive their CSG rights in retail contracts to avoid attracting this liability. Under these circumstances, the consumer would have no potential claim to CSG compensation.

Service providers have also expressed concerns around a lack of coordination and/or information available to wholesale customers. In particular, as they are responsible for the relationship with the consumer, unclear allocation of responsibility and inadequate information can lead to inefficient outcomes and blame shifting between NBN Co and its wholesale customers. These issues are discussed further in section 7.

Draft finding

There are issues with current NBN service level standards, including risk allocation, ineffective coordination, poor risk management and limited compensation, which are likely to have flow on impacts for the consumer experience on the NBN if left unresolved.

NBN roll-out information

Service providers have raised concerns about the availability and accuracy of NBN rollout information in the market study as well as the NBN SAU variation process.

One particular issue is that information is less readily available to service providers who do not directly connect to the NBN but rather acquire NBN wholesale aggregation services from another service provider. These concerns appear to persist despite NBN Co taking steps to facilitate direct access for certain categories of service providers to key NBN information pursuant to an Information Agreement.¹⁰⁴

Another issue raised by service providers is the persistent inaccuracy of NBN rollout information, despite being at the half-point of the rollout. Inaccurate rollout information hampers the ability of service providers to undertake business planning, marketing and sales processes, and particularly smaller service providers with limited budgets. We may see diminished levels of competition in the downstream market if service providers are unable to effectively market products to consumers in a timely way, particularly during the migration period when consumers are moving to the NBN. We discuss this issue further in section 5.2.

Draft finding

Despite improvements to NBN rollout information for service providers, this information continues to be inaccurate and does not appear to be readily available to all service providers. This has important commercial consequences and may limit the ability of service providers to actively compete for customers during the migration period to the NBN.

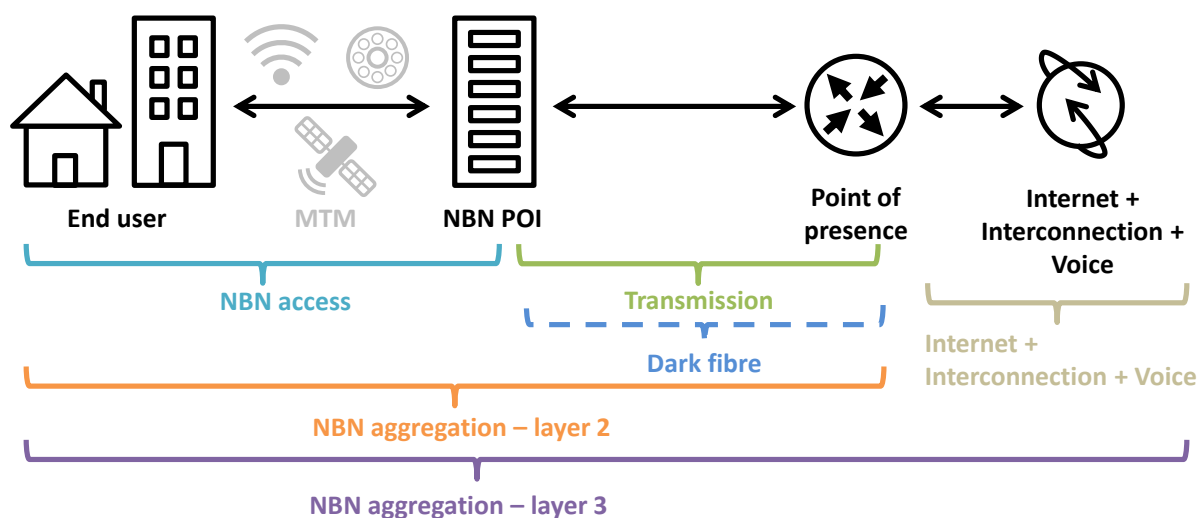
4.4 Aggregation services

For the purpose of the market study, we are using aggregation services to describe the wholesale supply of a group of services that would otherwise be purchased individually. In particular, access (e.g. NBN or mobile), transmission and potentially other value add services (e.g. interconnection and internet services). Wholesale aggregation services can be used as inputs to provide downstream fixed line and mobile voice and broadband services.

This difference between aggregation services and separately acquired access and transmission services for the NBN is shown in Figure 4.19 (the latter two are required for direct connection to the NBN). This also shows how aggregation services are not direct or perfect substitutes for either access or transmission or dark fibre services and therefore that they do not provide a complete competitive constraint on their supply.

¹⁰⁴ NBN Co, [Business planning information](#), viewed on 13 October 2017.

Figure 4.19: Aggregation services used in the supply of broadband over the NBN



As set out in the following sections, the NBN wholesale aggregation and wholesale MVNO services are, and will be, important inputs to competitive supply of voice and broadband services.

We acknowledge that supply of NBN wholesale aggregation services is evolving and that it requires supporting business cases underpinned by demand for the services. However, our assessment is that there is currently relatively concentrated supply of these services by vertically integrated providers which may limit service providers' ability to compete in downstream markets. We understand that NBN price discounts are not being universally passed through to the purchasers of wholesale aggregation services, that there is limited differentiation between services offered as well as some evidence of these services coming to market more slowly than equivalent retail services. This is likely to constrain the ability of acquirers to provide a differentiated product in a timely manner in downstream markets. This is set out below and section 5.3 examines these issues in more detail as well as potential responses.

We have less visibility over wholesale MVNO services, but note they are supplied in a relatively mature market, with approximately 60 service providers acquiring these services, and that there is an absence of significant complaints. However, some concerns have been raised in relation to the ability to provide differentiated downstream services using wholesale MVNO services and we intend to explore these via an industry survey prior to the final report.

4.4.1 Market structure and service providers

Aggregation services exist across different technologies as set out in Table 4.9, which also notes the current providers. The wholesale ADSL and NBN wholesale aggregation services (Layer 2 and 3) both enable the provision of retail fixed line voice and broadband services, with NBN wholesale aggregation services replacing wholesale ADSL as the rollout of the NBN continues. Ultimately, service providers will not have a choice and will have to acquire NBN wholesale aggregation services if they do not have the scale for direct connection. MVNO services enable the provision of retail mobile voice and broadband services by allowing MVNOs to resell mobile services over a mobile network operator's network.

Table 4.9: Characteristics and providers of aggregation services¹⁰⁵

Service	Characteristics of the service	Providers
Wholesale ADSL	Copper access network from the customer premise and a managed transmission service to the access seeker's point of presence (POP)	Telstra Optus TPG (AAPT, Pipe) Vocus MyNetFone Group
NBN wholesale aggregation— Layer 2	NBN access network from the customer premise to the NBN point of interconnection (POI) and a managed transmission service to the access seeker's POP (generally in a capital city).	Optus TPG (AAPT, Pipe) Vocus (Nextgen) MyNetFone Group Aussie Broadband
NBN wholesale aggregation— Layer 3	NBN access from the customer premise to the NBN POI and a managed transmission service to the access seeker's POP (generally in a capital city) Internet, voice, interconnection services and potentially other value add services May or may not connect to an access seeker's network (which would likely provide an application server, for content as well as having a billing system)	Telstra Optus TPG (AAPT, Pipe) Vocus (Nextgen)
Wholesale MVNO service	Includes the mobile radio access network from the customer device to the base station, managed transmission and core network services Generally will not connect to the MVNO as they do not have a network.	Telstra Optus Vodafone

There has been consolidation in the provision of NBN wholesale aggregation services over the last few years. Following several mergers and acquisitions, NBN wholesale aggregation services are now largely supplied by four providers (Telstra, Optus, TPG, and Vocus) as well as MyNetFone (iBoss). Aussie Broadband has also recently started to supply NBN wholesale aggregation services.

These providers are all vertically integrated, supplying both wholesale and retail services. As discussed below, there are concerns identified by industry, that we share, that this weakens the incentives for the competitive supply of wholesale services. These NBN wholesale aggregation services are acquired by a variety of other service providers.

If service providers intend to directly acquire access services from NBN Co then prior to reaching the scale at which this is commercially viable they are likely to acquire NBN wholesale aggregation services. These service providers have been characterised as tier 2 service providers.¹⁰⁶ This currently includes Skymesh, Exetel, Aussie Broadband, Australian Private Networks and Harbor ISP. My Republic is a recent tier 2 service provider, entering the market in late 2016.

¹⁰⁵ Company websites, viewed October 2017.

¹⁰⁶ Tier 1 providers are the large providers who are vertically integrated.

Service providers who do not intend to directly acquire access services from NBN Co have been characterised as tier 3 service providers. There are currently a large number of these providers (more than 150), although they serve a relatively small number of subscribers. They may be a pure retail broadband service provider, a wholesale reseller or part of a small business that sells NBN broadband (to both residential and business customers) in conjunction with other services, such as IT services and equipment.

For a period of time some service providers may use a hybrid model of acquiring some NBN wholesale aggregation services and also directly connecting to the NBN utilising access and transmission services.

4.4.2 Market shares

Wholesale ADSL services

In relation to wholesale ADSL services, the ACCC's February 2017 Final Decision on the Wholesale ADSL service declaration inquiry noted that while there are a number of providers selling wholesale ADSL services (Telstra, Optus, TPG and Vocus), competition in supply is extremely limited.¹⁰⁷

While we have limited publicly available information in relation to market shares, the February 2017 Final Decision noted that confidential market share information provided by stakeholders during the 2013 Fixed Line Services Final Access Determination inquiry clearly indicates Telstra is the dominant provider in the market for wholesale ADSL services.¹⁰⁸

NBN wholesale aggregation services

Since the start of 2016 the number of NBN Layer 2/3 wholesale aggregation services supplied by Telstra, Optus, TPG, Vocus and MyNetFone (iBoss) has been growing steadily.

As at May 2017, the aggregation services provided by Telstra, Optus, TPG and Vocus accounted for around 4 per cent of all NBN services provided and there appears to be some competition developing. Based on information provided by these four providers there is significant disparity in their level of activity in the early stages of development of this market.¹⁰⁹

This disparity relates to both the overall number of services supplied and to the characteristics of their wholesale customers, with some wholesale aggregation providers focused on tier 2 service providers and others on tier 3 service providers. This suggests that wholesale aggregation providers are targeting service providers with distinct characteristics, and not necessarily competing for the same customers.

The estimated HHI based on the current estimated market shares of providers operating in the NBN aggregation market is between 2900 to 3400, suggesting that the market is relatively concentrated.

Wholesale MVNO services

In relation to wholesale MVNO services, we understand that in 2016, there were around 60 MVNOs competing in the retail mobile services market:

¹⁰⁷ ACCC, [Wholesale ADSL service declaration inquiry - Final Decision](#), 3 February 2017, p. 18.

¹⁰⁸ *ibid.*

¹⁰⁹ Responses to informal information requests from the ACCC from Telstra, Optus, TPG and Vocus over 2016 and 2017.

- Optus appears to have the largest share of the wholesale MVNO market, with over 27 MVNOs acquiring wholesale MVNO services from Optus.¹¹⁰
- Telstra and Vodafone appear to have significantly smaller shares of the wholesale MVNO market compared to Optus. Over 12 MVNOs acquire wholesale mobile services from Telstra and over 16 MVNOs acquire wholesale MVNO services from Vodafone.¹¹¹

There appears to be a degree of competition in the supply of these wholesale MVNO services, although Optus appears to have a significant market share. The MNO's market positions appears to be quite different to those for the supply of retail mobile voice and broadband services, where in 2015-16 Telstra had the highest market share at 45 per cent, followed by Optus at 27 per cent and Vodafone at 18 per cent.¹¹²

4.4.3 Price Competition

Wholesale ADSL services

As wholesale ADSL services are regulated, the ACCC determines access prices through its Final Access Determination, noting that exemptions apply to non-Telstra providers and those commercial agreements that can be negotiated to set prices below those in the Final Access Determination.

During the 2016–17 wholesale ADSL declaration inquiry some submissions noted the importance of the declaration continuing so that these prices would remain in place while the NBN was being rolled out and enable competition to be promoted.¹¹³

NBN wholesale aggregation services

In contrast, NBN Layer 2/Layer 3 wholesale aggregation services are not regulated and prices are commercially negotiated. From the information available to us we understand:

- There is some differentiation between price structures and prices, although most seem to have connection and capacity charges as well as transmission charges.
- There have been some changes to price structures and prices over time.¹¹⁴

Information we have on Telstra and Optus' prices points to a degree of differentiation in the prices offered for aggregation services between these two carriers.

NBN wholesale aggregation service pricing is important in enabling downstream competition in the supply of fixed line voice and broadband services.

One aspect of this is the extent to which NBN Co's discounting of the capacity (CVC) charge is being passed on in NBN wholesale aggregation prices. The information available to us suggests that while there may be pass-through in some cases, this is not universal and in many cases the service provider specific CVC discount (implemented by NBN Co on 1 July 2017) is not being passed through. In our survey of service providers acquiring NBN wholesale aggregation services, of twelve service providers, seven said that the prices they

¹¹⁰ Telstra, *Response to the ACCC's Discussion Paper on the declaration of a wholesale domestic mobile roaming service*, 2 December 2016, p. 17.

¹¹¹ *ibid.*

¹¹² ACCC, [Telecommunications Report 2015–16](#), p. 29.

¹¹³ ACCC, [Wholesale ADSL service declaration inquiry - Final Decision](#), p. 22.

¹¹⁴ Responses to ACCC survey in relation to NBN wholesale aggregation services. To assist in better understanding some of the issues associated with the supply of NBN wholesale aggregation services we developed a survey that involved multiple choice and free text responses to a variety of questions. Twelve service providers responded to the survey over June and July 2017 and we have used the responses to inform our analysis, noting that given the sample size the results are indicative only. This information was collected on the basis that it was confidential and only aggregated information would be disclosed.

are paying do not have the service provider specific discount passed through, three said it was unclear whether this was the case and one indicated the discount was being passed through.¹¹⁵ This may be a timing issue, as the discount had only just been introduced, at the time of our survey. However, it could also suggest there is not strong competitive pressure in the supply of these services.

Another aspect is that tier 2 service providers are using the Layer 2 NBN wholesale aggregation services as a stepping stone prior to achieving scale and directly acquiring NBN access and transmission services. We understand this is because directly connecting to the NBN provides greater ability to supply a differentiated service and that it is more cost effective once a threshold number of retail customers are being supplied.¹¹⁶ Therefore the cost of NBN wholesale aggregation services relative to NBN direct connection and transmission will influence these decisions.

From both our analysis and modelling, and the information provided through the market study process, it appears for metropolitan NBN POIs that 300 to 500 services in operation¹¹⁷ are required in order to make direct connection commercially viable given current average provisioning of capacity and retail pricing. This is a relatively small proportion (typically less than 0.7 per cent) of the average number of services in operation from an NBN POI once the NBN is fully rolled out.¹¹⁸ It suggests that in metropolitan areas, with current NBN and transmission pricing, the barriers to entry as a result of economies of scale are not a significant impediment to competition.

This is different at regional and rural NBN POIs depending on the cost of transmission and where greater scale is required. From our analysis, it appears that 500–1000 services in operation are required on average to make direct connection commercially viable given current average provisioning of capacity and retail pricing.¹¹⁹ This is still a relatively small proportion of the average number of services in operation from an NBN POI (1.4 per cent or less), although around double what is required in metropolitan areas.¹²⁰

We are continuing to work with industry to understand scale issues at NBN POIs, including over the transitional period prior to the NBN being fully deployed in 2020.

Issues around the scale required to move from NBN wholesale aggregation services to a model of directly connecting to the NBN and acquiring transmission services are examined further in section 5.3.

Wholesale MVNO services

MVNOs negotiate access prices and terms and conditions directly with MNOs and there has been an absence of significant complaints about these prices or conditions. We do not have any pricing information in relation to wholesale MVNO services.

¹¹⁵ Note that one service provider did not provide a response. Responses to ACCC survey in relation to NBN wholesale aggregation services.

¹¹⁶ Responses to ACCC survey in relation to NBN wholesale aggregation services.

¹¹⁷ *ibid*. The estimate of 300–500 services in operation is based on the assumption that 1 Mbps is provisioned per service (for both the NBN access component, i.e. per AVC, and for the transmission component) and that a 25/5 Mbps speed service is acquired. Allowing for a range of retail costs, as well as a margin, the estimated wholesale costs are below a \$60 retail price.

¹¹⁸ This is based on an estimated average that an NBN POI will supply around 73 000 services in operation. While the actual number of services in operation will differ per NBN POI, 500 services in operation would be 1.1 per cent of the services in operation at the NBN POI with the least services (44 000). This reflects information available from the NBN Co's [website](#), noting it was accurate as at 14 August 2013.

¹¹⁹ The 500–1000 services in operation estimate is also based on the assumption that 1 Mbps is provisioned per service (for both the NBN access component, i.e. per AVC, and for the transmission component) and that a 25/5 speed service is acquired. Allowing for a range of retail costs, as well as a margin, the estimated wholesale costs are below a \$60 retail price.

¹²⁰ Again, this is based on an estimated average that an NBN POI will supply around 73 000 services in operation. 1000 services in operation would be 2.3 per cent of the services in operation at the NBN POI with the least services (44 000) noting that this is a metropolitan, not a regional NBN POI.

4.4.4 Non-price competition

Wholesale ADSL services

As noted above, Telstra's wholesale ADSL service is a declared service and as a result the service definition specifies the scope of the service. This, and the limits of the technology, provides very little scope for differentiation and we understand that in general the services supplied are very similar.

In the 2016–17 wholesale ADSL service declaration inquiry, Optus raised concerns about product differentiation in terms of Telstra imposing an underlying requirement on access seekers to acquire additional transmission services in order to supply a functional wholesale ADSL service.¹²¹ While the ACCC determined that it would not alter the service description, it did note that it would monitor the supply of transmission with Telstra's wholesale ADSL services to ensure that bundling of these services is not compromising competitive outcomes.

At this stage, as investigations have revealed limited industry concern about the bundling and pricing arrangements, and Optus engages in similar bundling, we will further examine this matter as a part of the 2018 wholesale ADSL Final Access Determination inquiry.

NBN wholesale aggregation services

In relation to NBN wholesale aggregation services, currently the key non-price differentiation appears to be whether the services are Layer 2 or Layer 3. As set out in Table 4.10, there is not a significant amount of non-price differentiation occurring other than on this basis. However, we note that these are relatively new services and their development requires supporting business cases (including demand), capital investment and time.

¹²¹ ACCC, [Wholesale ADSL service declaration inquiry - Final Decision](#), pp. 33–40.

Table 4.10: NBN wholesale aggregation product summary¹²²

	Telstra	Optus	TPG	Vocus
Voice				
Analogue	✓	✓	✓	✓
VoIP	✓	✓	✓	✓
Speeds (peak and committed information rate)				
12/1	✓	✓	✓	✓
25/5	✓	✓	✓	✓
25/10	✓	✓	✓	✓
50/10	✓	✓	✓	✓
100/40	✓	✓	✓	✓
Capacity				
Dedicated CVC for each service provider	x	x	x	x
Shared CVC for each service provider	✓	✓	✓	✓
Aggregation supported and location of the POI				
ADSL	✓	✓	✓	✓
Non-NBN fibre access e.g. FAB, non-NBN FTTB	?	?	?	?
State based aggregation	✓	✓	✓	✓
National aggregation	✓	✓	✓	✓
Traffic management				
Prioritisation	?	?	?	?
Protection (providing alternative transmission path)	✓	✓	✓	✓
Capacity management	?	?	?	?
Layer 2 services	x	✓	✓	✓
Layer 3 services				
Internet access	✓	Optional	Optional	Optional
Value added services	✓	Optional	Optional	Optional
Underlying access technology supported				
Fibre to the home	✓	✓	✓	✓
Fibre to the node	✓	✓	✓	✓
HFC	✓	✓	✓	✓

¹²² Company websites, viewed October 2017 and responses to informal information requests from the ACCC to Telstra, Optus, TPG and Vocus over 2016 and 2017.

	Telstra	Optus	TPG	Vocus
Fixed wireless	✓	✓	✓	✓
Satellite	x	x	x	x

The number of these aggregation products is growing, with one tier 2 service provider, Aussie Broadband, also starting to supply an NBN wholesale aggregation service. Further entry by tier 2 services providers supplying these services may occur where they move to a model based on direct connection to the NBN (depending on how they weigh the trade-off between the benefit of another revenue source versus the potential loss of retail market share). Supply by new providers may improve the extent of competition.

However, there is a tension here because as tier 2 service providers move away from acquiring NBN wholesale aggregation services, and potentially start to provide them, they are reducing the level of demand for those services. This may potentially undermine any business case around further development and innovation of NBN wholesale aggregation services.

The NBN wholesale aggregation products themselves are also evolving with, for example Optus announcing in January 2017 the introduction of state based interconnection, more data centre handover points and that services would be available over HFC.¹²³

The Competitive Carriers Coalition noted in its submission to the market study that there is no national aggregator that provides Layer 2 TC2 (business) or TC1 (voice only).¹²⁴ While this appears to have been the case at that time, we understand that some providers of NBN wholesale aggregation services now have these services available, or have intentions to supply these services in 2017 (following an initial focus on developing and delivering Layer 2 and 3 TC4 (residential services)).

A further concern expressed in relation to TC2 services is the time taken to provide these wholesale services and the lag compared to when the providers of the NBN wholesale aggregation services supplied them in the retail market.

Another concern from service providers is the extent to which they can control and differentiate the downstream fixed line broadband service being supplied using NBN wholesale aggregation services. This includes the influence they have over product design and control over the operational quality of their services using NBN wholesale aggregation services. For example, we understand that in most cases a service provider is generally dependent on the aggregation provider's CVC dimensioning and with no dedicated capacity this could potentially compromise the quality (speed) of the service the service provider is seeking to achieve. We are aware, however, that at least one provider offers some ability to dimension CVC for different average peak hour traffic outcomes within a limited range of capacity.

This was also somewhat evident from our survey where seven service providers (out of twelve) indicated that they acquired a service that does not enable a different bandwidth to be supplied to that being supplied to the provider's retail customers, while four acquired a service that enables a differentiated service.¹²⁵

¹²³ Optus, [Optus wholesale expands NBN introducing HFC access to improve flexibility and speeds](#), Media release, 10 January 2017.

¹²⁴ Competitive Carriers Coalition, *ACCC Issues Paper, Competition in evolving communication markets, Submission to the communications market study issues paper*, October 2016, p. 15.

¹²⁵ Responses to ACCC survey in relation to NBN wholesale aggregation services.

Some service providers have also expressed concern in relation to the information available from the providers of NBN wholesale aggregation services. In particular, that operational information which would help them in managing their service is either not provided or not available in a consistent manner and this is limiting their ability to compete effectively.

While these concerns can be an inherent limitation of network services supplied over a shared wholesale network, and may be occurring as we are in a stage of transition, some acquirers of these services feel that the fact that they are purchasing from vertically integrated providers weakens incentives to supply competitive NBN wholesale aggregation services.

These issues, which are fundamental to whether there is an effective market for the supply of NBN wholesale aggregation services, are discussed further in section 5.3.

Wholesale MVNO services

In relation to wholesale MVNO services all three MNOs provide 3G and 4G services but are differentiated as follows:

- Other than in relation to Boost, Telstra's wholesale MVNO service provides a smaller coverage area (98.8 per cent of the population) relative to the service available to Telstra's retail customers (99.3 per cent of the population). However, Telstra's wholesale MVNO service still offers the greatest geographic coverage.¹²⁶
- As far as the ACCC can tell, MVNO's using the Optus and Vodafone networks have access to the entire network footprint. It is less clear whether MVNOs using either of those networks have access to the same technology (i.e. 3G and 4G) footprint.

In its submission to the market study, the Competitive Carriers Coalition raised the possibility of MNOs supplying wholesale MVNO services that limit the ability for service providers to differentiate services and compete effectively. It provided an example of this with Telstra requiring MVNOs to move to a new wholesale platform that limits their ability to manage data usage across their customer base, therefore constraining them to reselling services.¹²⁷

It also considered there are similar issues which undermine competition in machine to machine services (e.g. commercial fridges capable of ordering new supplies when needed and remotely readable metres) which rely on wholesale mobile services. It noted that one of its members has not been able to supply a machine to machine drone service as Telstra has not supported the underlying wholesale mobile service.¹²⁸

The Competitive Carriers Coalition also noted the importance of MVNOs being able to supply bundled product offerings and providing an additional competitive dynamic to the MNOs.

We do not have clear evidence about whether, and the extent to which, these types of issues are restricting competition in the supply of downstream mobile and machine to machine services. Prior to finalising our report, we will explore industry views about any additional wholesale MVNO service functionality that is considered necessary to facilitate competition and any commercial or technical issues that limit the wholesale MVNO services supplied.

¹²⁶ Telstra, *Response to the ACCC's Discussion Paper on the declaration of a wholesale domestic mobile roaming service*, 2 December 2016, p 16 and ACCC, *Domestic mobile roaming declaration inquiry*, Draft Decision, May 2017, p 7 and 37.

¹²⁷ Competitive Carriers Coalition, *ACCC Issues Paper: Competition in evolving communication markets*, October 2016, pp. 10–12.

¹²⁸ *ibid.*, p. 13.

We also note that with mobile technology evolving to 5G services there is likely to be greater network functionality through network slicing, which may enable different wholesale MVNO service offerings (e.g. in relation to IoT). As 5G services evolve, and are deployed, we will examine their impact, if any, on MVNO services.

4.4.5 Competitive constraints

NBN wholesale aggregation services

A potential competitive constraint in relation to the supply of NBN wholesale aggregation services is the possibility of NBN Co providing a similar service.

NBN Co has expressed concern that access to the regional NBN POIs may represent a barrier to entry for smaller service providers given their higher transmission costs.¹²⁹ In this context we understand it has consulted with stakeholders about the development of a 'CVC trunking' product. This would essentially be an aggregation service (NBN access service and transmission) provided by NBN Co that would allow service providers to interconnect with the NBN network on an aggregated basis rather than at each of the 121 POIs.

We understand NBN is considering next steps, including whether it will provide a trunking product and if so the nature of the product the basis on which it would be provided e.g. whether it is targeted to smaller service providers or offered on a temporary basis.

In their submissions to the market study both Telstra and Optus argued that NBN Co's intervention in the market through the provision of an aggregation services is unwarranted, would cause uncertainty and presents a sovereign risk for communications investment.¹³⁰

We are interested in the potential for an NBN wholesale aggregation service supplied by NBN Co to provide further competitive dynamic. This is examined further in section 5.3.

4.4.6 Overall assessment of competition

Wholesale ADSL services

There is limited competition in the supply of wholesale ADSL services, with Telstra having a dominant position in the market. This is reflected in our February 2017 Final Decision on the Wholesale ADSL service declaration inquiry where we determined regulation of the service should be retained. As the NBN is progressively rolled out, wholesale ADSL services will no longer be required and service providers may decide to use NBN wholesale aggregation services or directly connect to the NBN.

Draft finding

There is limited competition in the supply of wholesale ADSL services, with Telstra having a dominant position in the market.

NBN wholesale aggregation services

The supply of NBN wholesale aggregation services appears to be evolving, as is the degree of competition. While it is still in the early stages, the significant rollout of NBN services over 2017 and 2018 provides an opportunity for the market to grow, product innovation to occur and the potential for new entry.

¹²⁹ Morrow, Bill, [Keynote address at National Press Club](#), 16 September 2015.

¹³⁰ Telstra, *Telstra submission to ACCC competition in evolving communications markets issues paper*, November 2016, p. 21 and Optus, *Submission in response to ACCC Issues Paper Competition in evolving communications markets*, October 2016, pp. 33–34.

Draft finding

NBN wholesale aggregation services are being used by some service providers as a stepping stone prior to directly connecting to the NBN, while other service providers are using them in an ongoing capacity to supply retail broadband services on the NBN. Under both possible models of use it is important for there to be competitive supply to promote competition in the supply of downstream retail broadband services.

There is concern from downstream service providers that NBN wholesale aggregation services do not meet their needs and that the vertically integrated providers of these services may have conflicting incentives to supply their own retail voice and broadband services in preference to competing for NBN wholesale aggregation market share. This is discussed further in section 5.3.

Reflecting the information currently available to us and our modelling, economies of scale at the NBN POIs do not appear to be a significant barrier to entry given it is commercially viable to offer services at a POI when there are 300–500 services in operation (out of around 70 000 on average when the NBN services are fully rolled out) or between \$6000–\$10 000 of revenue in metropolitan areas. This is less clear in regional and rural areas and scale issues in these regions are discussed further in section 5.3. We encourage submissions to the draft report to provide evidence in relation to the scale required at NBN POIs (metropolitan, regional and rural) to make direct connection to the NBN commercially viable.

Draft finding

Economies of scale at the NBN POIs do not appear to be a significant barrier to entry in metropolitan areas. However, this is less clear in regional and rural areas.

Wholesale MVNO services

Wholesale MVNO services are currently available from the three MNOs who compete for wholesale MVNO customers. However, it is currently unclear what ability MVNO customers have to differentiate services and we do not have clear evidence to determine whether the basis on which wholesale MVNO services are supplied restricts downstream competition.

The growing importance of wireless networks will have implications on MVNOs and their ability to compete. At the market study stakeholder forum, several MVNOs suggested that restrictions on their access to mobile networks limited their ability to effectively compete with the infrastructure-owning MNOs. Further research on the restrictions faced by MVNOs is currently being undertaken by the ACCC.

Draft finding

There appears to be some competition in the supply of wholesale MVNO services. However, it is currently unclear what ability MVNO customers have to differentiate services.

Further, to the extent mobile technologies compete in the future with fixed line services and offer substitutable services, wholesale MVNO services may be used instead of, or along with NBN wholesale aggregation services depending on the service provider's business model. This is discussed further in section 6.1.

4.5 Transmission and dark fibre services

By transmission and dark fibre services we mean those services which enable large volumes of aggregated communications traffic (e.g. voice, data, video) to be carried, in many instances over long distances, from one point to another. These generally involve high

capacity data links and are acquired by service providers as a wholesale input to the supply of voice and broadband services (fixed line and mobile) to end-users. We have mainly focused on the use of these services to supply retail fixed line services reflecting the significant use of these services by tier 1 and 2 service providers to supply services over the NBN and where most of the concerns have been raised. They are also used by tier 1 service providers to supply mobile services.

Our assessment is that competition in the supply of transmission services, including to NBN POIs, continues to develop and is particularly strong in metropolitan areas. However, there are some regional routes where competition is more limited and this may be impacting competition in the supply of downstream voice and broadband services. This is discussed further in section 5.3.

Information we have suggests there is limited competition in the supply of dark fibre services, including to NBN POIs, with only two active larger suppliers and a small number of other providers supplying more niche services in metropolitan areas. Dark fibre and any potential need for regulation is also discussed further in section 5.3.

4.5.1 Market structure and service providers

The differences between transmission types (managed transmission and the DTCS) and dark fibre services are set out in Table 4.11, which also details the various providers. The differentiation between transmission and dark fibre services is supported by the ACCC's March 2014 Final Report on the review of the declaration for the DTCS that considered dark fibre was not a transmission service and was not a direct substitute.¹³¹

Table 4.11: Characteristics and wholesale providers of transmission and fibre services¹³²

Service	Characteristics of the service	Wholesale providers
Managed transmission services	<ul style="list-style-type: none"> Can be provided using fibre, copper and microwave Point-to=point, or point-to-multipoint Rates generally above 2 Mbps Symmetric/Asymmetric Contended/Uncontended Additional functionality such as proactive monitoring and service assurance Includes managed transmission from the NBN POIs Prices are averaged based on zones and route types rather than based on radial distances 	<ul style="list-style-type: none"> Telstra Optus TPG (Pipe, AAPT) Vocus (Nextgen)
Declared domestic transmission capacity services (DTCS)	<ul style="list-style-type: none"> Can be provided using fibre, copper and microwave Point-to-point Rates above 2 Mbps Symmetric 	<ul style="list-style-type: none"> Telstra Optus TPG (Pipe, AAPT) Vocus (Nextgen)

¹³¹ ACCC, [Domestic Transmission Capacity Services, An ACCC Final Report on the review of the declaration for the Domestic Transmission Capacity Services](#), March 2014, p. 29. It was noted that while dark fibre was capable of being used as in input to provide transmission services, it is nevertheless an unconditioned product which requires access seeker's connecting equipment and management systems in order to replicate the DTCS.

¹³² Company websites, viewed October 2017.

Service	Characteristics of the service	Wholesale providers
	Uncontended Includes DTCS from the NBN POIs Prices based on radial distances	Others—e.g. utility and rail corporations*
Dark fibre	Unlit fibre Requires connecting equipment and management system to be provided by the access seeker to supply a transmission service Scalable Generally utilised in metropolitan areas where the shorter distances suit its technical capabilities	TPG (Pipe, AAPT) Vocus (Nextgen, Firstpath) Others—e.g. Superloop, Nexium, Wideband Others—e.g. utility corporations

* Although not subject to the declaration they are considered as a part of the DTCS competition assessment given they have limited networks.

As with the wholesale aggregation services, there has been consolidation of the providers supplying these transmission services over the last few years and they are now predominantly supplied by the four larger providers (Telstra, Optus, TPG and Vocus). Transmission may be acquired from providers selling it over their own transmission infrastructure or from providers reselling transmission services supplied by another operator.

Dark fibre services are provided commercially by a subset of these providers, with TPG and Vocus having commercial offers. There are also a small number of other providers that have developed niche services e.g. on a geographic basis and generally in metropolitan areas. Our understanding is that Telstra and Optus do not currently provide dark fibre services, except that agreed between Telstra and NBN Co under the Definitive Agreements.

The four larger providers mentioned above are vertically integrated, supplying wholesale services as well as downstream retail voice and broadband services.

Similar to wholesale aggregation services, transmission and dark fibre services are acquired by a variety of service providers. In the context of the NBN this includes the tier 2 service providers noted in section 4.4 that are directly connecting to the NBN once they have reached a commercially viable scale at an NBN POI. In submissions to the market study, as well as responses to the survey of service providers acquiring transmission and dark fibre services, some service providers considered that dark fibre is a pre-requisite for managing exponentially growing consumer demand, is more cost effective at scale and that it provides greater flexibility in supplying and the ability to differentiate services.¹³³

4.5.2 Market shares

Transmission services

Our framework for assessing competition in the supply of transmission services in the 2014 review of the declaration for the DTCS involved examining specific Telstra exchange service

¹³³ Vodafone, *ACCC Communications Market Study Issues paper, submission by Vodafone Hutchinson Australia*, October 2016, pp. 23–24 and MNF Group, *MNF Group Limited (MNF) response to the ACCC Issues Paper “Competition in Evolving Communications Markets*, September 2016, pp. 1–2. Responses to ACCC survey in relation to transmission and dark fibre services. This survey was issued at the same time and on the same basis as the survey in relation to NBN wholesale aggregation services noted above.

areas (ESAs), rather than across a national market. As a result, the competition assessment was more disaggregated and aggregate market shares on a national basis are not available.¹³⁴ It involved examining whether there are at least three providers of fibre infrastructure at, or within close proximity to, a Telstra exchange¹³⁵ and a number of other quantitative and qualitative assessments.

Our findings in that review were that:

- The majority of already deregulated ESAs and routes were competitive with three or more providers¹³⁶ and that competition was effective on most inter-capital routes, a number of regional routes and between a large number of metropolitan ESAs.¹³⁷ In total 27 regional routes and 200 metropolitan ESAs were deregulated.¹³⁸
- Telstra remained the dominant supplier of transmission service in regional areas.¹³⁹
- There were some ESAs/routes where competition was not sufficient, including where there were fewer than three providers, and as a result these routes were declared and regulated. This included three regional routes that were previously deregulated (Maryborough, Bundaberg and Rockhampton).¹⁴⁰
- In some areas there were providers with existing optical fibre networks located within very close proximity to, but perhaps not connected to, an exchange. They were not providing transmission, and would need to make additional, not insubstantial investments to do so. But we considered there were some routes where demand was sufficient for it to occur and investment was more likely to be encouraged if regulation was removed. In other cases, where investment was not considered likely, the route remained declared.¹⁴¹

Reflecting the importance of transmission services to NBN POIs, we examined this issue in the 2014 review of the declaration for the DTCS.¹⁴² The ACCC's March 2014 *Final Report on the declaration for the DTCS* found that transmission on routes from 46 of the NBN POIs to POPs did not demonstrate sufficient competition with less than three infrastructure providers, and should remain declared. However, we found that transmission from 75 of the NBN POIs located in relevant ESA's was sufficiently competitive and that declaration was not required.¹⁴³

Since the declaration inquiry in 2014 there has been further investment at some NBN POIs which will have improved the state of competition.¹⁴⁴ In particular:

- Optus is now connected to all NBN POIs via a combination of its own transmission infrastructure¹⁴⁵ and acquiring transmission services from other providers from a small number of POIs.

¹³⁴ When examining the state of competition, the ACCC did not consider it was necessary to define a national market. While access seekers may require access on a national basis, we considered that they typically acquired transmission services from specific Telstra exchanges and as such the services are not substitutable. We therefore assessed competition on an exchange service area (ESA) basis. ACCC, [Domestic Transmission Capacity Services, An ACCC Final Report on the review of the declaration for the Domestic Transmission Capacity Services](#), March 2014, pp. 26–27.

¹³⁵ In many cases this would be Telstra plus two others.

¹³⁶ ACCC, [Domestic Transmission Capacity Services, An ACCC Final Report on the review of the declaration for the Domestic Transmission Capacity Services](#), March 2014, p. 46.

¹³⁷ *ibid.*, p. 82.

¹³⁸ *ibid.*, p. 54.

¹³⁹ *ibid.*, p. 8.

¹⁴⁰ *ibid.*, p. 47.

¹⁴¹ *ibid.*, p. 82.

¹⁴² Noting that the ACCC made this assessment in each Telstra ESA where there was an NBN POI.

¹⁴³ *ibid.*, p. 24.

¹⁴⁴ This reflects the information provided under the Infrastructure Record Keeping Rule for the period to 31 January each year.

¹⁴⁵ Optus, *Submission in response to ACCC Issues Paper Competition in evolving communications markets*, October 2016, p. 33.

- TPG has invested to expand its network to reach most NBN POIs, although it still acquires transmission connectivity to some regional and remote POIs.
- Vocus has increased the number of NBN POIs it provides transmission services to as a result of its merger with Nextgen. Vocus has also made statements about investing \$11.5 million to increase connectivity of infrastructure from 68 to 112 NBN POIs following the Nextgen acquisition.¹⁴⁶

While there are some NBN POIs where there is limited infrastructure competition (i.e. where Optus, TPG and Vocus acquire transmission) those POIs are regulated. We have some evidence to suggest that at these POIs commercial agreements are being negotiated. For example, Aussie Broadband and M2 have negotiated transmission agreements with Telstra for access to all 121 NBN POIs.¹⁴⁷ We are also aware that some service providers have been able to negotiate commercial competitive rates for a ring structures, including from Tasmanian POIs back to Melbourne.

There have been concerns expressed during the market study, including through the survey of service providers acquiring transmission and dark fibre services, that there is limited choice of active suppliers of transmission services and limited choice of service. For example, in response to our survey one service provider noted that there are limited supply options for fully protected (dual path) feeds to all NBN POIs.¹⁴⁸

As a part of the upcoming review of the declaration for the DTCS we will undertake a comprehensive examination of ESAs to establish whether there have been any changes to the extent of competition.¹⁴⁹ It is anticipated that further incremental investment will have increased competition at some metropolitan ESAs, but that competition will remain limited at some regional ESAs. The DTCS declaration review will specifically examine the state of competition at each of the NBN POIs (and in particular the relevant ESA). Without wanting to pre-judge this, based on the information we currently have there appears to be at least an additional 30 NBN POIs where there are now three or more providers supplying services, suggesting an improvement in competition. However, the state of competition assessment in the DTCS declaration review will also need to take into account the concerns expressed in the market study and the survey about the limited service options mentioned above as well as other relevant information.

We consider there are some regional transmission routes, e.g. Tasmania, coastal Queensland, remote WA and Darwin where there is more limited competition (these routes will most likely remain regulated) and this may be impacting competition in the supply of downstream voice and broadband services.

Dark fibre

We understand dark fibre services are provided commercially by a subset of the providers who supply transmission and wholesale aggregation services.

In particular, TPG (including AAPT and Pipe Networks) and Vocus are offering commercial dark fibre services in the market. This was confirmed via our survey of service providers acquiring transmission and dark fibre services. Of the twelve service providers surveyed, and the seven acquiring dark fibre, three were acquiring services from TPG and five from Vocus, noting that two providers were acquiring services from both providers.¹⁵⁰

¹⁴⁶ Vocus, [Acquisition of Nextgen Networks and Capital Raising](#), June 2016, p. 8, viewed on 26 October 2017.

¹⁴⁷ Aussie Broadband, [Aussie Broadband building to all nbn POIs](#), viewed on 26 October 2017 and M2 Group, Investor Presentation [Investor Presentation](#), 24 August 2015, presented by Geoff Horth CEO, viewed on 26 October 2017.

¹⁴⁸ Responses to ACCC survey in relation to transmission and dark fibre services.

¹⁴⁹ We will be commencing a review of the DTCS declaration before the end of 2017.

¹⁵⁰ Responses to ACCC survey in relation to transmission and dark fibre services.

TPG's involvement in the market is also illustrated by the significant agreement it entered into with Vodafone for the supply of dark fibre services to 3000 Vodafone base stations representing the majority of its mobile network. This is a 15 year, \$1 billion agreement and has been designed to prepare Vodafone for the requirements of 5G.¹⁵¹ It will likely also have benefits in terms of TPG's entry into supplying mobile voice and broadband services.

As noted above, we understand that Telstra and Optus are not supplying dark fibre services. Again, from our survey, of the seven service providers acquiring dark fibre, four had approached Telstra, with only one receiving a quote and three had approached Optus with two receiving a quote. None of the seven service providers acquired dark fibre services from Telstra or Optus.¹⁵²

Further, we understand from our survey of service providers acquiring transmission and dark fibre services that while some providers are supplying dark fibre services, their availability at NBN POIs is limited.¹⁵³ One service provider noted that dark fibre services are supplied by one provider to around 40 NBN POIs.

In its submission to the market study Vodafone submitted that some vertically integrated providers have incentives to restrict supply, particularly in regional areas, given they are likely to generate lower margins than other services and limit the ability to compete.¹⁵⁴ MNF Group and the Competitive Carriers Coalition also expressed similar concerns in relation to vertical integration playing a role in limiting the supply of dark fibre services.¹⁵⁵

The other providers of dark fibre appear to have developed niche services, such as between data centres or in specific geographic areas and we do not have visibility of the extent to which these services are being used in the market.

On the limited information that we have in relation to dark fibre services, the market appears to be relatively concentrated with only two active larger suppliers and a small number of other providers supplying more niche services.

4.5.3 Price competition

Transmission

Prices for regulated DTCS services are set in our 2016 Final Report on the Public Inquiry to make a Final Access Determination for the DTCS. These are dependent on the route (metropolitan, regional, tail end and routes to/from Darwin and Hobart), the radial distance (0–4000 km) and the capacity (2 Mbps–1 Gbps). These are regulated prices and different prices can be commercially negotiated. Prices for managed transmission services reflect the outcomes of competitive market processes.

We have obtained information informally about the current commercial pricing of transmission services from the NBN POIs. Some of these routes are subject to price regulation under the DTCS 2016 Final Access Determination and others are not. This information suggests that there is a reasonable degree of competition at many NBN POIs and with varying prices between providers. The information from several providers for

¹⁵¹ Vodafone and TPG, *Vodafone and TPG announce \$1 billion deals*, media release, 30 September 2015.

¹⁵² Responses to ACCC survey in relation to transmission and dark fibre services.

¹⁵³ Responses to ACCC survey in relation to transmission and dark fibre services.

¹⁵⁴ Vodafone, *ACCC Communications Market Study Issues paper submission by Vodafone Hutchinson Australia*, October 2016, pp. 23–24.

¹⁵⁵ MNF Group, *MNF Group Limited (MNF) response to the ACCC Issues Paper "Competition in Evolving Communications Markets"*, September 2016, pp 1–2. Competitive Carrier Coalition, *ACCC Issues Paper: Competition in evolving communication markets Submission to the communications market study issues paper*, October 2016, p. 16.

selected NBN POIs for 1 Gbps services show that the commercial prices at these POIs are below the regulated prices that would apply under our 2016 Final Access Determination.

However, other pricing information suggests that competition in the supply of transmission services on some regional NBN POIs that are regulated remains limited, with instances of list prices being above those set in our 2016 Final Access Determination. While service providers have been able to negotiate prices lower than these list prices, in some cases these are still above our Final Access Determination prices (which can occur if there is commercial agreement and no regulatory intervention has been sought). This pricing information raises concerns about the ability of tier 2 service providers to negotiate reasonable transmission service pricing outcomes at these regional NBN POIs, and therefore for competition in the downstream supply of retail broadband services in these locations. As such, it may represent a barrier to entry for smaller service providers offering services at these NBN POIs, and in national retail voice and broadband markets, meaning service providers may have to rely on wholesale aggregation services in some regional areas.

A small service provider told us it supported these observations noting that inter-capital transmission is very competitive but that its key concern is in the lack of competition to access NBN POIs. It noted this is making it hard for it to compete (margins are poor on 'direct connect' routes particularly to regional POIs where bandwidth costs are high and sales are poor).

This may also reflect the concerns raised in the survey of service providers acquiring transmission and dark fibre services. Of the twelve service providers surveyed, and the six acquiring transmission services, four had concerns that transmission pricing is not competitive.¹⁵⁶

Dark fibre

We have limited information in relation to the prices of dark fibre and whether providers are actively competing based on price.

As a part of our survey, we asked whether service providers had any concerns in relation to the price and non-price terms and conditions that limit their ability to compete. Of the twelve service providers surveyed, and the seven acquiring dark fibre, none raised concerns in relation to the price and non-price terms and conditions.¹⁵⁷ Further, the information provided in the survey about dark fibre pricing indicated that of the seven service providers acquiring dark fibre, three had experienced price decreases over time¹⁵⁸ suggesting there are no pricing concerns from those providers that have been able to negotiate supply.

4.5.4 Non-price competition

Transmission

While price is the key differentiator of DTCS services, service providers also have the ability to purchase managed transmission services with additional functionality and components beyond the basic DTCS service. As noted in Table 4.11, these provide very similar services to DTCS but have additional functionality such as proactive monitoring and service assurance.

¹⁵⁶ Responses to ACCC survey in relation to transmission and dark fibre services.

¹⁵⁷ *ibid.*

¹⁵⁸ *ibid.*

However, in its submission to the market study Vodafone raised concerns that Telstra does not allow it to acquire both the regulated DTCS and different managed transmission products, i.e. it must acquire DTCS exclusively.¹⁵⁹ Vodafone was of the view this is making it impossible for existing customers to purchase DTCS without causing major impacts.

We have examined this issue and our view is that where there is no current agreement for declared DTCS in place, and where there is no commercial agreement requiring all transmission products to be acquired as managed transmission services, then Telstra would be obliged to supply the services under its standard access obligations. However, under the regulatory hierarchy the terms and conditions (including price) in an existing access agreement will take precedence over the terms and conditions in the Final Access Determination. Therefore, if a service provider has negotiated terms and conditions that require the purchase of all new/future transmission services under an existing agreement then this may serve to preclude a service provider from purchasing DTCS services without first terminating the agreement for managed transmission services.

In the context of our upcoming review of the DTCS declaration and Final Access Determination, we will consider the service description and whether in the future some features of the managed transmission service should be included.

While the focus of this section has been on transmission services used as inputs for the supply of fixed line broadband services, they are also used as wholesale inputs to provide mobile services. As a part of the review of the DTCS declaration, we intend to examine transmission services used to supply mobile services, particularly in remote areas. This follows our Domestic Mobile Roaming Declaration Inquiry and concerns raised in that context about whether transmission used to provide mobile backhaul in remote areas, and particularly for towers funded under the Government's Mobile Black Spot Program, should be distinguished from other transmission services (both more generally and where they are used to supply fixed line broadband services in remote areas).¹⁶⁰

It is also worth noting that another issue we will examine in the context of the DTCS declaration review is the extent to which business services supplied over the NBN (TC2 services) are potential substitutes for transmission services.¹⁶¹

Dark fibre

We do not currently have significant information about any non-price differentiation that exists in relation to dark fibre services, apart from noting that as it is an unlit fibre service not much non-price differentiation would be anticipated, other than perhaps the option of path diversity for resiliency.

The different geographic coverage that service providers have may be a point of differentiation when negotiating agreements. Vocus appears to offer greater coverage with its dark fibre services (including those it acquired in its merger with Nextgen) than TPG.

4.5.5 Competitive constraints

Transmission

As outlined above, DTCS is regulated on routes where there is not sufficient evidence of infrastructure-based competition. The presence of regulation, and the potential threat of

¹⁵⁹ Vodafone, *ACCC Communications Market Study Issues paper: submission by Vodafone Hutchinson Australia*, October 2016, pp. 24–25.

¹⁶⁰ ACCAN, *Submission to the ACCC's Domestic Mobile Roaming Inquiry Draft Decision*, 16 June 2017, p. 4.

¹⁶¹ These are currently provided on FTTP and FTTN technologies, but not on HFC, fixed wireless or in satellite areas.

regulation, is likely to further constrain the way in which transmission services are supplied. Providers will be aware that if they seek to limit the supply of services, or to set prices in a manner which are outside the bounds to be expected in a competitive situation, then regulatory intervention may occur.

Dark fibre

The potential regulation of dark fibre (as suggested by some of the submissions to the market inquiry—see below) may be a potential competitive constraint. That said, it is unclear whether there is a case for regulation of dark fibre services and this question is explored further in section 5.3. We consider it is important to examine this given that access to competitive dark fibre services may help enable the sector to manage exponentially growing data demand and traffic.

4.5.6 Overall assessment of competition

Competition in the supply of transmission services, including to NBN POIs, continues to develop, particularly as the rollout of the NBN progresses, and in metropolitan areas. The presence of managed transmission services, in addition to the DTCS, and the possibility of regulatory intervention also facilitate competitive outcomes.

There are some regional transmission routes, where there is more limited competition and this may be impacting competition in the supply of downstream voice and broadband services.

Draft finding

Competition in the supply of transmission services, including to NBN POIs, continues to develop, particularly as the rollout of the NBN progresses, and in metropolitan areas. However, there are some regional transmission routes where there is more limited competition.

The potential role of transmission services in regional and rural areas in promoting competition on the NBN is discussed further in section 5.3.

While we do not have significant information, the data we have suggests that there is limited competition in the supply of dark fibre services, including to NBN POIs, with only two active larger suppliers and a small number of other providers supplying more niche services in metropolitan areas.

Draft finding

The market for dark fibre services appears to be relatively concentrated with only two active larger suppliers and a small number of providers supplying more niche services, limiting competition in the supply of these services, including to NBN POIs.

The role of dark fibre in metropolitan, regional and rural areas, and any potential need for regulation, in order to promote competition in the supply of fixed line broadband services is discussed further in section 5.3.

4.6 Internet interconnection

The internet comprises many independently owned, managed, and operated networks that connect with one another to create the global internet. In order to achieve any-to-any connectivity and enable the exchange of data between users across the internet, individual networks make direct connections with one another, as well as indirect connections through

other providers that transport data traffic. The overall goal of internet interconnection is to ensure that content and data can get to and from end-users in a reliable, efficient, and cost-effective way irrespective of where the data originates or the location of the end-user.

To access content hosted on (or originating from) another service provider's network, a broadband service provider must interconnect directly or indirectly (i.e. via a third party network) with that service provider. Further, the broadband service provider must also interconnect with another network in order to deliver any communications or content generated by its own end-users (or content and application service providers hosted on the broadband service provider's network), to end-users on the other network.

The larger the other network (in terms of content it hosts and the number of end-users on its network), the more important it becomes for a broadband service provider to interconnect with it. This may give rise to an imbalance in bargaining power when negotiating internet interconnection arrangements with large broadband service providers. As a key input into retail broadband services, it is important that all service providers can obtain internet interconnection on competitive terms so as to not deter entry or expansion in the supply of downstream communications services.

4.6.1 Interconnection arrangements between networks

There are two key types of commercial models for interconnection: transit and peering—Australian networks of all sizes will generally use a combination of both arrangements.¹⁶²

- Transit agreements are bilateral interconnection agreements between two networks where the larger network interconnects with the smaller network in exchange for a fee.
- Peering is an agreement between networks to carry traffic for each other and for their respective transit customers, typically on a settlement free basis. In a settlement free peering agreement, the networks usually share the fixed costs associated with setting up and maintaining the interconnection, but do not generally charge each other for the exchange of traffic.

Peering agreements tend to arise where traffic flows between the networks are of a similar value or other commercial incentives make the agreement mutually beneficial.

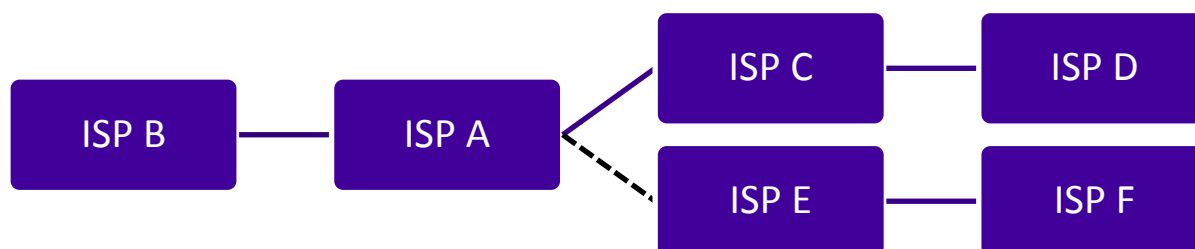
Internationally, it is common for large networks to develop and promulgate a set of criteria another network must meet in order to qualify for a peering arrangement. These criteria often relate to the scale, coverage, quality and traffic characteristics of the requesting network.

Where a requesting network does not meet the requirements for peering, the larger network will typically charge the smaller network for interconnection under a transit agreement. Transit provides full internet connectivity to the smaller network, and is an essential wholesale input in supplying downstream broadband services including residential and business broadband services over both fixed and mobile access networks.

In Figure 4.20 below, transit relationships are represented as a solid line and peering relationships are represented by a dash line. Internet service provider (ISP) B buys transit from ISP A and in doing so gains access to all the other ISPs in the diagram (i.e. ISPs C, D, E and F). Access to ISP E and F is obtained through a peering relationship ISP A has with ISP E. In essence, the transit agreement imposes an obligation on ISP A to exchange traffic with ISP B directly and to use its network to carry traffic from third party ISPs to ISP B's network through ISP A's peering and transit relationships.

¹⁶² While large Australian networks will generally peer with other large Australian networks for interconnection, they tend to enter into transit agreements to gain access to very large global telecommunications networks.

Figure 4.20: Interconnection arrangements between various networks



4.6.2 Internet interconnection arrangements in Australia

In Australia, there are four broadband service providers (Telstra, TPG, Optus, and Verizon) who have long-established peering relationships (the TTOV).

Due to the number of end-users on TTOV and value of internet content they host, smaller broadband service providers must interconnect (directly or indirectly) with at least one of TTOV to supply retail broadband services. Interconnection with one of TTOV provides access to all four of TTOV networks through their peering relationships. This arrangement reflects international practice for internet interconnection but may give TTOV networks a cost advantage over smaller service providers. It may also allow these larger networks to set price and non-price terms to their advantage.

Transit has largely become a homogenous wholesale product offered by TTOV networks providing full access to the domestic internet, which may be bundled with international transit (providing international internet connectivity). TTOV networks tend to charge a unit based price (based on committed capacity) for the volume of traffic flowing between the two networks.

4.6.3 Interconnection options for smaller networks

While smaller broadband service providers require access to TTOV networks to achieve full internet connectivity, there may be a range of full and partial substitutes to acquiring transit from TTOV. These include:

- Purchasing transit from aggregators rather than directly from TTOV (for example, Vocus aggregates and re-sells a mix of domestic and international transit product to other networks).
- Interconnecting with other networks and content and application providers through settlement free peering at internet exchange points (IXPs), sometimes referred to as 'public peering.' These IXPs are located within carrier-neutral data centres and attract a range of networks and content providers to co-locate for the optimal and low-cost exchange of traffic. While this may provide a large volume of the traffic requirements of smaller broadband service providers, it does not provide access to TTOV.
- Networks may also use international transit as a substitute for some domestic transit should they be able to obtain it at a lower price or be able to access other inputs such as international transmission on a cost-effective basis. A disadvantage of this is that it can increase the latency due to the distance being travelled to the international IXP and impact on the quality of service for some applications.

The volume of traffic a network can exchange through public peering or international routes will vary depending on the characteristics of the traffic it is seeking to exchange. While transit is an unavoidable cost in providing downstream broadband services, the proportion of the total cost in providing the downstream service comprised of transit costs will vary between service providers, their business models and products.

Although alternative interconnection options exist in relation to non-TTOV traffic, because access to TTOV (either directly or through an aggregator) is necessary for broadband service providers to offer full internet connectivity, this is likely to collectively confer a degree of market power on TTOV in the supply of transit. Their control over the supply of transit may provide TTOV, individually or collectively, with the ability to set unreasonable terms of access to interconnect and exchange traffic with their networks, and raise their rivals' costs in downstream markets to the detriment of competition.

Long standing competition issues

Competition concerns in relation to internet interconnection with key networks have been an issue in Australia since Telstra gained dominance in the internet market. In 1998 the ACCC issued Competition Notices to Telstra which led to Telstra entering into peering arrangements with Optus and two other networks (which ultimately became TPG and Verizon through acquisitions). These three networks subsequently entered into peering arrangements with each other. There has been no material change in these arrangements despite significant market developments over the past 18 years.

During this period the ACCC has received complaints from other network operators about the prices charged to them by TTOV for transit. In 2004 the ACCC conducted an inquiry into whether it should declare an internet interconnection service, but despite having concerns about interconnection arrangements, did not have sufficient information to declare the service.

4.6.4 Developments in interconnection arrangements

TTOV peering arrangements appear to be resulting in weak competitive incentives in relation to the supply of transit services. The peering arrangements have endured in a static manner despite other broadband service providers reaching network scale of relative parity with TTOV (and some networks party to the peering arrangements diminishing in importance such that it is questionable whether they provide equal value to the other peering parties). In a dynamic market, we would expect these peering relationships to change with the relative value of traffic on each network. This issue appears to be related to the reluctance of TTOV to publish peering criteria (in contrast to networks of similar status internationally).

While the TTOV peering structure has remained the same, two key developments have occurred in the communications sector which have influenced interconnection arrangements in Australia over recent years:

- Market consolidation in the broadband access market has meant that many smaller networks have been absorbed by TTOV—this has resulted in these networks gradually leaving public peering arrangements, meaning that other networks need to acquire transit to exchange traffic with these networks.
- Internet usage is now dominated by streaming and multimedia content, which is provided by independent content and application providers. The huge growth in the consumption of OTT content services such as Netflix, Facebook and YouTube has led to content providers accounting for increasing volumes of domestic traffic. Large content and application providers distribute their traffic to end-users by utilising CDNs to cache content in IXPs across the country. CDNs can be operated by third parties or be owned

by the content and application provider themselves. These IXPs facilitate public peering between content hosted on CDNs and broadband service providers allowing cost-effective local hand-off of content, and providing increased service quality for end-users.

As a result of significant changes in internet usage patterns, smaller broadband service providers targeting the residential market are exchanging a lower proportion of their traffic with TTOV under transit agreements than in the past. Instead, as their end-users consume greater volumes of OTT services supplied by independent content and application providers, this traffic is obtained at a lower cost through IXPs. At the same time, the shift of traffic from previously independent broadband service providers onto TTOV resulting from industry consolidation is likely to have resulted in a reduction in traffic exchanged between broadband service providers themselves at public exchanges.

4.6.5 Submissions to the market study on internet interconnection

Submissions and evidence presented to the market study suggests the long standing concerns with the peering arrangements between TTOV and consequent competition issues continue to persist despite significant market developments. Several respondents observed that while there are four networks who can supply transit to broadband service providers the market is not working to deliver efficient pricing and prices are significantly above the costs of supply. Many smaller networks submitted that the current transit arrangements in Australia are not competitive with some contending that the peering arrangements between TTOV are anti-competitive.

Another feature of the Australian market structure observed is that the four participants to the peering arrangements (or their successors) have remained the same since the establishment of the agreements in the late 1990s despite significant changes in the communications market.

While transit prices have been trending down (largely associated with declining costs of inputs such as technology) a number of submissions commented that transit prices are typically much higher in Australia than in Europe and North America. The international transmission costs incurred in providing bundled domestic and international transit products may be one factor contributing to comparatively higher transit prices in Australia.

Some respondents also alleged that TTOV possess market power which enables them to charge smaller networks for transit without taking into account the value that they derive from those agreements. As a result, some parties seeking to interconnect with TTOV do so at US and Asian IXPs where transit arrangements are more cost-effective despite the costs of transmitting traffic to and from that location.

A further issue raised is that TTOV do not publish their peering policies, which would provide other networks with guidance on the minimum attributes they must meet in order to enter into a peering arrangement with each of TTOV.

While submissions recognised that the growth in independent content providers was alleviating some of the disadvantages faced by smaller broadband service providers (by reducing their reliance on TTOV), continued adverse impacts on smaller broadband service providers remain an issue of concern. Concerns were raised that certain key content continues to be hosted on TTOV which each of TTOV can access on a settlement-free basis, whilst charging smaller networks inefficiently high prices. It was also noted that key content providers and businesses often require their broadband service provider to be directly connected to TTOV in order to obtain direct access to their customer bases for quality of service reasons.

4.6.6 Impact on downstream markets

The proportion of the total cost in providing downstream broadband services which transit comprises may vary significantly between service providers, their business models and products.

Interconnection arrangements have evolved in response to changing patterns of internet use and consumption. Residential broadband service providers are decreasingly reliant on transit arrangements with TTOV and obtain a large proportion of their data directly from content and application providers via IXPs. This is likely to reduce their input cost profiles and reduce their cost disadvantage in supplying residential broadband services. However, it is not clear if, and to what extent this trend will continue.

While changing patterns of consumption and traffic profiles may currently be working to reduce the input costs of smaller broadband service providers serving residential end-users this may not be a uniform trend across all end-user segments. Parallel trends in cloud computing adoption and the rise in quality sensitive business applications may have the opposite effect on broadband service providers in the business and corporate segments. Market consolidation, which has increased the proportion of end-users connected to TTOV, may also make access to TTOV increasingly important for corporate end-users.

The digital services and applications used or supplied by smaller networks' corporate end-users may increasingly require networks to acquire direct access to TTOV for a growing proportion of their traffic. For example, popular cloud applications may be hosted on TTOV; corporate end-users may offer services that rely on high quality access to the residential customers of TTOV for sales; and the increasing trend for staff to work from home or remotely (when those staff are customers of TTOV). As a result, transit requirements are likely to be higher for corporate end-users than residential end-users and may significantly advantage TTOV in securing key corporate customers particularly where transit requirements represent a material cost in the supply of the downstream service.

Draft finding

Transit costs in Australia, while declining on a unit basis, appear to be relatively high compared to other jurisdictions such as Europe and the United States. Furthermore, domestic and international transit product prices are converging and we are observing small networks exchanging some domestic traffic at overseas interconnection points.

Draft finding

Telstra, TPG, Optus and Verizon (TTOV) are collectively relatively unconstrained in determining their price level and structure in the supply of transit services and appear to enjoy a degree of market power in relation to access to their networks. Australia's geographic isolation, which makes international transit an inferior substitute, is likely to be one reason for this.

4.7 Over-the-top content services

OTT services are those services delivered to consumers over a broadband access network that are not offered or managed by that consumer's broadband service provider. The range of OTT services is extensive and includes services such as communication and social media platforms and apps, video content and audio services. OTT services are provided to consumers via apps developed for devices and operating systems used by consumers on smartphones, tablets, computers and Smart TVs.

The availability of OTT services provides consumers with new services (such as social media, ride-sharing and internet shopping etc.). It also permits the entry of new service providers offering voice and messaging services. As these services run over the top of third-party networks, the service providers cannot guarantee the quality of the service, however advancements in access speeds and content delivery technologies are continually improving the quality of OTT services. In many cases, consumers can access OTT communications services for free, due to advertising-based revenue models.

The increased usage of OTT services, particularly data intensive content services (notably video content) is driving rapid growth in data consumption which must be accommodated by broadband service providers. As the OTT services often compete with or displace the usage of these providers' own communications (voice and text) and content services (where offered), there are mixed implications for broadband service providers from the continued growth of these services. On the one hand broadband service providers benefit from the complementarity between broadband access and OTT services, which is stimulating demand for broadband access. On the other hand, their business models are disrupted by increasing substitutability away from their own communications and content services to OTT services. As a result, the revenues accrued from consumers' use of voice and messaging services is declining.

In general, OTT service providers are subject to fewer regulatory obligations than those providing traditional services with which they increasingly substitute for. However, the increasing use of OTT services as substitutes may provide opportunities in the longer term for regulations on traditional services to be relaxed or harmonised.

4.7.1 OTT content services

There are a large and diverse number of OTT content suppliers with various business models with the common characteristic that they offer a library of content to access 'on-demand'. In the supply of audio-visual content, OTT service providers range from new entrants such as Netflix to traditional providers of content such as Foxtel and the free-to-air (FTA) networks. Key categories of OTT content services include:

- subscription video-on-demand (SVOD) services such as Netflix and Stan
- transactional video-on-demand (TVOD) services such as the Apples iTunes store
- subscription TV (STV) services such as Fetch TV and Foxtel Now which offer a range of linear (broadcast) and on-demand content
- advertisement funded video-on-demand (AVOD) services such as YouTube
- catch-up services from FTA broadcasters such as ABC iView, and
- broadcast of live sports events (with digital rights often held by communications service providers).

The essence of OTT content is that the content aggregator or provider can establish a direct relationship with the consumer on both fixed and mobile access networks. There appears to be relatively low technical barriers to entry in supplying OTT content services. These services are often supplied using apps on mobile devices, internet connected TVs, games consoles and set-top boxes. OTT content service providers can deploy or utilise infrastructure and services to enhance the quality of their service to consumers (for example, content delivery networks and new coding compression techniques). However, they remain susceptible to any congestion or traffic management practices employed by the consumer's broadband access provider.

While we consider there are currently no technical impediments to entering the OTT content services market, the acquisition of compelling content remains a key barrier particularly in the SVOD market. As a result, concentration is relatively high in the SVOD market segment, with Netflix and Stan capturing most of the market.¹⁶³ However, when the video content market is defined more broadly to include a range of catch-up, pay TV and other internet content services (such as YouTube) there does not appear to be any major competition concerns at present.

Whilst OTT services bring benefits to fixed and mobile broadband service providers in terms of increasing demand for access and data, service providers may face a relative decline in revenues as OTT content services capture larger proportions of consumers' spend. To combat this, we have seen broadband service providers continue to acquire and distribute content both to re-capture value from OTT providers and to differentiate their service offerings from other broadband service providers and mobile service providers. Similarly, in response to the growth of OTT services, traditional content providers such as Foxtel and the FTA broadcasters have also continued to acquire exclusive rights for both premium sports and other premium content to maintain their audience and advertisement shares. Both have also sought to utilise OTT delivery methods to expand their reach across increasingly fragmented audiences.

As noted above, access networks controlled by broadband service providers and MNOs are a potential point in the supply chain where OTT services may encounter traffic management that impacts on the quality of service. Where this occurs, and impacts on third party services it raises network neutrality or 'net neutrality' issues. Where this traffic management extends to selective discrimination of third party services it raises competition issues. While this has been a significant issue for regulators in the US and EU due to highly publicised instances of OTT services being blocked or impeded by network owners, it has yet to emerge as an issue in Australia.

We consider that net neutrality issues have not generally arisen in Australia partially because the incentive and opportunity to discriminate or foreclose are not as evident as in other jurisdictions. Retail competition disciplines the behaviour of network operators and where conduct of concern does arise, the ACCC has adequate enforcement powers to address any anti-competitive conduct. The countervailing power of key OTT service providers may also reduce the potential for broadband service providers to discriminate against these services.

4.7.2 Communications and other OTT platforms

Consumers tend to sign-up to and switch between a variety of different OTT communications and social media services for different uses given the zero cost of doing so (this is known as 'multi-homing'). For example, consumers may use different services for communicating with different groups of friends. While this can diminish the potential for services to acquire market power, there are particular categories of OTT services where other characteristics can give rise to competition concerns. These are where a particular service enjoys network effects (which refers to the value of a particular service increasing with the number of other users) and interoperability issues (which prevent a user of one service or platform being able to communicate with a user on a competing service).

A further feature of many digital platforms is that many are 'multi-sided markets', that is, they act as 'market makers' - platforms with two or more distinct groups of users that the platforms are designed to match. For example, Uber and Airbnb connect drivers and rooms with consumers seeking transport and accommodation. The more drivers and rooms available the more valuable the platform is to prospective consumers, and in turn, as the

¹⁶³ M, Mason, [Netflix leads the way as streamers set to take down pay TV](#), *Australian Financial Review*, 7 August 2017.

number of consumers grows, the more attractive the platform is to drivers and providers of rooms.

Multi-sided platforms need critical mass in order to achieve sustainable growth; they must obtain enough customers on each side of the platform. This means that there can be particularly high barriers to entry in markets with established players. This can lead to market concentration and the acquisition of market power and could potentially elevate the risk of competition issues arising. While social media platforms co-exist, they do so by offering a significantly differentiated user experience (Facebook, Instagram, Twitter). There appears to be a tendency towards monopoly in each market segment as seen by the dominance of Facebook to the exclusion of similar platforms such as MySpace.

As in the case of these social media platforms, dominance by other major platform operators such as Google and Amazon in the Australian market is reflective of their position in global markets. While the market power of these global giants raises competition issues for regulators,¹⁶⁴ these are not being addressed in this market study.¹⁶⁵

OTT services continue to grow in popularity and are necessitating continued investment in capacity by network operators and service providers. However, risks remain that bottlenecks may emerge if capacity investment is not coordinated throughout the supply chain.

The developments and trends we have observed suggest that competition for the provision of OTT content services generally appears to be vigorous and dynamic. In many areas we are seeing new entry from international and local players, continued competitive responses and innovation of services, which means that consumers are benefiting from greater choice.

While net neutrality issues continue to be low risk, we recognise that network operators and service providers use traffic management tools, particularly during periods of congestion, to reduce demands on their network and promote economically efficient investment decisions. In doing so, they should ensure that they fully disclose to new and existing customers how these traffic management policies may impact on their services.

Although OTT services do not directly contribute to the costs of additional network investment, the availability of OTT services increases the value proposition of broadband services, which in turn is likely to drive further take-up and adoption of higher value plans. It would appear that, currently, this complementarity between broadband access and OTT services is supporting continued investment by broadband service providers in their networks. Both broadband service providers and OTT service providers appear to be making complementary investments in infrastructure and technologies to expand capacity and promote a high quality of service.

There is still the potential for broadband or mobile service providers to employ strategies or conduct to foreclose competition from new and innovative services, particularly where those services do not possess any countervailing power. Where the ACCC is alerted to and identifies such conduct, enforcement action is likely to be the appropriate response.

¹⁶⁴ For example, the European Commission recently fined Google €2.42bn for abusing its dominance as a search engine by giving illegal advantage to its own comparison shopping service (European Commission [press release](#) 27 June 2017).

¹⁶⁵ We note that as part of the government's recent media reforms (Broadcasting Legislation Amendment (Broadcasting Reform) Bill 2017), the ACCC will be tasked to conduct an inquiry into the impact of Google and Facebook on advertising markets in Australia.

Draft finding

Over-the-top (OTT) services continue to grow in popularity and are necessitating continued investment in capacity by network operators and service providers arising from the broad complementarity between these services and broadband access. However, minor risks remain, including the potential for bottlenecks to emerge if capacity investment is not coordinated throughout the supply chain, and the potential for discriminatory traffic management to occur.

4.8 Content delivery networks

A content delivery network (CDN) is a system of distributed servers which improves the quality of service and consumer experience of a content service and reduces transmission costs for on-demand services by storing content closer to end-users.

The use of CDNs in the transmission of traffic is growing rapidly and is expected to account for 73 per cent of all traffic by 2021.¹⁶⁶ The growth of CDNs is strongly linked to the rapid growth in internet traffic and OTT video consumption (as well as other online services). CDNs seek to address the performance issues associated with the internet as a 'best efforts' communications network by minimising packet delay, packet loss and network congestion.¹⁶⁷ The consumption of online video content which has helped drive the use of CDNs is being further stimulated by the success of CDNs in improving quality and performance of OTT content services.

There are broadly three types of CDN services used in Australia. These are:

- broadband service provider owned and operated such as Telstra and Optus
- content provider owned and operated such as Netflix, and
- independent third-party CDN providers such as Akamai.

OTT content providers may use one or more of the above types of CDN services to transmit their content depending on their scale and needs. For example, broadband service providers offering content are likely to use their own CDN services. Independent content providers commonly use specialist third-party CDN providers who co-locate their servers with various broadband service providers. A recent trend is for very large content providers to deploy their own content delivery infrastructure. They may use their own CDNs in conjunction with third-party services to ensure that they can meet peaks in demand.

Draft finding

The provision of content delivery network (CDN) services in Australia currently appears to be reasonably competitive given the presence of global providers such as Akamai, and broadband service providers and large content providers who have also deployed their own CDN infrastructure. However, the market is rapidly growing and evolving, so at this stage it is difficult to assess whether competition issues may emerge in the future.

4.9 Internet of Things

IoT encompasses a diverse range of emerging technologies with the common attribute of communication between devices or 'things'. A subset of IoT technology is machine to machine (M2M) communication which occurs without direct human intervention. The

¹⁶⁶ Cisco, [The Zettabyte Era: Trends and Analysis](#), 7 June 2017.

¹⁶⁷ C Drake, 'CDN Future Scenarios: a growing market delivers new business opportunities', Informa Telecoms & Media/Ovum, 11 September 2012.

Communications Alliance considers that IoT is the evolution of M2M which has been in existence for a considerable period. The IoT describes a much broader and more sophisticated gathering and analysis of data from multiple devices.¹⁶⁸

These technologies range from low data rate static sensor networks communicating on an intermittent basis to high data rate mobile systems requiring continuous communications while operating things such as autonomous vehicles. The growth of IoT applications has been driven by a number of enablers including large reductions in the costs of the intelligent sensors installed on 'things', increasing availability of connectivity (such as broadband networks) and increasingly sophisticated methods for data analysis (computing power).¹⁶⁹

The innovations associated with the growth of IoT applications are likely to have a significant impact on the economy and society more broadly over the five year horizon of the market study and beyond. Sectors where IoT applications will have the greatest impact include agriculture and food supply chains, transport, home (automation and security), healthcare and fitness, retail, manufacturing and logistics. There are also numerous and growing applications for communities and municipal authorities to enhance service delivery and improve public amenity in areas such as water and air quality monitoring, energy efficiency and wildlife conservation. The Communications Alliance predicts that by 2025, IoT will provide one to two per cent uplift in gross domestic product (GDP) per year and an impact of \$45 billion to \$116 billion across all key sectors of the economy.¹⁷⁰

The very heterogeneous nature of IoT services makes it difficult to assess competition in the supply of these services and to make broad observations. However, significant segments are emerging with more homogeneous characteristics (for example, low data rate IoT applications used in a number of vertical sectors such as agriculture).

Just as the applications are diverse, so are the types of connectivity currently in use or being developed to support them. Some applications currently use existing mobile networks. Others use Wi-Fi or Bluetooth for short distance communication or use narrowband or other low powered wireless technologies for wide area communications.

Broadly, the participants in an IoT supply chain can be categorised as:

- the connectivity service provider who provides the underlying connectivity
- the service provider who provides the IoT platform and controls the sensors and other infrastructure and may include data storage and analysis
- the application provider—depending on the supply chain this can be a manufacturer or service provider who engages an IoT solution to obtain the productivity benefit or include as part of a retail product, and
- the consumer.

However, vertical integration means that each supply chain can look very different and business models are likely to continue to evolve in response to new developments and applications.

4.9.1 Deployment of new specialised IoT networks

At the connectivity layer, due to the availability of alternative wireless technologies and standards (as distinct from traditional mobile networks), barriers to entry have been lowered to enable the entry of new specialist wireless connectivity providers. These new entrants,

¹⁶⁸ Communications Alliance Ltd, *Enabling the Internet of Things for Australia*, October 2015, p. 6.

¹⁶⁹ *ibid.*

¹⁷⁰ *ibid.*, Figure 29.

such as NNN Co and Thinxtra are deploying low-power wide-area (LPWA) networks almost as extensive as the existing mobile networks. These new entrants are able to deploy geographically extensive networks which support connectivity to large numbers of low cost, low power sensors. While revenues per sensor are very low, the large number and low cost of sensors makes the solution feasible. In addition, two of the key LPWA technologies being deployed in Australia use 'class-licenced' (shared) spectrum (the third technology is being deployed by MNOs using their existing spectrum holdings and networks).

LPWA networks are particularly useful for low-power, low-cost IoT solutions that cannot be met by relatively higher cost M2M connectivity which has, until now, relied on 2G, 3G and 4G mobile networks. The sensors and devices connected to LPWA networks tend to send low volumes of data intermittently. Key sectors that are targeted with these IoT applications include agriculture, water metering and logistics. As noted above, the existing mobile network operators are also entering this IoT space by implementing narrowband standards on their networks. In September 2017 Telstra activated Cat M1 technology on its network to target a range of IoT applications which include voice capability.¹⁷¹ Both Optus and Vodafone have recently trialled another IoT technology, known as NB-IoT, on their networks.¹⁷² In addition to these macro deployments, we understand that smaller fixed-wireless operators are also rolling out niche IoT networks, for example on-farm IoT network deployments.

In contrast, other IoT applications have more demanding connectivity requirements. In the automotive industry the 'connected car' is at a very nascent stage in Australia, and the low latency, high-bandwidth requirements of connected cars are likely to be best served by mobile networks.

As the IoT sector is in relative infancy, we consider that these technologies will continue to develop and compete. Each technology is likely to have its own strengths and weaknesses and target different sectors and uses.

4.9.2 Potential inhibitors to growth and competition

There are a number of barriers to entry and potential competition issues relevant to the development of IoT. Some of the key issues identified include:

- competing technologies and standards and the ability to achieve interoperability (both at the network and service layers)
- spectrum availability—which will be an important enabler of competition and innovation in the supply of IoT services. Further, there is unlikely to be a one sized solution in terms of spectrum for the various IoT technologies and applications
- the development of suitable NBN products for niche IoT applications (which has been raised with NBN Co by the Internet of Things Alliance Australia (IoTAA)), and
- access to infrastructure and services (such as regional transmission) for new entrants seeking to supply new services.

There are also a large number of other issues which may present challenges to the continued growth of a competitive and dynamic IoT sector (including consumer trust in these services) these include:

- legacy telecommunications regulations which may impose costs or complexity on the development of IoT services

¹⁷¹ M Wright, '[The next steps in the evolution of 4G connectivity](#)', Telstra Exchange, 20 September 2017.

¹⁷² R Crozier, '[Vodafone switches on NB-IoT network](#)', IT News, 11 October 2017.

- new privacy and security concerns and availability of accessible consumer information on relevant consumer protections which may deter take-up
- consumer lock-in (through standards or the collection of data) which may also deter take-up and subsequent switching, and
- the challenging economics of extending networks to ensure connectivity to support remote IoT deployment (such as in remote farms).

There is also currently a lack of information on the progress of IoT deployment in Australia. Greater visibility and sharing of information on IoT adoption may assist in enabling faster diffusion of IoT across the economy and society and identify areas where IoT adoption strategies could be focused. Work is underway both domestically and internationally to address many of these key issues, involving industry bodies and relevant regulatory and policy agencies. For example, the IoTAA is currently developing an IoT Adoption Index involving a broad range of stakeholders which it expects to release in early 2018.¹⁷³

As with other communications markets, there is the potential for entities that control access to key inputs or enjoy other advantages to leverage this to inhibit or foreclose competition in nascent downstream markets. However, the nascent IoT sector ought to be allowed to evolve without upfront regulation, noting that there are currently a number of ACMA, industry (largely through the IoTAA) and other government processes examining issues of concern as outlined above.

Draft finding

The diverse and fragmented nature of different IoT applications is likely to create disparate service markets with different competitive dynamics, for example, specific sectors may tend towards concentration or vertical integration, and other IoT applications may involve more contestable supply chains. We will continue to monitor competitive dynamics as the downstream market develops.

¹⁷³ IoTAA [website](#), viewed on 12 October 2017.

4.10 Cloud computing

The terms cloud computing and the cloud are used to describe information and communications technology (ICT) services that can be accessed over a network from a remote location on demand. Cloud computing has been defined as ‘the practice of using remote internet servers to store, manage and process data’.¹⁷⁴ Cloud computing services allow users to store and access data in an external environment (i.e. not within the user’s own physical computer) which they can access when connected to the internet. The advent of broadband and increasingly ubiquitous connectivity has provided the conditions for new services such as cloud computing to develop.

4.10.1 Service models

Service models can be defined by the level of end-user control in the cloud computing infrastructure. Cloud computing is developing along three different models:

- ‘Software as a Service’ (SaaS)
- ‘Platform as a Service’, (PaaS) and
- ‘Infrastructure as a Service’ (IaaS).

Examples of these services are provided in Table 4.12.

Table 4.12: Cloud computing service models¹⁷⁵

Service model	User control and access	Examples of key services
SaaS	Web interface, software application	iTunes, iCloud, Dropbox, OneDrive, Spotify, Gmail, Facebook, Office 365 (which provides an online version of MS Office Suite along with SharePoint Server, Exchange Server and Lync Server.
PaaS	Software development platform and tools, operating systems and web servers	Amazon Web Service, Elastic Beanstalk, Windows Azure, Google App Engine, Development tools line NAPA.
IaaS	Virtual machines, network equipment, servers and storage	Amazon EC2, Rackspace, Windows Azure, OpenStack, IBM

4.10.2 Deployment models

Cloud computing services can be further differentiated according to their deployment model. These deployment models are described below:

Public cloud—Public cloud services are available to the general public on a shared basis. The benefits of a public cloud service include the ability to scale computing resources to match demand fluctuations and the potential for economies of scale (through using large data centres housing IT infrastructure). Internet electronic mail providers such as Gmail and Hotmail are examples of a public cloud service.

¹⁷⁴ CRN article, ‘[Google acquires Australian data science platform Kaggle: touts new cloud customer wins](#)’, April 2017.

¹⁷⁵ ACCC analysis from various sources.

Private cloud—A private cloud is a service deployed exclusively for use by a single organisation (e.g. a business) or restricted group of organisations and is usually controlled in private data centres. The primary users of private cloud computing services in Australia are businesses and government. Compared to other deployment models, the private cloud model is considered the most secure in terms of data protection.

Hybrid cloud—Hybrid cloud services involve extending private cloud infrastructure to access public cloud resources. For example, in 2016, AWS announced a strategic partnership with VMware, where VMware's private software-defined data centre offering would run on the AWS public cloud.¹⁷⁶ This 'hybrid' model addresses the concerns of businesses of 'losing' control of their data in a public cloud, but allows the scalability, collaboration and efficiencies of public cloud offerings.

Community cloud—Community cloud is shared by several organisations that wish to make use of a common cloud computing environment. The cloud may be managed by the organisation or a third party and may be on-premises or off-premises. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realised.

The benefits of cloud computing are already being realised by many businesses, with over 80 per cent of Australian businesses using cloud computing for some software requirements while over 60 per cent use cloud for their storage requirements.¹⁷⁷

A number of factors are making cloud computing increasingly more important to the way businesses and consumers store, use and distribute content and data:

- the scalability of cloud services
- lower costs
- opportunities for collaboration
- demand for mobility and the proliferation of portable devices, and
- rollout of the NBN.

According to Ovum, Amazon Web Services (AWS), Microsoft Azure and IBM SoftLayer are the dominant IaaS and PaaS cloud computing service providers in Australia, with AWS and Azure alone accounting for around two-thirds of the market. All three providers have data centre footprints in the Asia-Pacific region. Regarding SaaS, the Microsoft Office suite has recently overtaken Salesforce in a highly competitive market segment.¹⁷⁸ The SaaS market is competitive, as entry barriers are very low in the development of new software. Australia has around 500 cloud service providers, of which a significant number compete in the SaaS market.

Overseas cloud service providers are increasingly locating data centres in Australia or partnering with local businesses to provide locally based services. This is largely driven by the need to overcome challenges of data sovereignty and to improve latency and performance.

As cloud computing involves the combination of telecommunications network and IT infrastructure technologies, the growth in the demand for cloud services has resulted in broadband service providers in Australia entering the market to take advantage of this opportunity. Large broadband service providers are partnering with established cloud-based

¹⁷⁶ CRN, '[Ten Biggest AWS Stories of 2016](#)', April 2017.

¹⁷⁷ Venture Insights, 'Cloud Computing – Are We All In?' November 2016.

¹⁷⁸ Ian Brown, Ovum Cloud Service Provider Update: Microsoft Azure, 15 March 2017.

players to launch their own services. In partnering with established cloud service providers, broadband service providers increasingly act as ‘brokers’ or cloud portals, that is, they can resell a range of cloud services from the global wholesale providers.

A key advantage that broadband service providers have over specialised cloud computing providers is their control over the quality of service connectivity to and from data centres. Having control over the network allows broadband service providers to offer customer connectivity that is flexible and tailored to the needs of their users.¹⁷⁹ Another advantage is their established customer base. Broadband service providers are likely to seek to leverage these advantages by offering customers bundled connectivity and cloud platforms.

This is consistent with international trends. Ovum estimates that over 400 telecommunication networks worldwide are now offering cloud services, often involving low-margin reselling of third party public cloud services (AWS, Azure etc.). Internationally, the reselling model is generally accompanied with product bundling, where the network operator will bundle technical support services with access to IaaS public cloud services.¹⁸⁰

According to Ovum’s statistics, the revenues earned by Australian telecommunication network operator’s from selling or re-selling cloud services is approximately 22 per cent of the total cloud revenues earned in the sector and is forecast to remain at this proportion over the next five years.¹⁸¹

4.10.3 Links to the broader communications sector

The ongoing development and increasing importance of cloud computing is a key element of the evolving communications sector, and is closely related to broader trends such as the growth of data consumption over higher capacity networks, the proliferation of internet connected devices and increasing capabilities of these devices and the availability of ubiquitous connectivity.

The shift of data and software from being held on end-users’ computers or servers to the cloud is a strong driver of data usage on networks. For businesses, this is contributing to day-time traffic volumes, for residential consumers, their use of cloud services such as storage may be more pronounced during the busy evening period. These trends have implications for the investment and use of transmission infrastructure for network owners.

The demand for cloud services is also a key driver of the growth of data centres where cloud servers are located and co-located with other elements of the supply chain and complementary services. These include CDNs and the servers of broadband service providers who interconnect with cloud providers and CDNs to deliver a range of content and OTT applications to end-users.

As broadband availability and download speeds grow with the deployment of the NBN and other high speed access networks, end-users are increasingly using software and apps stored and manipulated in the cloud. Cloud services mirror the trends that we are observing across the business and consumer segments of the communications sector. These include the demand for remote access (mobility), backing-up of data, collaboration and analysis of data as well as security and redundancy through distribution of data across multiple sites. To support these uses, high bandwidth, low latency data connections become essential for cloud service providers and broadband service providers to deliver the quality of service those end-users require. This in turn increases the necessity for broadband service providers to directly interconnect with the cloud service providers in many geographically

¹⁷⁹ J Gabrielsson et al, *Cloud computing in telecommunications*, Ericsson Review, p. 30.

¹⁸⁰ Mark Newman, ‘Telcos grow into their role as cloud service providers’, Ovum Knowledge Centre, 11 May 2016.

¹⁸¹ Ovum Knowledge Centre, ‘Enterprise Cloud Service Forecast 2015’, 20 January 2016.

distributed data centres. Consistent with how network owners are responding to the range of disruptive OTT services facilitated by broadband and the digital economy, broadband service providers are looking to diversify into the growing cloud services market both to differentiate and offer a value-added bundle of products.

4.10.4 Potential competition and consumer issues

The various components of the market for public cloud computing services are at different stages of development. The most mature market is SaaS, which Ovum forecasts to grow from \$761 million in 2016 to \$1.2 billion in 2021.

The SaaS market has a large number of providers, including most of the leading content providers such as Salesforce.com, Microsoft 365, and WebEx (Cisco's web conferencing solution). There are low entry barriers for developing a new SaaS application, and this segment has a plethora of diverse applications generally targeted at end-users (i.e. Gmail, Facebook, Spotify, Soundcloud, etc.).

The IaaS market is developing rapidly with AWS and Microsoft as the two largest providers, and Google as a relatively new entrant. The IaaS segment is difficult for broadband service providers to address because significant scale is needed to offer competitive services. Thus, broadband service providers generally resell Azure or AWS and seek to value add by bundling access to IaaS products with technical services for enterprise customers. Ovum forecasts the IaaS market in Australia to grow from \$435 million in 2016 to \$738 million in 2021.¹⁸²

As broadband service providers are increasingly moving into the cloud computing market, there is a potential concern that they may seek to leverage their position in the communication sector, given that cloud computing services are heavily reliant upon access to the internet and bandwidth capacity. For example, a broadband service provider seeking to protect its own cloud services could impede end-user access to rival platforms through degrading the quality of service of access to other cloud services. There is also the potential for a network service provider to discriminate in favour of its own (or affiliated) cloud computing services against competing services. In early 2014 there were reports in the media that US-based network service provider Verizon was limiting bandwidth to competing cloud providers such as Amazon Web Services (and by extension Netflix).¹⁸³ However, as noted above in section 4.7.1, there have been no specific instances of network traffic discrimination of this kind identified in Australia so far.

Bundling strategies are another theoretical concern, if broadband service providers seek to bundle their own or affiliated cloud services with access products in a manner that independent cloud service providers cannot replicate. This would be a particular concern if either the broadband service provider or cloud service provider was dominant or the bundle was exclusive. Our analysis to date suggests that both the cloud services market and broadband access market are sufficiently competitive to mitigate this kind of conduct. We note that many cloud service providers are well established global brands who are likely to wield significant countervailing power.

The quality and performance requirements end-users seek when accessing the cloud may also impact on competition at the broadband service provider level due to the requirement for high quality interconnections. If a dominant broadband service provider is able to create a cloud service or exclusively host a cloud service provider on its network, it may be able to set terms of access to that service that are less favourable for competing broadband service providers. This is relevant to the ACCC's consideration of whether current internet

¹⁸² Ovum Knowledge Centre, 'IT Services Market Forecast: Cloud Services, 2015-21', 11 May 2017.

¹⁸³ B Butler, '[Verizon denies throttling Amazon's cloud, Netflix services](#)', ARNNet, 5 February 2014.

interconnection arrangements in Australia are detrimental for smaller broadband service providers seeking to obtain direct access to the larger providers who host key services. While we have not received evidence to date that dominant broadband service providers are positioning themselves as access bottlenecks to cloud services, these services do have characteristics which could provide broadband service providers with direct access a competitive advantage in downstream markets.

A common feature of some cloud computing services is the use of proprietary standards and service agreements that effectively lock users in to particular cloud computing services, through an absence of interoperability between cloud platforms. These arrangements may make it difficult for a business or an individual consumer to transfer their data ('data portability'), or to access their content via other services. This may result in a 'lock-in', where a business or consumer is unable to easily switch between providers.

Draft finding

The collection, storage and use of data by cloud service providers and concerns about 'vendor lock-in' may raise potential competition and consumer protection concerns for cloud services.

Entry costs to supply of cloud computing services appear relatively high but surmountable particularly by well-resourced global providers. As a result, cloud services both internationally and in Australia are dominated by global providers such as Amazon, Salesforce, and Microsoft. In Australia, we have recently seen entry from other international providers such as Google and Oracle who have the scale and brand to inject competitive tension in the provision of cloud computing services. While competition appears to be intensifying currently, we note that more mature markets such as the US are becoming more concentrated (for example, Amazon's AWS appears to dominate the US cloud computing market).¹⁸⁴

We have observed that broadband service providers in Australia, including the larger providers, are entering the cloud computing market or partnering with global cloud computing providers to provide a bundle of communication and cloud services to business customers. This could potentially exacerbate the concerns about internet interconnection discussed in sections 4.6 and 5.3.4 of this report if other broadband service providers have to exchange traffic with the larger providers in order for their customers to access cloud computing services.

4.11 Data centres

Data centres are dedicated facilities which house and operate IT equipment including servers, routers, and 'racks', and may house interconnection infrastructure to accommodate Points of Presence (POPs). Data centres range from simple 'in-house' facilities in a basement or IT room, to large scale specialist facilities.

While in their most basic form, data centres provide the physical infrastructure for networks to co-locate equipment and interconnect, they are increasingly providing value-added services. Data centre operators can provide a range of services to a broad range of customers including:

- colocation services
- interconnection services
- enabling storage for some cloud storage services, and

¹⁸⁴ Synergy Research Group, [The Leading Cloud Providers Continue to Run Away with the Market](#), 27 July 2017.

- managed storage services.

Data centres are increasingly becoming central hubs where key activities of a range of service providers are taking place.

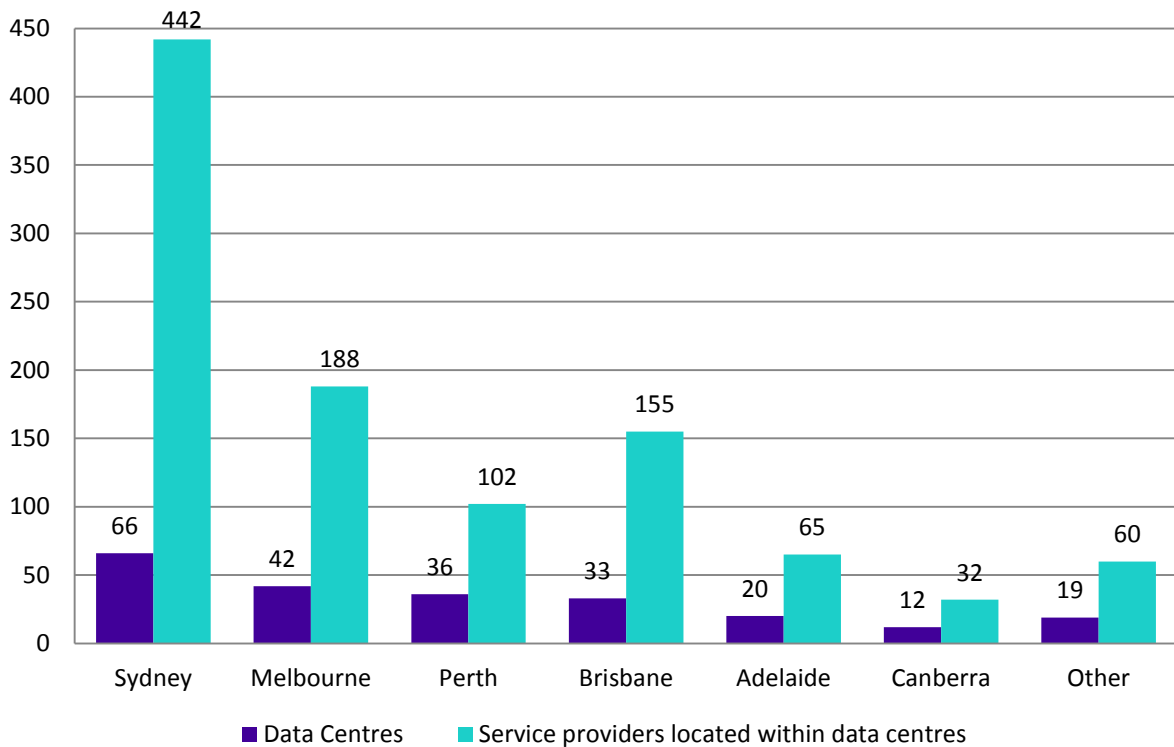
The growth in data traffic over networks (due to adoption of cloud services, uptake of SVOD, and other OTT services), the rise in use of CDNs and increased demand for interconnection has driven increased demand for independent large scale data centres, where enterprise, cloud/content providers and broadband service providers interconnect with each other.

Specialist independent data centre service providers are carrier neutral, which encourages the development of business ecosystems (such as for carrier-to-carrier connectivity) within their facilities, and attracts both local and global cloud and IT service providers to their facilities.

The location of data centres reflects the structure of how cloud computing, content and a range of other OTT service providers seek to distribute their network infrastructure—balancing factors such as proximity to end-users as well as efficient aggregation. It also aligns with the general aggregation points of broadband service providers and MNOs where they route, switch and exchange data traffic.

The national distribution of data centres and users is shown in Figure 4.21.

Figure 4.21: National distribution of data centres and users¹⁸⁵



Broadband service providers and other users seeking efficient and cost-effective access to each other's networks and services seek to locate POPs at these data centres. OTT service providers such as Google, Amazon and Apple and service providers who support content distribution such as Akamai have been key drivers of this trend, demonstrating the cost and performance benefits of utilising highly interconnected data centres.

¹⁸⁵ Cloudscene, [Australia](#), viewed on 18 October 2017.

Data centres provide the infrastructure for cloud and IoT services to store and access the data collected by the growing number of connected devices. Enterprises that rely heavily on cloud services and value low latency, highly redundant connections to broadband service providers and other service providers are also recognising the benefits of co-locating in independent data centres.

In early 2017 there were around 200 third party data centres in Australia¹⁸⁶, run by almost 100 operators, located in key business and government locations in Melbourne, Sydney, Brisbane, Newcastle, Perth, Adelaide and Canberra.

4.11.1 Overall data centre market

The overall data centre market is summarised in Table 4.13. Frost & Sullivan estimate that the Australian data centre industry revenue will grow by a compound annual growth rate (CAGR) of 12.4 per cent until 2022, from \$976 million in 2015, to approximately \$2 billion by 2022. Below, we present the four largest independent data centre providers as a proportion of Frost & Sullivan’s forecasted industry revenue for 2016 (\$1.097 billion). The market represented includes all data centre service provision including revenues from specialist providers, IT services firms, and telecommunications companies.¹⁸⁷ The two largest data centre operators by annual revenues are international firms, namely Equinix and Global Switch. The next two largest are the local firms Metronode and NextDC.

Table 4.13: Approximate major independent data centre market shares for 2016¹⁸⁸

Data centre operator	Annual revenue (\$m)	Estimated Market Share
Equinix	139.1	13%
Global Switch	134.6	12%
Metronode	116.8	11%
NextDC	92.8	8.5%
Total industry revenue	1 097	

4.11.2 Independent data centres

Independent data centre operators are independent from the networks that interconnect within them. This is attracting both local and global cloud service providers to their data centres as carrier neutrality encourages the development of business ecosystems within the data storage and interconnection facility. The largest four data centre operators in Australia (see Table 4.13 above) are independent operators.

Independent data centres are benefiting from network effects, where many different users are co-locating and interconnecting in carrier neutral facilities, making it attractive for new users to join ‘data centre ecosystems’. The majority of service providers are co-located in independent carrier neutral facilities (with Equinix, NextDC and Global Switch, all carrier neutral, in aggregate, accounting for over 50 per cent total of the service providers co-locating in data centres in Australia). It is also notable that despite only operating large data centres in Melbourne and Sydney (with an estimated 13 per cent of total industry revenue),

¹⁸⁶ Cloudscene, [Australia](#), viewed April 2017.

¹⁸⁷ Frost and Sullivan, ‘[Australian Data Centre Market Offers Sizeable Growth Opportunities](#)’, 15 June 2016.

¹⁸⁸ B. Lo, IBIS World, ‘J5922 Data Storage Services in Australia Industry Report’, April 2017, Company 360 reports, ‘NextDC Limited’, accessed April 2017 and Frost and Sullivan as above.

approximately 28 per cent of service providers are located in Equinix data centres.¹⁸⁹ This highlights the significant network effects from which Equinix is benefiting, as many broadband service providers, cloud/content providers and business enterprises collocate in its facilities.

Notwithstanding the network effect advantages enjoyed by existing operators, new data centre entry is still occurring. In September 2017 new entrant, AirTrunk opened a large data centre in Sydney. Another large data centre is due to open in Melbourne, with both part of AirTrunk's plan to cater for the rapid adoption of cloud services in the Asia-Pacific region.¹⁹⁰

4.11.3 Broadband service provider operated data centres

Broadband service providers own both data centres and networks. Leading broadband service providers that operate data centres located in Australia (with the number of data centres shown in brackets) include TPG (23), Vocus (17), Optus (7) and Telstra/Pacnet (5). These data centre operators do not house as many third party service providers as the major independent data centre operators.¹⁹¹ Increasingly, broadband service providers are choosing to retire their old and less efficient data centres, and lease out data centre space from the independent operators, as this is likely to be more cost effective.¹⁹²

Telstra leases data centre space in NextDC, Equinix and Canberra Data Centres to complement its existing facilities in Sydney and Melbourne, whilst concurrently Telstra is using its Clayton data centre in a proprietary sense, to host the Telstra-Cisco Intercloud platform positioned to compete with AWS and Microsoft Azure. Further, Telstra claims to have one of the largest data centre footprints, and number of POPs in large independent data centres in the Asia-Pacific, facilitated by the acquisition of Pacnet in 2014, and establishing POPs in many Equinix facilities in major business districts.¹⁹³ Broadband service provider owned data centres have different characteristics to independent data centres. Generally, they lock customers into the broadband service provider's network, limiting connectivity and flexibility. In contrast, independent data centres offer more options in terms of connectivity as the customer can choose the network provider and can opt to use more than one network provider.

Competition between broadband service provider owned and independent data centres often depends on the location of the data centres, as well as the strategy followed by the broadband service providers, which sometimes make it difficult for companies hosted in the same site to interconnect with each other.

4.11.4 Other data centre operators

Content providers both own and operate data centres (usually located abroad) and also acquire data centre space from third parties.

For data security reasons, some government departments and financial institutions operate their own data centres, including the Department of Defence, the Department of Health, NAB and the ASX.

¹⁸⁹ Cloudscene, [Australia](#), viewed on 26 October 2017.

¹⁹⁰ AirTrunk [website](#), viewed September 2017.

¹⁹¹ Cloudscene, [Australia](#), viewed on 26 October 2017.

¹⁹² Frost & Sullivan, '[Cloud computing driving outsourced data centre market up in Australia, says Frost & Sullivan](#)', 1 September 2015.

¹⁹³ Telstra, [Solutions: Data Centre Interconnect](#), viewed April 2017.

4.11.5 Strategic and potential competition issues

As the digital economy continues to increase in size and scope, the role of the data centre is undergoing transformation from 'data centre as real estate' to 'data centre as a strategic element in the digital economy'. The growth of data due to OTT applications and the uptake of cloud computing services and IoT have heightened the need for cost-effective data transmission, storage and management. Data centres serve a critical role in this by co-locating the related data services, including communications, storage and security, and facilitating interconnection between them.

Data centres have become intermediaries between many of the OTT service providers and act as a key component in the supply chain of many communication related services. This means that it is becoming increasingly important for many service providers to be physically located within the same facility as other key players. This is reflected in industry submissions in response to the European Commission's review of the Equinix/Telecity merger in Europe,¹⁹⁴ which stated that when deciding to purchase data centre services, a key consideration is whether the data centre provider already hosts a number of large content/cloud providers. This suggests the importance of network effects. We note a recent press report that the owner of Metronode may sell the business, with Equinix touted as one of the possible buyers.¹⁹⁵

There currently appears to be strong competition in the provision of data centre services in Australia and this is likely to continue over the next few years as the industry is rapidly expanding. There are a large number of different data centre operators, including independent providers, broadband service providers, content owners and other large enterprises, and we are seeing entry and expansion by global providers such as Equinix and Global Switch. Key points of differentiation between data centres appear to be the quality of connectivity offered by the data centre and the presence of a large number of service providers in the data centre (as a result of the network effects arising from the growing strategic role of data centres in facilitating interconnection between service providers).

Overall we consider that data centre services in Australia will remain competitive over the next five years. However, based on experience in some overseas markets, competition concerns could potentially arise over the longer term due to increases in barriers to entry and industry consolidation driven by a combination of factors including:

- high sunk costs of establishing a presence in the market
- economies of scale
- network effects, and
- costs of churning between providers by customers.

Draft finding

There currently appears to be strong competition in the provision of data centre services in Australia and this is likely to continue over the next few years as the industry is rapidly expanding. However, we expect that this market is likely to become more concentrated over time due to factors including large economies of scale, very low churn between data centres and the presence of considerable network effects.

¹⁹⁴ European Commission, [Case M. 7678 – Equinix/Telecity](#), Regulation (EC) No 139/2004 Merger Procedure, 15 June 2016.

¹⁹⁵ ['Equinix, ST Telemedia mandate banks for Metronode sale'](#), *Australian Financial Review*, online edition, 29 September 2017.

5 Immediate issues requiring action to promote competition

5.1 Price and speed of NBN broadband services

We consider that competition for the supply of broadband services on the NBN may not be working as well as it could be for consumers in terms of encouraging take-up and use by delivering quality broadband services on the NBN, as discussed in section 4.2 and 4.3. While we acknowledge that some of these issues may be transitional there are immediate and longer-term factors that could dampen future competition on the NBN, and consequently warrant further examination.

Many consumers claim to be worse off on the NBN compared to their legacy broadband service with slow speeds and congestion, particularly in peak evening periods. There has also been wide-spread media coverage of NBN speed issues, with NBN Co acknowledging the problems and estimating 15 per cent of users are dissatisfied.¹⁹⁶

Poor consumer experience may be the result of a number of factors including misaligned incentives of NBN Co and service providers, including efforts by both parties to avoid demand risk¹⁹⁷ as much as possible.

In this section we will explore underlying reasons for poor consumer experience on the NBN, including the conflicting incentives of service providers and NBN Co, the role of NBN access prices, as well as, consumer expectations and willingness to pay.

5.1.1 Take-up and efficient use of the NBN

NBN Co has incentives to encourage both take-up and use of the network, particularly higher speed services, to drive revenue growth over time and ensure efficient use of the network.

Service providers have similar incentives to drive take-up of NBN services to maintain or grow their market share, particularly during the migration period from the legacy networks. However, they may not face the same incentives to drive take-up of higher speed services at this time given the additional costs of provisioning adequate CVC to support the service.

Despite the NBN rollout recently passing the half-way point with approximately 6.2 million premises eligible for connection, only three million premises had an active NBN service as at 12 October 2017.¹⁹⁸ As shown in Figure 5.1, there has been a lag in take-up since the beginning of the rollout.

This lag in take-up is partly due to the 18 month migration window, designed to allow consumers time to choose the NBN plan that best suits their needs and afford service providers enough time to migrate customers before the legacy networks are de-commissioned.

However, we have observed that some service providers may be incentivised to keep customers on legacy services for as long as possible if they earn better margins, which may also be contributing to the lag in take-up.

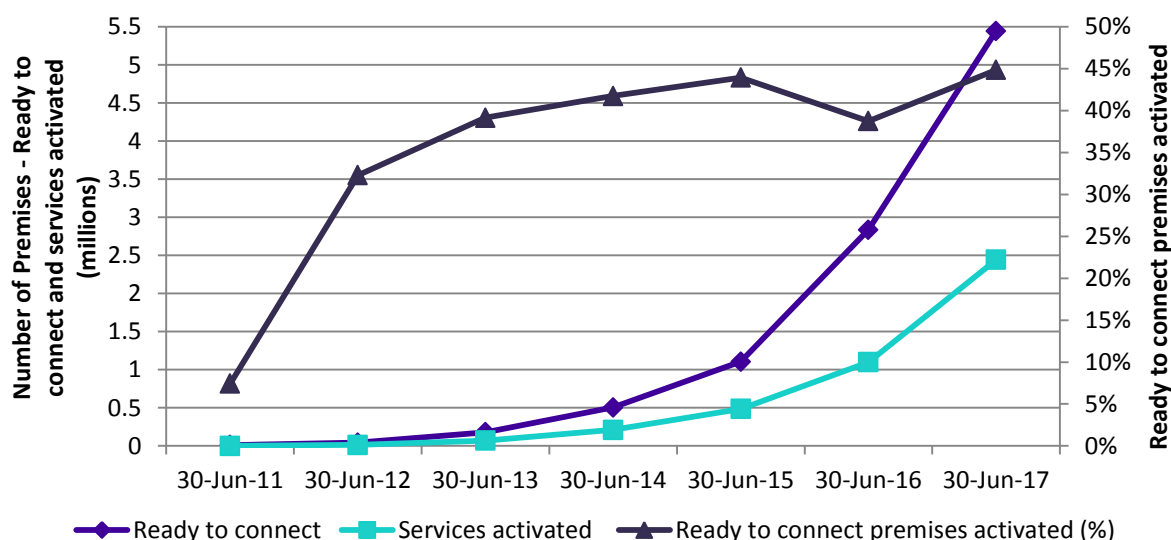
¹⁹⁶ Jennifer Dudley-Nicholson, News Corp Australian Network, [NBN Co admits more users 'than ever' are suffering slow downloads as consumer groups call for reform](#), viewed on 11 October 2017.

¹⁹⁷ Demand risk is the potential for a loss due to a difference between forecast and actual demand. For example, if NBN Co does not sell enough services it may earn less revenue than forecast and be unable to recover its investment costs. Service providers may face demand risk in terms of customer use of data (which must be pre-purchased), and face losses if this is over or under-estimated.

¹⁹⁸ NBN Co, [Weekly summary rollout progress](#), for week ending 12 October 2017, viewed on 18 October 2017.

On the other hand, service providers, particularly new entrants, also have incentives to attract new customers and build their market share during the migration period, and we are seeing this through strong price competition in the retail market as discussed in section 4.2.

Figure 5.1: Take-up of NBN services compared to premises ready to connect¹⁹⁹



While service providers and NBN Co may have similar incentives to encourage take-up of NBN services, service providers also have incentives to maximise their profits and appear to be wary of actively promoting higher speed tiers given the additional costs incurred to provision enough capacity (which is further discussed in section 5.1.2) to support these services. Service providers may also be wary of trying to up-sell customers to higher priced, higher speed plans at present in case they risk losing the customer.

As shown in Table 5.1, there has been limited take-up of higher speed NBN services, with the most popular speed tiers being 12/1 and 25/5 Mbps, as highlighted for each service provider group, which accounts for the majority of current NBN broadband services.

Table 5.1: Take-up of different (wholesale peak download) speed tiers by service provider²⁰⁰

Service Provider	12/1 Mbps	25/5 Mbps	50/20 Mbps	100/40 Mbps
Telstra	20%	69%	3%	9%
TPG Group	42%	39%	3%	15%
Optus	29%	42%	11%	18%
Vocus Group	47%	45%	2%	7%
Others	24%	53%	5%	18%
Overall	29%	56%	4%	12%

On the NBN the demand risk faced by service providers from growing consumer data usage is more difficult to manage as they must acquire capacity from an upstream provider

¹⁹⁹ NBN Co, [Weekly summary rollout progress](#), week ending 12 October 2017, viewed on 18 October 2017.

²⁰⁰ ACCC, [NBN Wholesale Market Indicators Report](#), 30 June 2017, viewed on 11 August 2017.

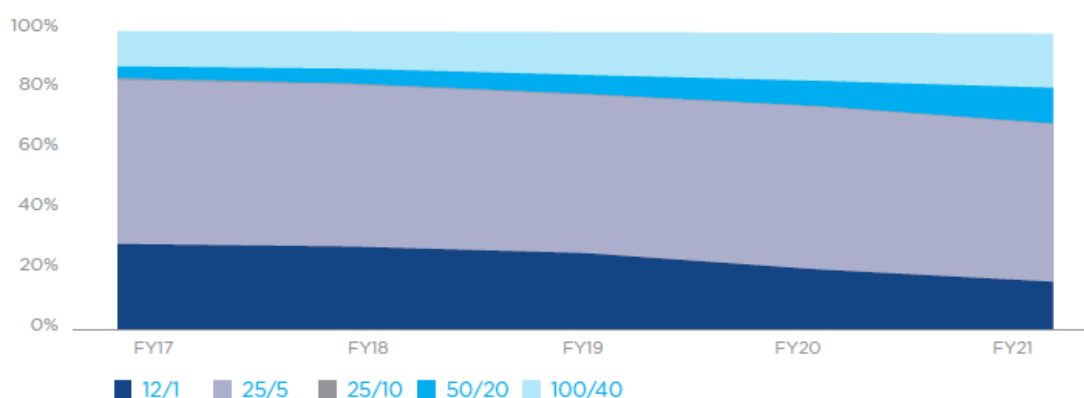
(NBN Co). In contrast, on the copper network service providers acquiring ULLS or LSS are able to better manage demand risk on-net through their own equipment (DSLAMs) in the exchange and aggregation links from the exchange rather than having to throttle customer usage.²⁰¹

We have observed some service providers seek to mitigate this demand usage risk on the NBN by promoting lower speed plans instead of higher speeds, as discussed in section 4.2. For example, Vocus has publicly expressed concerns that uncertainty around its NBN margins is causing it to actively drive customers towards lower-speed plans, rather than promoting the NBN as an ultrafast broadband network, as there is less risk associated with lower speed plans in terms of consumption growth.²⁰²

This practice, if continued, may have significant implications for NBN Co's long-term revenue and cost recovery, which relies on assumptions of substantial take-up of higher speed plans, as well as potentially undermining efficient use of the network.

As stated in NBN Co's current Corporate Plan for 2018–2021, projected revenue growth is reliant on an increase in take-up of plans based on higher wholesale speed tiers, exponential growth in download volumes and increasing penetration of small and medium business segments.²⁰³ As shown in Figure 5.2, NBN Co estimates that by 2021 there will be somewhat fewer lower speed plans and greater take-up of higher speed plans, particularly 50/20 Mbps, which we note are not currently strongly marketed by most service providers.

Figure 5.2: NBN Co projections of wholesale speed tier mix²⁰⁴



In addition, service providers appear to be engaging in strong price competition at the expense of service quality and performance across all speed levels. Service providers claim the cost of supplying broadband services on the NBN that meet the data usage needs and service quality expectations of consumers is too high and exceeds consumer willingness to pay, even at lower speed tiers given growing intensity of use. While this may be exaggerated in the short-term given the current level of price competition and the principle of 'no price shock'²⁰⁵ for consumers in the migration period, it is likely that the cost of growing usage on the NBN will continue to put pressure on service providers to make similar price-quality trade-offs in the future.

²⁰¹ On the copper network, only service providers acquiring wholesale ADSL services are exposed to this demand risk.

²⁰² Communications Day, *NBN margin uncertainty causing Vocus to drive customers towards lower speeds*, 15 June 2017, p. 3.

²⁰³ NBN Co, [Corporate plan 2018](#), p. 53.

²⁰⁴ *ibid.*

²⁰⁵ 'no price shock' refers to the objective of ensuring that consumers were not made worse off in migrating to the NBN in terms of higher prices for comparable services.

In summary, the current prevalence of low speed NBN plans may be influenced by a range of factors, including but not limited to:

- service providers not competing on speed and service performance at this stage
- prices of NBN services
- consumer reluctance to pay more for speed given perceptions about poor speed and service performance
- a lack of consumer awareness or understanding about their speed needs and the different options available (discussed further in section 5.4)
- a consumer preference for lower speeds at this time given the limited high-bandwidth applications (such as 4K TV) available or
- for some consumer segments, a preference for low speed services (such as low data-users or voice-only consumers).

We consider that the ACCC's current work in relation to the broadband speed claims guidance and the broadband performance monitoring and reporting program²⁰⁶ will help to increase consumer awareness and understanding of NBN speeds, as well as increase the incentive for service providers to improve their peak hour speeds and performance. This is discussed further in section 5.4.

However, as discussed in section 4.2, we also consider that the low take-up of higher speeds and corresponding lack of non-price competition around speed and service performance appears to be partly due to the current price structure and level of NBN services, particularly the CVC charge for capacity, which we discuss below.

5.1.2 Pricing of NBN broadband services

The pricing of NBN services has attracted significant attention in the market study, as well as more broadly within industry and by the media in the past several months.

The NBN pricing construct was designed as a two-part tariff to balance the competing needs of NBN Co to encourage take-up (AVC charge) and usage (CVC charge) over time to generate sufficient revenue to recover its efficient costs of investment. A key effect of these pricing arrangements is that NBN Co's ability to recover enough revenue to recover its efficient costs over time is highly dependent on future traffic growth and uptake of higher value services. This in turn places the revenue sufficiency risk with NBN Co.²⁰⁷ Service providers are able to differentiate their service quality and performance from each other by provisioning different levels of CVC. Insufficient CVC leads to network congestion resulting in slow speeds for the consumer.

While there are currently some transitional issues relating to co-existence with the legacy network services that may be impacting the quality of some NBN broadband services, the level of CVC being provisioned by service providers, appears to be significantly contributing to poor consumer experience on the NBN. This is evidenced through lower than anticipated actual speeds, particularly at peak times, across all speed tiers, which may have ongoing implications for consumer outcomes and competition on the NBN.

The price level and structure of NBN access service charges is contained in NBN Co's Special Access Undertaking (SAU), approved by the ACCC in 2013. In accepting NBN Co's original SAU, the ACCC considered that end-users should not be made worse off by virtue of

²⁰⁶ See the ACCC's [Broadband performance monitoring and reporting program](#).

²⁰⁷ Revenue risk is the risk that a potential event or condition that negatively impacts future revenue, it can be internal or external.

their transition to the NBN, in particular that there was no ‘price shock’ for end-users in the migration.²⁰⁸ We considered the initial price levels for AVC and CVC were reasonable as they were broadly similar to functionally equivalent copper and HFC based access/wholesale services at the time. However, we noted that there were differences between the copper network and the NBN. For example, service providers acquiring ULLS access services on the copper network were required to install their own equipment (DSLAM) in the exchange, an additional investment not required for NBN access services.

Service providers have expressed concerns that consumer behaviour and demand for data have changed significantly since NBN Co’s AVC-CVC price construct was originally developed, with data usage rising faster than anticipated, placing more emphasis on the CVC charge (creating higher costs for them) sooner than expected. This increase in data demand is commonly attributed to the mainstream introduction and substantial uptake of video on-demand streaming services such as Netflix and Stan, and is expected to continue to increase rapidly in the future.

We acknowledge that NBN Co is seeking to address industry concerns, most recently through the introduction of a discount model offering service providers a CVC price as low as \$8/Mbps (compared to the maximum regulated price of \$20/Mbps). We also note that NBN Co is currently undertaking a ‘Pricing Evolution Project’ and consulting with industry participants through its Product Development Forum on a range of pricing options for NBN services.²⁰⁹ While we consider NBN Co is taking steps in the right direction in the short-term, these steps may not go far enough to resolve some of the underlying issues in the longer term. In particular as illustrated in NBN Co’s most recent Corporate Plan for 2018–21 future growth in data demand is forecast to be 20–30 per cent year-on-year to 2025. This expected growth is attributed to the evolution of the Internet of Things as well as adoption of more data heavy applications (including artificial intelligence and robotics, 4K and 8K TV, augmented reality and virtual reality technologies).²¹⁰ As a result, costs of supplying data on a broadband service will continue to increase and be borne by service providers or consumers.

NBN Co has also stated its longer term intention to reduce CVC prices as traffic increases across the network over time.²¹¹ However, we consider it is important to ensure that these price reductions are timely and sufficient to support the significant increase in data download/traffic expected in the near future.

The NBN charges (AVC, CVC and NNI) represent a significant proportion of service providers’ total costs of supplying broadband services on the NBN. For example, as shown in Table 5.2, for a \$60 retail plan (which many service providers claim is the limit of many consumers’ willingness to pay for broadband services), the NBN charges represent 72 per cent of the retail price. As such, service providers (and retail prices for consumers) are highly vulnerable to any changes in these input costs.

²⁰⁸ ACCC, [ACCC Draft Decision on the Special Access Undertaking lodged by NBN Co on 18 December 2012](#), April 2013, p. 104.

²⁰⁹ NBN Co, [nbn submission to the ACCC – Communications sector market study](#), 21 August 2017, p. 11.

²¹⁰ NBN Co, [Corporate plan 2018](#), p. 40.

²¹¹ NBN Co, Corporate Plan 2012–15, p. 67.

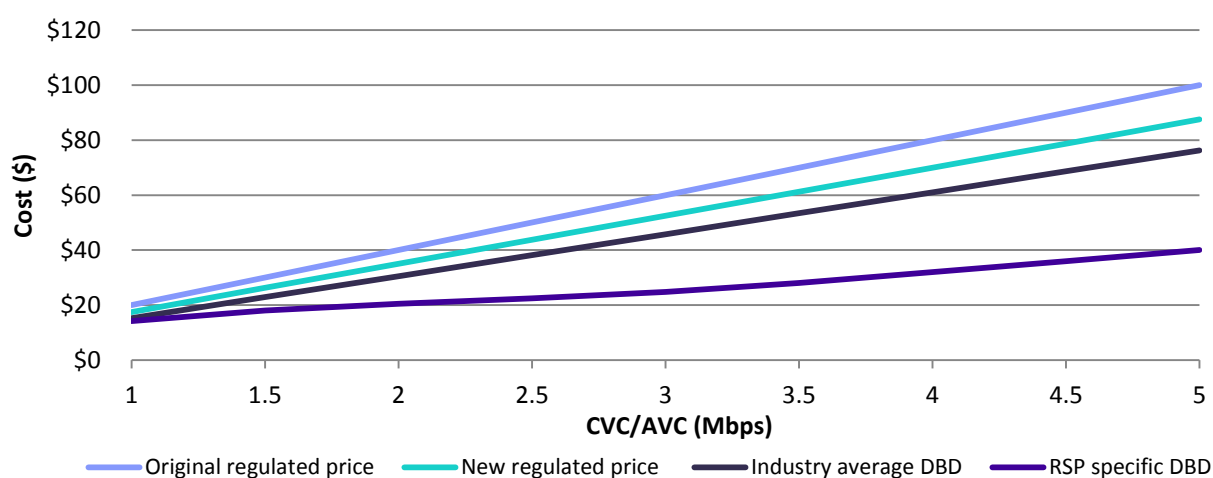
Table 5.2: Example of wholesale input costs for an NBN broadband service²¹²

NBN services	Cost	Proportion of \$60 retail price
AVC (25/5 Mbps)	\$27	45%
CVC (1.084 Mbps at \$14.25/Mbps based on current industry average June 2017)	\$15.45	26%
NNI	\$1	2%
Total	\$43.45	72%

In particular, as demand for data and intensity of use, and service quality increases, more CVC will be required, which will greatly influence the overall cost of NBN services despite current discounts available.

As shown in Figure 5.3, the service provider (known as the Retail Service Provider (RSP) specific Dimension Based Discount (DBD)) model provides a more substantial saving for service providers compared to the original CVC prices and the industry average DBD model (which was based on an industry average level of CVC per end-user). It also encourages service providers to provision more CVC to create a better consumer experience through a sliding scale discount. The more CVC provisioned per end-user, the greater the discount for the service provider.

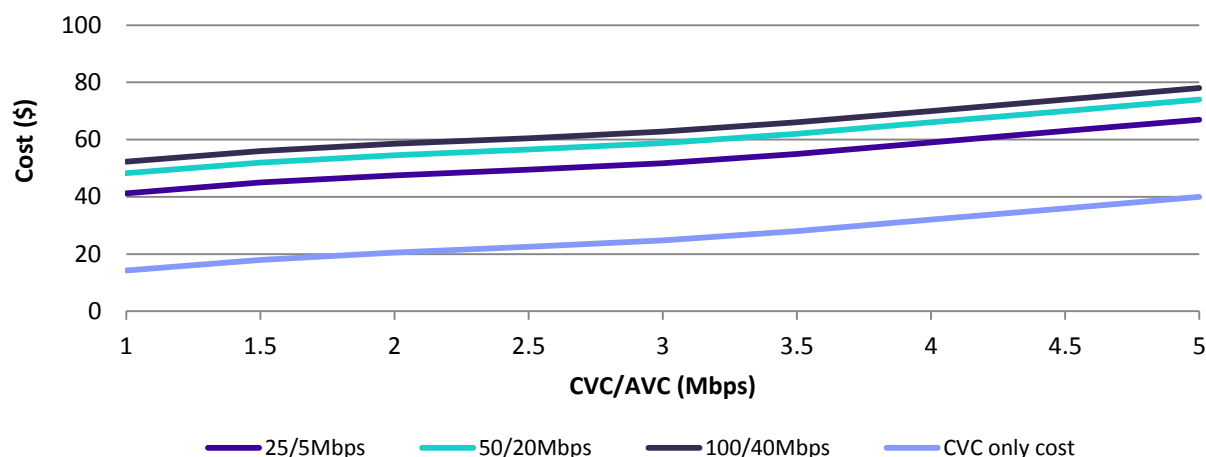
Figure 5.3: Comparison of different CVC prices and costs for different levels of CVC per AVC



However, once CVC per end-user is more than approximately 4 Mbps per end-user, for example, the cost of NBN charges alone will be more than \$60 per month across all speed tiers, as shown in Figure 5.4. As noted above, \$60 is the price level that some service providers have stated may be the limit of consumer willingness to pay for broadband.

²¹² ACCC estimates.

Figure 5.4: Example of projected access costs (AVC and CVC only) for different speed tiers and CVC capacity



As consumer data demands and hence, levels of CVC required increase, some service providers may be unable to provide competitive and commercially viable retail service offerings on the NBN. While some service providers may be able to ride out a prolonged period of below cost retail prices, other service providers may need to merge to build scale or be forced to exit the market if they are unable to sustain competitive offerings. If these consequences eventuate, they could reduce future competition on the NBN and lead to poor consumer outcomes, such as less choice and higher prices.

The cost of consumer usage is more pronounced on the NBN compared to the legacy copper network, where the majority of Telstra’s revenue from wholesale ADSL services which attract an access, usage and other connection charge, represent 72 per cent, 23 per cent and four per cent respectively of overall revenue from this service.²¹³

5.1.3 Consumer expectations and willingness to pay

In respect to communications services such as voice and broadband, experience has taught consumers to expect more for less, particularly when it comes to broadband and technology services in general, such as laptops, mobile phones, etc. As discussed in section 4.2, the price of broadband services has remained relatively stable in recent years, while data inclusions have grown substantially.

On the NBN, consumers have been led to expect higher speeds at similar price points to their legacy broadband service. At present, consumers are seeing limited variation in speed between legacy broadband services (up to 24 Mbps) compared to low speed NBN plans (up to 12/1 or 25/5 Mbps). However, consumers are paying similar prices for these services, according to Roy Morgan Research. As shown in Figure 5.5, an Australian household’s monthly expenditure on fixed broadband services in 2016 was broadly equivalent for ADSL broadband services and broadband services supplied over the NBN.

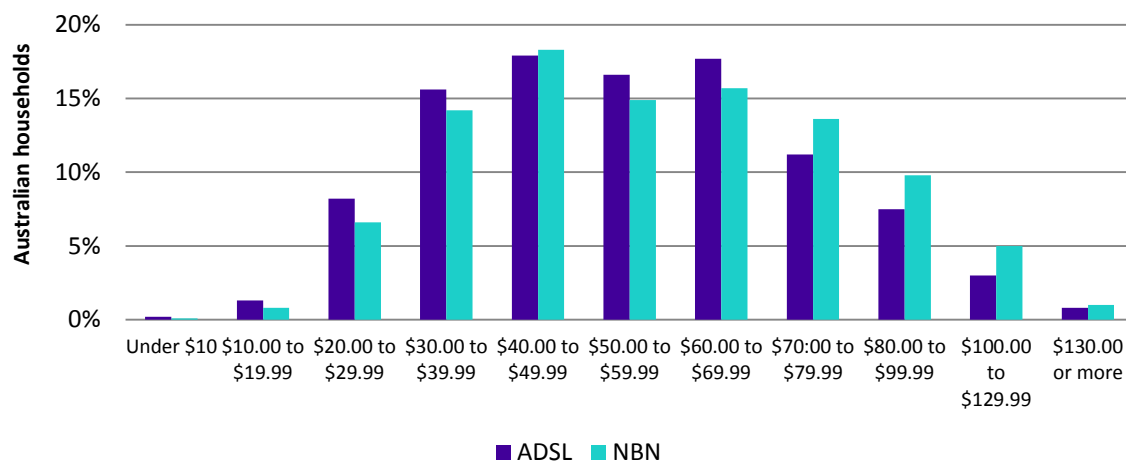
The majority of households appear to spend between \$30 and \$69.99 a month²¹⁴ with 62 per cent of households on ADSL and 57 per cent of households on NBN falling in this range. This aligns with the current retail broadband service offerings, as discussed in section 4.2, with the price of most broadband plans on the NBN observed falling between \$40 and

²¹³ ACCC, [TEM SSU Public Report – FY17](#), 29 August 2017, viewed on 10 October 2017.

²¹⁴ Roy Morgan Single Source (Australia), January to December 2016, n=30 875, Australian Households.

\$80 per month depending on data quota and speed tier. Higher speed plans (100/40 Mbps) observed in the market range from around \$80 to \$120 per month.

Figure 5.5: Australian households’ monthly expenditure on fixed broadband for ADSL and NBN for 2016²¹⁵



In this context, we note that at present there does not appear to be significant consumer appetite to pay for higher speed services on the NBN evidenced by the low take-up of higher speed NBN services and as such, consumer willingness to pay for additional speed is unclear.

At present, consumers typically have to pay between \$20 and \$30 extra per month to upgrade to the top speed tier on the NBN, as shown in Table 5.3.

Table 5.3: Example of different service provider charges for additional speed tiers on the NBN²¹⁶

Service Provider	12/1 Mbps	25/5 Mbps	50/20 Mbps	100/40 Mbps
Telstra	No longer offered	Included in base plan (\$70–\$120)	\$20	\$30
Optus	Included in \$60 base plan (no option to upgrade speed on this plan)	Effectively \$20 as included in \$80 base plan	Not listed as an option on website	\$20
TPG	Included in base plan (\$29.99–\$109.99)	\$10	Not listed as an option on website	\$20
Exetel	Included in base plan (\$39.99–\$89.99)	\$10	Not listed as an option on website	\$20

²¹⁵ Roy Morgan Single Source (Australia), January to December 2016, n=30 875, Australian Households.

²¹⁶ Company websites, viewed on 22 September 2017.

We have heard from some service providers in submissions and at the market study stakeholder forum that many consumers are unwilling to pay more for broadband services and are expecting an NBN service at the same price point as they have paid for legacy services. NBN Co disagrees with this view and has referred to research it has undertaken that indicates a willingness by consumers to pay more for fast broadband and that service providers could be more pro-active in promoting higher speed services in their marketing.

As discussed in section 4.2, there are a range of plans for broadband services supplied over the NBN on offer. It is apparent that there is a degree of market segmentation with entry level plans at prices comparable to those of legacy services but also plans at higher price points with more inclusions, including higher speed. We consider that the question of consumer willingness to pay for higher speed services is linked to the issue of consumer dissatisfaction with the speed of their NBN service and will become clearer with improved consumer information.

We consider that this can be addressed directly through much better retail plan information and support for consumers in making their purchasing decisions, and through service providers supplying their retail NBN plans so that they normally operate in the manner described.

We are introducing measures we consider have good prospects of bringing widespread improvements in the near term, via retailers implementing our 2017 broadband speed claims guidance, our introduction of a broadband performance and monitoring reporting program, and the enforcement of the ACL to address serious or systemic failures in advertising practices.

5.1.4 Aligning NBN Co and service provider incentives

In this section we consider to what extent the incentives of NBN Co and services providers are sufficiently aligned in the immediate and longer term so that issues surrounding CVC pricing might be commercially resolved or may instead require further regulatory or policy action.

Reflecting the trends affecting CVC usage discussed above, one of the notable features of the financial performance of the NBN to date is that it has largely met its original revenue target for CVC charges despite its connections being below target. By contrast it has earned substantially less revenue than forecast from AVC charges due to the number of connections and the take-up of higher speed plans being much lower than expected.²¹⁷ This is shown in Table 5.4.

Table 5.4: AVC and CVC revenue forecast and estimated actuals for 2016-17^{*218}

	2016–17 Forecast (\$m)	2016–17 estimated actual (\$m)	Difference
AVC revenue	1700	640	–62%
CVC revenue	375	346	–8%

** Excluding fixed wireless and satellite services.*

²¹⁷ The lower than forecast AVC revenues also reflects that the build schedule in terms of premises passed is behind the 2010 forecast. There is therefore scope for AVC revenue to rise as the number of premises passed rises towards the original target over time.

²¹⁸ NBN Co, Corporate Plan 2010 and Exhibit 9.5, NBN Wholesale Broadband Agreement Price List and ACCC NBN Wholesale Market Indicators Report December 2016.

We consider that there is alignment of incentives between NBN Co and service providers to resolve the CVC pricing issue to the extent that lower CVC charges may result in increased revenues, and particularly average revenue per use (ARPU), for NBN Co as a result of service providers selling more NBN connections, buying more CVC per AVC to improve performance, and moving customers to more expensive higher speed AVC plans.

At this stage, there appears to be considerable scope for NBN Co and service providers to work cooperatively to encourage these outcomes given that NBN Co's connections and its overall revenue and profitability are well behind initial forecasts. Further NBN Co has stated the objective of progressively increasing its ARPU from its current level of \$43 per month to \$52 per month in 2021, so it should be interested in methods to increase the amount of CVC purchased per customer and take-up of higher speed plans given it is constrained from increasing prices.²¹⁹

As discussed above, we consider that there are also likely to be transitional factors that are preventing greater take-up of connections or higher speed plans that will diminish in due course. These include:

- the 18 month period for migration of services from the legacy network infrastructure that slows the need for consumers to transfer and allows service providers to keep consumers on legacy networks where they can earn higher margins
- service providers not wishing to risk losing market share by pricing greater than customers' legacy plans when they move to the NBN—so transitioning people at base-level plans to avoid causing initial bill-shock.

The momentum toward higher speed plans is also expected to occur as more HFC customers move to the NBN given that recent experience suggests they are more prepared to pay for these products in order to retain the levels of speeds they are already receiving.²²⁰

However, looking further ahead, it would not be expected that NBN Co and service providers' incentives will be fully aligned given the tension between upstream and downstream firms in the supply chain and NBN Co's position as a monopoly provider of upstream bottleneck services. Its monopoly position means NBN Co is more likely to maximise profits (or in the case of a government-owned monopoly possibly be more prone to cost inefficiency in the absence of strong capital market disciplines or efforts to replicate these via proxy mechanisms) than to maximise output to serve the interests of service providers. Our regulation of NBN Co under the SAU is designed to help address these issues.

This in turn raises the issue of whether that regulation is sufficient to align incentives. The 30 year period of the maximum revenue constraint means that NBN Co has considerable leeway to earn revenue sooner rather than later if demand exceeds expectations. That may encourage NBN Co to charge significantly above costs in the nearer term—which seems to be reflected in the case of CVC to date, with substantially higher than anticipated demand for CVC capacity likely to have allowed NBN Co to keep the CVC price well above the level required to recover the costs of supplying the additional capacity.²²¹

²¹⁹ NBN Co, *Corporate Plan 2018–21*, p. 53.

²²⁰ Based on data in the ACCC's *Wholesale Market Indicators Report*, June 2017, customers supplied on NBN HFC purchase a higher percentage of 50/20 Mbps and 100/40 Mbps services than FTTN customers.

²²¹ We note NBN Co's entry level AVC prices were not set to be fully cost-reflective to help encourage take-up of NBN services, with at least some of the shortfall to be recovered by the anticipated demand for CVC at prices that would be expected to recover more than the costs of CVC provisioning over time. This only tempers our proposition about cost over-recovery given that demand for CVC has been much higher than originally anticipated. See NBN Co, *Supporting Submission NBN Co Special Access Undertaking*, 28 September 2012, pp. 100, 113–114.

In relation to the costs that NBN Co is seeking to recover, a more immediate issue is whether the current SAU prices that were set to recover the costs of installing FTTP technology are appropriate for the recovery of the costs of the MTM services. This issue is presently subject to an SAU variation submitted by NBN Co that we are considering and is discussed further in section 5.1.5.

We consider that there are some further points to be made about NBN Co's status as a government-owned monopoly (as opposed to a privately owned monopoly) reducing its incentive to operate efficiently. The proposition is broadly supported by the absence of the threat of takeover for a government-owned business that exists for a private firm.²²² As a consequence, there may be less discipline over management to contain costs and price dynamically in the interests of profit maximisation than exists in a monopoly private firm. On the other hand, we note that as a new business, NBN Co has been subject to a high level of expenditure scrutiny by the Government. It is also subject to ongoing economic regulation via the SAU.

We also observe that under government ownership, there is also the potential for policy imperatives to be imposed on NBN Co. These might work against service provider interests by adding to costs (such as by requiring universal supply of services discussed below). Alternatively policy considerations might be used to favour service provider interests, such as by directing NBN Co to sacrifice commercial imperatives to drive further take-up of NBN services.

The potential downsides of government ownership suggest that improved cost efficiency could be delivered by privatisation. In the absence of network competition, improved pricing outcomes for service providers would, however, require ongoing regulation of NBN Co to contain monopoly profits.²²³ We would also expect privatisation to be directed at improving efficiency outcomes within the markets in which NBN Co operates, rather than in seeking to provide it with regulatory protections from competition directed at maximising its sale price.

We consider there is a higher level question as to whether all the costs NBN Co has incurred in constructing the NBN can be feasibly recovered from its customers. This particularly concerns its requirement to supply non-commercial fixed wireless and satellite services to rural and regional areas of Australia as part of the requirement imposed on it to provide high speed broadband services to the entire population of Australia. This is estimated to add \$9.8 billion to the net costs of the roll out until 2040, which under NBN Co's original mandate to charge nationally uniform prices, was to be funded by cross-subsidies and is estimated to add around \$8 per month to the per customer costs of NBN services in the absence of a contribution by other fixed line providers.^{224, 225} This is in the context of Australia's large land mass and low population density particularly outside the capital cities, making delivery of communications more expensive per premises relative to other countries including the United States, UK and New Zealand.²²⁶ Further there are requirements imposed on NBN Co by other regulation that make it more costly than otherwise, such as restrictions on being able to deploy overhead cabling.²²⁷

²²² J Vickers and G Yarrow, *Privatization – An Economic Analysis*, The MIT Press, p. 7.

²²³ ACCC, *Privatisation of state and territory assets and new infrastructure*, Submission to the Senate Economics References Committee, 29 January 2015, p. 3.

²²⁴ Bureau of Communications Research, *NBN non-commercial services funding options*, Final report, March 2016, pp. 7, 70 Table 11.

²²⁵ The prices paid for NBN services may not be sufficient to recover more than long-run incremental costs in commercial areas at present, but as that is the intention over the term of the SAU which goes to 2040, we expect there will be a cross-subsidy for non-commercial services in total over this time period.

²²⁶ D. Geradin and M. Kerf, *Controlling Market Power in Telecommunications*, Oxford University Press, 2003, p. 63.

²²⁷ Schedule 3 of the *Telecommunications Act 1997* restricts the ability of communications providers to install overhead street cables.

These factors can help to explain why retail broadband prices are higher in Australia for equivalent services than many other countries as illustrated by a recent international comparison compiled by the United States Federal Communications Commission using 2014 price data (see Table 5.5). These higher prices could reduce the international competitiveness of Australian businesses reliant on broadband services and reduce the benefits to residential consumers from access to high speed broadband services, particularly for those consumers that are required to fund (as oppose to receive) the cross-subsidy.

Table 5.5: International comparison of high speed standalone fixed broadband prices with unlimited usage, 2014 ²²⁸

Plans >=25Mbps to 50 Mbps download speed					Plans >50 Mbps download speed				
Rank	Country	Average monthly price (\$US PPP)	Average download speed	Plan count	Rank	Country	Average monthly price (\$US PPP)	Average download speed	Plan count
1	France	18.81	25	1	1	Israel	32.35	100	2
2	Bulgaria	26.09	39.17	6	2	Czech Republic	40.67	80	2
3	Poland	26.90	50	1	3	Poland	40.95	147.69	13
4	Israel	27.24	40	2	4	Slovak Republic	44.13	233.33	3
5	Slovak Republic	28.57	41.25	4	5	Bulgaria	44.37	112.5	4
6	United Kingdom	32.89	44	4	6	Italy	46.18	100	2
7	Netherlands	34.09	45	2	7	Japan	46.79	756	10
8	Japan	35.71	44.91	11	8	Germany	47.31	125	4
9	Germany	36.17	43.75	4	9	Korea	49.45	460	10
10	Spain	36.45	50	1	10	Spain	52.96	100	1
11	Italy	38.15	30	1	11	Austria	53.82	108.33	3
12	Korea	38.17	50	4	12	United Kingdom	55.47	116	5
13	Austria	38.96	36.25	4	13	Sweden	57.86	358.57	14
14	Denmark	42.62	37.14	7	14	Hungary	61.31	132	5
15	Switzerland	42.84	45	2	15	Singapore	61.82	371.43	7
16	Czech Republic	51.74	40	1	16	Netherlands	64.95	226.67	3
17	United States	52.49	37.5	4	17	Hong Kong	65.17	481.82	11
18	Portugal	53.11	35	2	18	Australia	81.95	100	1
19	Greece	54.29	45	4	19	Belgium	82.96	120	1
20	Hungary	58.01	33.63	9	20	Portugal	96.30	133.33	3
21	Sweden	58.92	40	4	21	Switzerland	109.89	158.33	3
22	Mexico	68.72	50	2	22	United States	109.99	208.89	9
23	Australia	73.67	37.5	2	23	Mexico	112.47	133.33	3
24	Chile	75.01	40	3	24	Finland	123.58	100	1
25	Finland	75.18	50	2	25	Chile	124.48	107.5	4
26	Brazil	97.86	40	4	26	Brazil	142.24	150	3
27	Slovenia	101.50	38.13	8	27	Slovenia	410.26	248	10
28	Canada	128.31	37.5	2	28	Turkey	731.20	550	2
29	Turkey	285.01	42.5	2					

We note that the low price for France in the first comparison (plans >= 25 Mbps to 50 Mbps) is likely to be explained in large part by the included plan's relatively low download speed, provisioning via legacy copper technology and limited geographic availability.²²⁹ In the second comparison (plans >50 Mbps) the higher price for the United States compared to Australia is counterbalanced by the average plan download speed being double that of the Australian plan. Certain countries, notably New Zealand and Canada seem to be missing from one or both plans in Table 5.5 above because no unlimited plans were offered even

²²⁸ FCC, *International Broadband Data Report*, Fifth Report, 28 January 2016, Tables 4f and 4g.

²²⁹ A Homes and C Zubak-Skees, 'These maps show why internet is way more expensive in the US than in Europe', *The Verge*, 1 April 2015.

though the speed ranges were available. It is noted that OECD data, also for 2014 (the last available) indicates that plans greater than 100/40 Mbps with a monthly download of 400GB were cheaper in New Zealand and more expensive in Canada than in Australia.²³⁰

The NBN's structural cost issues outlined above could suggest that in the medium term, part of the answer to addressing concerns about high NBN pricing and aligning incentives between NBN Co and service providers may require Government policy changes. These might include the options of direct budget funding arrangements for non-commercial services, debt repayment relief or an asset revaluation to enable NBN Co to charge lower prices.

We note that a potential external constraining factor on the pricing and funding issues discussed above, and which would aid in better aligning incentives between NBN Co and service providers, is the potential for increased substitution of competing fixed wireless and mobile services for NBN services (the prospects of this are discussed in section 6.1). However, we consider this will occur in a timeframe of several years rather than more immediately. Furthermore, to the extent substitution is driven by distortions in NBN's pricing such as those arising from cross-subsidisation of non-commercial services, it could involve substitution that is economically inefficient.

In addition, we note that ACCC initiatives within the service provider market such as the broadband speed claims guidance, the broadband performance monitoring and reporting program and misleading claims enforcement actions should also better align services provider and NBN Co's incentives in relation to quality of service. These initiatives are expected to increase consumer awareness of service quality issues and may encourage service providers to supply better quality services through acquiring more NBN CVC capacity and promoting higher speed plans if consumers become more willing to pay more for better performing retail services.

5.1.5 Actions for addressing pricing issues

As discussed in section 5.1.2, NBN Co is continuing to engage with service providers about pricing changes as part of its Pricing Evolution Project. NBN Co has flagged a number of possible changes to its prices for AVC and CVC services including rebalancing between AVC and CVC prices, changes to the AVC price steps and AVC-only pricing (among other options).²³¹ Given NBN Co's ARPU targets in its Corporate Plan 2018–21 our understanding is that NBN Co will be keen to at least maintain its current ARPU of \$43 per service as a result of any of the pricing changes under this process.

Our view is that this process has the potential to produce mutually beneficial pricing outcomes and we consider NBN Co and service providers should be allowed an opportunity to come to an agreed outcome in regards to pricing, noting that ongoing uncertainty about pricing structures is contributing to service provider concerns and negative consumer experiences in the use of NBN services.

²³⁰ [OECD Broadband Portal](#), 18 October 2017.

²³¹ NBN Co, [nbn submission in response to ACCC's consultation paper in relation to nbn's revised variation to the NBN Co Special Access Undertaking](#), 25 August 2017, p. 10.

Proposed recommendation 3

We strongly encourage NBN Co and service providers to continue to engage constructively to address issues raised about NBN wholesale access pricing within the existing regulatory framework. This is essential if there are to be improved outcomes for NBN Co, service providers and consumers. We have delayed our decision on varying NBN Co's Special Access Undertaking (SAU) in order to give NBN Co and service providers flexibility to continue their discussions in relation to pricing.

Further to this, we consider that there is room for NBN Co to respond to pricing concerns within the existing SAU framework, either with or without a further variation to the terms of the SAU. Both NBN Co and service providers need to share the risk of pricing services that meet consumer needs. We will carefully examine any outcome of the pricing consultation, including the need for changes to the SAU or other regulatory response to ensure that there are positive outcomes for consumers and the market generally.

In addition to the issues surrounding the AVC and CVC pricing construct, a number of smaller service providers claim they are disadvantaged in competing with larger service providers in directly connecting to NBN POIs. This arises from the scale required in purchasing CVC and transmission capacity from many of the NBN's 121 POIs to these providers' centrally located POPs. There are opportunities to address the scale issues through the purchase of aggregation services from larger providers, but there is some evidence that this market is not meeting the needs of the smaller providers and that NBN Co should consider providing targeted service or pricing options to help address this on a transitional basis. This is discussed further in sections 4.4 and 5.3.1 of the report.

Proposed action 4

We will carefully examine any outcome of NBN Co's pricing consultation, including the need for consequential changes to NBN Co's Special Access Undertaking (SAU) or other regulatory response to promote positive outcomes for consumers and the market generally.

In light of the cost issues with the NBN mandate that we have identified above and which, among other things, reflect the multiple objectives and complexity of the task that NBN Co has been given by the Government, commercial and regulatory developments may not be able to provide a complete solution to broader economic efficiency objectives in the medium term. Much will depend on future NBN take-up, the level of speed plans sold at particular price points, and so NBN revenues. Subject to these developments, there could be a need for Government intervention to provide for direct budget funding arrangements for non-commercial services, debt relief measures or an asset revaluation, to enable NBN Co to charge lower prices for its services. We note that private sector firms that fail to meet rate of return targets regularly write-down the carrying value of their assets.

Proposed recommendation 5

In the medium term, and depending on future developments, the Government consider whether NBN Co should continue to be obliged to recover its full cost of investment through its prices. We consider further work could be done by the ACCC and the Department of Communications and the Arts to examine this issue and in particular possible options that may provide NBN Co greater flexibility regarding its cost recovery objectives for example, direct budget funding arrangements for non-commercial services, debt relief measures or an asset revaluation.

5.2 Service standards for fixed line broadband services

This section examines the concerns noted in section 4.3 about wholesale service levels associated with access networks that are used to supply fixed line broadband services and specifically those services supplied using the NBN. In particular, concerns about:

- the wholesale service levels and their appropriateness
- recourse and compensation where NBN Co does not meet wholesale service levels
- coordination and information flows to assist service levels being met.

Wholesale service levels impact the fixed line broadband services that a service provider supplies to downstream customers, including those acquiring NBN wholesale aggregation services and consumers (residential and small business). They set the baseline level of service that service providers can provide to the downstream supply chain, assuming that back-to-back arrangements are put in place and service providers do not seek to supplement this with any value that they may be able to add.

We note that service providers are the primary party who own the contractual arrangements and relationships with the consumer. During the NBN migration phase, NBN Co may be involved in directly providing services to consumers, for example, NBN contractors may visit consumers' premises to install equipment (which can cause confusion for customers over who is supplying their service). However, even during this phase, the service provider is responsible for supplying fixed line broadband services to the consumer, not NBN Co. In its supplementary submission to the market study NBN Co notes that it is trying to improve service provider and consumer satisfaction by clarifying the roles and responsibilities between NBN Co and service providers.²³²

As noted in section 4.3, service providers are also responsible for making Customer Service Guarantee (CSG) payments to consumers. To the extent compensation and rebates are limited at the wholesale level, service providers are more likely to seek to require consumers to waive their CSG rights in retail contracts to avoid attracting this liability.

As with all supply chains, the effective provision of retail fixed line broadband services needs to be supported by coordinated operational arrangements and information flows between NBN Co, service providers and the consumer. The underlying wholesale agreements do not need to be transparent to the consumer, but they do need to reflect the shared responsibility between NBN Co and service providers in supplying fixed line broadband services. While supported by commercial agreements, a partnership is required to provide a good consumer experience.

This was a key issue discussed at the market study stakeholder forum where the evolving nature of the NBN services, the degree of complexity associated with migrating customers nationwide to the multi-technology mix network and the number of different parties involved in the supply chain was recognised, along with the need to work together as an industry.

5.2.1 Current wholesale service levels—Wholesale Broadband Agreement 2

The current NBN service levels are set out in the Wholesale Broadband Agreement 2, which has undergone a number of revisions since it was first put in place, including incorporating terms relating to the supply of services under the multi-technology mix model.

When this agreement came into place in 2013, NBN Co took the view that its proposed service levels represented the maximum level of commitments it could reasonably make at

²³² NBN Co, *nbn supplementary submission to the ACCC Communications Sector Market Study*, 21 August 2017, pp. 16–17.

that point in time given the early stage of its rollout, operational maturity, and IT system development. NBN Co stated it would offer enhanced service level commitments as its network systems mature.²³³

Around that time we also considered non-price terms and conditions, including service levels, as a part of NBN's SAU. We had a number of specific concerns about the adequacy of the service levels NBN Co had proposed and were not satisfied it was reasonable to 'lock in' these service levels in the SAU as the NBN was in the very early stages of its rollout. As a consequence, the service level provisions were removed from the SAU prior to its acceptance.

In addition, we noted it was open to NBN Co and service providers to set the terms for service levels through commercial negotiations. However, we also indicated that service level terms may be implemented through regulatory determinations if they are unable to be agreed between NBN Co and service providers.²³⁴

At a high level the service levels that currently exist in the Wholesale Broadband Agreement 2 include:

- A number of service levels, performance objectives and operational targets that apply to the products and services that NBN Co supplies, including:
 - specific service levels for connections, appointments, activations, fault rectification, modifications, order processing and completion, availability and disconnections
 - service levels are generally represented by timeframes such as business days or hours (for example, new FTTP connections in urban areas where a new lead-in is required at the end-user premises are to be completed within 14 business days). Generally, the service levels differ depending on the type of activity, location of premises, extent of the physical infrastructure available at the premises and the network technology used (e.g. FTTP, FTTN, wireless, etc.)
 - various performance objectives, represented as percentages, that NBN Co will aim to achieve in meeting its service levels overall (e.g. for all standard connections, NBN Co will aim to meet its service level at least 90 per cent of the time)
 - operational targets that are aspirational and non-binding.
- Some requirements to take corrective action if a service level or performance objective is not met. These are not breaches of the Wholesale Broadband Agreement 2. Rather, if a service provider requests that NBN Co take corrective action where NBN Co has failed to meet a service level, NBN Co will:
 - inform the customer for reasons of failure
 - inform the customer of the relevant corrective action to be undertaken, and
 - notify the customer once corrective action has been taken.
- In limited circumstances, service providers may claim CSG compensation or commercial rebates where NBN Co has failed to meet a service level. However, the ability to claim rebates or CSG compensation is limited to a number of service level standards. Further, a number of conditions attach to a service provider's eligibility to claim compensation. For example:
 - In all cases, the obligation rests on the service provider to initiate the process to claim a rebate or compensation, rather than being an automatic process.

²³³ NBN Co, [NBN Co Submission to ACCC Consultation Paper on variation of NBN Co SAU – Appendix B](#), May 2013, pp. 4–7.

²³⁴ ACCC, [Variation of NBN Co Special Access Undertaking – explanatory statement](#), October 2013, p. 91.

- A service provider's eligibility to claim a standard connection rebate is not a direct multiplication of the number of times the connection service level is not met. The rebate is linked to a forecast factor such that if a service provider's forecast for connection is inaccurate to a specified extent, the rebate is reduced.
- CSG compensation is limited to accelerated connections, end-user fault rectifications and appointments for end-user connections and end-user fault rectifications.
- The service provider must warrant that it has contravened a CSG standard to the consumer and must take all reasonable action to avoid or mitigate its CSG liability. Further, NBN Co may appoint an auditor to audit claims for CSG compensation.

At the market study stakeholder forum, service providers raised the service levels in Wholesale Broadband Agreement 2 as an area of concern. Broadly speaking these concerns can be grouped into three main areas:

- The current service levels do not represent an appropriate baseline to ensure a positive end-user experience particularly around connections, fault rectification, complaint handling.
- There is insufficient recourse to compensation where service levels are not met (several service providers indicated that from their perspective the Wholesale Broadband Agreement 2 needed 'more teeth').
- There is inadequate information flows and coordination between NBN Co, service providers and consumers.

It was also noted that without strong measures around recourse and compensation in the Wholesale Broadband Agreement, no redress provisions are included in downstream agreements for the provision of NBN wholesale aggregation services to smaller service providers and new entrants.

Practical examples of information flows and coordination were also raised at the market study stakeholder forum. For example, during the activation phase, service providers indicated that real time information about what is occurring, where issues are arising, what is being done to resolve them and associated timeframes is required. In this regard it was noted that with the increased complexity in the migration phase NBN Co's business to business (B2B) systems do not necessarily provide the information that will enable service providers to keep customers up to date where there are delays or rescheduling is required.

5.2.2 Revised service levels—proposed Wholesale Broadband Agreement 3

NBN Co has been consulting with service providers on the next version of its Wholesale Broadband Agreement since 2015, which provided the opportunity for the above concerns to be raised and examined. NBN Co has extended the term of Wholesale Broadband Agreement 2 a number of times pending the Wholesale Broadband Agreement 3 being finalised.

NBN Co's supplementary submission to the market study notes that the service level timeframes contained in Wholesale Broadband Agreement 3 for both activation and assurance activities are set by the practical limitations of the rollout (including managing NBN Co's costs appropriately).²³⁵ As a result, NBN Co does not expect material changes to those service levels during the rollout period.

²³⁵ NBN Co, *nbn supplementary submission to the ACCC Communications Sector Market Study*, 21 August 2017, pp. 16–17.

We are concerned that without changes to these service level standards, there may be inefficiencies and/or poor consumer outcomes as a result of the lack of incentives/ accountability on NBN Co to meet its service level targets.

NBN Co has stated that service activation and assurance issues faced by consumers have a direct reputational impact on NBN Co and therefore NBN Co has every incentive to improve consumer experiences related to the NBN and these incentives are playing out in practice. In this regard, NBN Co has noted that it continues to expend significant effort on improving service delivery through several initiatives, for example, the launch in 2017 of its Project Future of Customer Experience, a strategic customer experience program designed to shift service provider and consumer satisfaction.²³⁶

Several service providers have recently voiced their concerns with us in relation to Wholesale Broadband Agreement 3. While some issues are specific to service providers, there is some commonality in the issues being raised, with universal concern regarding the extent to which the CSG compensation payments from NBN Co will cover the service provider's liability, which may encourage service providers to require consumers to waive their rights under the CSG.

We have concerns that the proposed service standards in Wholesale Broadband Agreement 3 may not provide sufficient protection for NBN consumers. As the scale of the NBN rollout increases, this issue is likely to impact a significant proportion of consumers. Consequently, we propose to seek further information from NBN Co and service providers about the adequacy of the service standards.

We consider that NBN service levels should enable a positive customer experience and that greater transparency is needed around services outcomes, with clear consequences and redress options where standards are not met by those best placed to manage the risk (which would then flow on to consumers).

Proposed action 6

We propose to examine the non-price terms of access, particularly the service standards being proposed for access to NBN services, and the impact that these may be having on delivering positive consumer experiences on the NBN. The allocation of responsibility for connections and service faults between NBN Co and service providers is an issue that will affect consumer experiences, especially where consumers suffer detriment.

In particular, we will examine whether there are appropriate incentives for NBN Co to remedy service failures and consider the adequacy of compensation available to service providers to enable them to provide appropriate consumer redress. As NBN Co is moving from the rollout phase to delivery of services, risk allocation must also shift to ensure services are delivered to consumers that meet expectations of quality.

We will consider whether the proposed allocation of responsibility is appropriate and whether regulatory intervention is necessary, for example, by including service level terms within NBN Co's regulated terms of access.

²³⁶ NBN Co, *nbn supplementary submission to the ACCC Communications Sector Market Study*, 21 August 2017, pp. 16–17.

5.3 Critical wholesale inputs for the supply of fixed line broadband services

Beyond access, wholesale aggregation, transmission and dark fibre services are essential components in the communications supply chain enabling (fixed and mobile) broadband services to be provided to consumers. This section discusses the potential competition and efficiency issues raised in sections 4.4 and 4.5 in relation to these services as they are used to supply fixed line services.

Another important component enabling the supply of fixed line and mobile broadband services is internet interconnection services, which is also discussed below.

5.3.1 NBN wholesale aggregation services

NBN wholesale aggregation services are replacing wholesale ADSL services and supply of these services is evolving as rollout of the NBN continues and the number of NBN services in operation increases. These services are a key input for particular service providers supplying retail fixed line broadband services, in general representing over 50 per cent of the costs of supplying these services²³⁷, and as a result potential competition issues have the ability to impact the downstream retail market.

As outlined in section 4.4, there appear to be two models for service providers connecting to the NBN. There are those service providers that intend to directly connect and are using NBN wholesale aggregation services prior to reaching the scale at which this is commercially viable (we have described these as tier 2 service providers) and those service providers that do not intend to directly connect and will use NBN wholesale aggregation services on an ongoing basis (tier 3 service providers). The supply of NBN wholesale aggregation services has an important role to play in both the 'stepping stone' model (for tier 2s) and reseller model (for tier 3s) (the latter, particularly where a Layer 3 service is acquired, being similar to the MVNO model in the mobile services market).

As at May 2017 we estimate around four per cent of all NBN fixed line broadband services were provided using NBN wholesale aggregation services.²³⁸ It is interesting to compare this to mobile services where around 10 per cent of services are supplied using wholesale MVNO services. In this regard, we note that in contrast to the market for mobile communication services, the large supermarket chains (Woolworths, Coles and Aldi) and other general retailers with a large national presence have not entered the NBN retail market. This may reflect the additional complexity in supplying services over the NBN during the network rollout.

In seeking to understand this difference, we also note the relatively nascent and evolving nature of the market supplying NBN wholesale aggregation services as compared to wholesale MVNO services. With the NBN having reached the halfway mark of its rollout, and over three million NBN services in operation as at 12 October 2017²³⁹, there is opportunity for the market to continue to grow, as has occurred in the supply of wholesale MVNO services, for product innovation to occur and the possibility of new entrants supplying these services.

The extent to which these developments will occur is unclear and the outcome will reflect an interplay of supply and demand factors in the market. For example, on the supply side the

²³⁷ Responses to ACCC survey in relation to NBN wholesale aggregation services. Of the 12 service providers surveyed, two said that the costs represented less than 50 per cent of the costs to supply a fixed line broadband service, three said the costs represented 50–75 per cent and six said the costs are greater than 75 per cent of the costs.

²³⁸ Responses to informal information requests from the ACCC to Telstra, Optus, TPG and Vocus over 2016 and 2017.

²³⁹ NBN Co, [Weekly summary rollout progress](#), week ending 12 October 2017, viewed on 18 October 2017.

commercial and technical challenges with developing a wholesale network (integration, network sharing, enabling real time information) may limit the number and types of the NBN wholesale aggregation services available. In addition, integrated wholesalers may be slow to bring wholesale aggregation products to market as they may prefer to supply their retail customers over their wholesale customers. And on the demand side, the current complexity and cost faced by service providers seeking to supply NBN services may be limiting entry, or alternatively this could reflect the absence of a genuinely competitive wholesale market in which NBN wholesale aggregation services are supplied that enable differentiation and downstream competition to occur.

From our survey of service providers acquiring NBN wholesale aggregation services over June and July 2017, eleven out of twelve currently have concerns in relation to the price and non-price terms and conditions for NBN wholesale aggregation services.

Given the potential impacts of these services on downstream retail fixed line broadband services, this section examines the competition concerns raised in section 4.4 including:

- the pricing of these services, including concerns that NBN price discounts are not being universally passed through
- the limited extent of differentiation between NBN aggregation services and the ability to use them to provide differentiated downstream products
- delays in NBN wholesale aggregation products coming to market compared to equivalent retail services.

As a part of this analysis, we have considered potential supply and demand side issues and between the draft and final reports we intend to seek further information from both providers and acquirers of the NBN wholesale aggregation services on these matters.

Pricing of NBN wholesale aggregation services, including pass through of NBN CVC discounts

As outlined in section 4.4, the evidence we have suggests that NBN Co's pricing changes, particularly the recently introduced discount model based on each retail service provider's dimensioning decisions, are not being universally passed through to downstream service providers. This may lead to service providers reliant on aggregation services facing a price squeeze in retail markets where they compete with aggregation providers' retail services.

As NBN Co's prices represent a significant proportion of the overall NBN wholesale aggregation service costs, if this is occurring it places the tier 2 and 3 service providers at a relative competitive disadvantage and could limit their ability to viably compete in the supply of retail fixed line broadband services. This is because the vertically integrated providers may be passing through the benefits of NBN Co's pricing changes to their retail customers, but not their wholesale customers.

We note that this may be a timing issue, as NBN Co's retail service provider based discount was only introduced in June 2017. However, it may also reflect the current market structure and incentives in place. In this regard, the vertically integrated providers have incentives to maximise retail rather than wholesale market shares, given retail service margins tend to be larger. Some service providers have indicated that NBN wholesale aggregation services have very little margin.

This is further illustrated by considering a hypothetical where the NBN wholesale aggregation providers are not vertically integrated. In these circumstances we would expect to see providers actively competing for customers and seeking to pass through any NBN

price changes. If they did not, and a competitor did, then this could result in them losing market share.

Some responses to our survey indicated the prices for NBN wholesale aggregation services appeared similar to the retail prices that their wholesale provider has in the market, which would be suggestive of a price squeeze. While we are concerned NBN Co's pricing changes are not being passed through, reflecting the anecdotal concerns expressed to us, we do not have firm empirical evidence to demonstrate that this is the case. Wholesale NBN aggregation service pricing information we have informally obtained to date from service providers also does not enable us to make any conclusions in relation to potential price squeezes.

Reflecting the above concerns, we propose to consult about the need to more formally and systematically collect NBN wholesale aggregation pricing information via a RKR. The purpose of this is to enable us to understand whether NBN Co's price changes are being passed through and if so to what extent. An outline of the information we would propose to seek is set out below.

Limited differentiation between NBN wholesale aggregation services

As outlined in section 4.4, some tier 2 and 3 service providers have expressed concerns in relation to their ability to use NBN wholesale aggregation services to differentiate their services in the downstream supply of retail fixed line broadband. For example, in our survey, of the eleven service providers with concerns around the price and non-price terms and conditions, seven were concerned that the products did not enable differentiated supply and six had concerns that the products did not meet their needs.²⁴⁰ At a high level these concerns related to both the nature of the services provided and the operational information available to support them.

We understand that most NBN wholesale aggregation services are differentiated by headline speed, using NBN Co's speed tiers e.g. 12/1, 25/5, 50/20 and 100/40 Mbps. However, as noted in section 4.4 it appears many service providers have been unable to acquire services that enable them to supply different levels of CVC provisioning to that which the NBN wholesale aggregation provider supplies to its own retail customers. This means that those service providers that do not have the ability to directly connect to the NBN are unable to supply higher quality retail services than those supplied by the integrated wholesalers.

For example, in our survey of service providers acquiring aggregation services, one service provider noted that while it provides a speed guarantee to its end-users it is experiencing issues delivering that commitment with its NBN wholesale aggregation service.²⁴¹ Specifically that the aggregation provider is not supplying sufficient CVC provisioning to the NBN POI, impacting the service its end-user customers are receiving. The service provider considers it has provisioned enough capacity to meet its end customers' needs and is being charged for, but is not receiving, the service.

In addition to the above concern, the following specific concerns about NBN wholesale aggregation services were noted in our survey:

- inability to manage congestion during peak time and similarly an inability to influence or quickly modify network dimensioning (contention levels)
- limited control and visibility of its customers' experience

²⁴⁰ Responses to ACCC survey in relation to NBN wholesale aggregation services.

²⁴¹ *ibid.*

- limited reporting and information, including notices from NBN Co which detail planned change activity warnings
- inability to directly interface with NBN ordering and provisioning, B2B, systems
- inability to utilise all traffic classes available from NBN Co, e.g. TC2 for business services and TC4 peak information rates e.g. peak information rates greater than 100/40
 - there was also concern in relation to the inability to use UNI-V, enhanced fault rectification services, multicast and to recover first battery credit
- availability of business centric features including multi-line voice services and enhanced service level agreements
- the restrictions in place on the rollout of the service provider's own network directly connected to the NBN and difficulties when time comes to migrate customers onto a service provider's network
- slow activation of services and communication and coordination issues in relation to activation and service assurance stemming from indirect access to the NBN.

Some of these issues may reflect inherent limitations of network services supplied over a shared wholesale network, and others may reflect that we are in a stage of transition with the NBN. However they could impact the extent to which tier 2 and 3 service providers can effectively compete in the supply of retail fixed line broadband services.

At this stage, we consider that the market may continue to evolve and address some, or all, of the above limitations. This may occur as demand for these services increases, enabling aggregation providers to develop business cases which support further investment in network infrastructure and related systems and processes. There is also the potential for new entrants to supply these services and compete for customers by offering more differentiated services. This may occur as tier 2 service providers move to a model where they directly connect with the NBN and decide to supply NBN aggregation wholesale services (as Aussie Broadband has done).

While we encourage entry by non-vertically integrated providers of these services, at this stage it does not appear likely. This reflects the significant investment required to develop a presence at all 121 NBN POIs, either via rolling out transmission infrastructure or by entering into long-term agreements with transmission and/or dark fibre providers, likely low margins and high uncertainty about the level of demand.

Given the importance of these services, we propose to monitor their development in order to understand whether they evolve to address the limitations noted above. We will also seek to understand any commercial and technical issues that limit the ability of NBN wholesale aggregation service providers to supply more differentiated services that address the above concerns. An outline of the information we propose to consult on the need to seek via a RKR, as noted above, is set out below.

Delays in wholesale products coming to market

Concerns have been expressed in relation to how long it has taken for Layer 2 TC2 (business) and TC1 (voice) aggregation services to become available in the market. Similarly, in response to the survey of service providers acquiring NBN wholesale aggregation services, one provider expressed concern about providers not releasing new services at the same time products are released by NBN Co, e.g. new peak information rate tiers, new services like HFC and FTTC. There was also concern expressed that the NBN wholesale aggregation providers decide which NBN capability is passed on to service providers and when.

We acknowledge that although services provided over aggregation services make up only around four per cent of the NBN end-user market, a number of service providers rely on NBN wholesale aggregation services to supply retail broadband services, making it a critical wholesale input. This is particularly the case in the rollout phase of the NBN when there is active competition for customers as they transition off the legacy networks and onto the NBN.

However, we recognise that there will be a period of time between when NBN Co makes new services available, and they are supplied at the retail level, in comparison to when they are made available at the wholesale level. This reflects that providers need to establish the business case supporting the wholesale product including the business support systems and then develop and test it before moving into implementation and delivery phase.

This period of time, however, should not be so long as to overly disadvantage those service providers that rely on NBN wholesale aggregation services. Further, we would be concerned if wholesale products were being withheld or delayed from release to reduce competition in the supply of retail fixed line broadband services.

While this may be a transitional issue as NBN Co releases new products and services during its rollout phase, we propose to monitor it to understand whether it is creating significant barriers to entry for service providers and diminishing competition in the supply of retail fixed line broadband services. An outline of the information we propose to consult on the need to seek via a new RKR, as noted above, is set out below.

Draft finding

NBN wholesale aggregation services currently support a small number of all retail broadband services on the NBN. The market for NBN wholesale aggregation services may not fully mature until after the network is built is completed but there remains the potential for this market to grow and provide competitive constraint in the provision of downstream services on the large service providers.

In light of the identified concerns and the potential evolution of the market, we propose to consult about the need to obtain information from industry as part of a RKR applying to carriers supplying aggregation and other wholesale inputs that will enable us to monitor how the supply of these services develops and whether any regulatory or policy intervention is required.

At a high level we consider the following will be required, noting this will be the subject of further consideration and consultation with industry:

- quarterly supply information—to enable us to monitor developments and changes in the supply of NBN wholesale aggregation services
- the ability to remove or add information requests—to provide flexibility in terms of the information collected, and recognise where it is no longer useful or additional information is required reflecting ongoing concerns
- information to be collected up to the expected completion of the NBN rollout in 2020 followed by a review of ongoing information needs.

We have set out below, the nature of information we will consult about the need to collect in relation to the supply of aggregation services:

- From each provider supplying NBN wholesale aggregation services:
 - the customers being supplied and the number of services in operation for each customer

- the wholesale list prices for plans across the various speeds e.g. 12/1, 25/5, 50/20 and 100/40 Mbps, as well as actual wholesale prices for a representative sample of customers and any subsequent changes
- the terms and conditions for the list/negotiated wholesale prices and any subsequent changes
- the details of the wholesale products supplied, including the traffic class and those aspects which enable the acquiring service provider to manage and differentiate their downstream service (e.g. ability to manage congestion and dimensioning, access to information about NBN changes or operational statistics) and any subsequent changes
- details of technical or commercial issues that limit the ability of the provider to supply differentiated NBN wholesale aggregation services and/or which delay the provision of wholesale services relative to retail services.
- the prices for their retail plans across the various speeds e.g. 12/1, 25/5, 50/20 and 100/40 Mbps and any subsequent changes
- the amount of capacity dimensioned for their own retail plans and the amount of capacity dimensioned for the representative sample of wholesale customers that the wholesale price information is collected for

This information, in combination with information we will continue to voluntarily collect from demand side participants, will enable us to determine the effectiveness of competition in the market and any particular issues that arise, using indicators such as market shares, price competition, pass through of NBN price changes and non-price differentiation.

If concerns about the level of price and service competition are evident, we could (following appropriate consultation) potentially use the information to publish competitive benchmarks. For example we might publish details of the lowest commercial offers in the market to NBN POIs if there is substantial variation in offers between aggregation providers.

We will consult prior to introducing the RKR to collect and report this information. This will include examining instances where some of this information is already being provided to other government agencies for different purposes to avoid unnecessary inconsistency.

Proposed action 7

We will consult on the need to obtain information from industry via a record keeping rule to monitor the supply of wholesale aggregation services to determine whether regulatory intervention is required. To the extent the market does not evolve, and the information we collect points to a lack of competition, we will consider (following further consultation) the publication of competitive benchmarking information.

In the absence of further evidence of a genuinely competitive wholesale aggregation market, an aggregation service (e.g. a 'CVC trunking' product) could be supplied by NBN Co to provide a further competitive dynamic by enabling smaller service providers and new entrants to create differentiated retail products. There are a variety of possibilities that such a model could take, e.g. it may supply services back to capital city NBN POIs, it may only apply to certain traffic classes, to certain service providers and it may only be available on a transitional basis that is no longer than the NBN build period.

By way of precedent, we note that in its initial build phase there were a number of transitory measures introduced by NBN Co to help them overcome the costs of connection. These included the centrally located transitional POIs with provision for transit services at no extra

cost and the CVC transitional pricing credit equal to up to the first 150 Mbps of CVC purchased at POIs with up to 30 000 serviceable premises.

We are aware that NBN Co has been approached by a number of smaller service providers about offering such a service. We are interested in NBN Co's considerations around offering such a product on a transitional basis via commercial negotiations with smaller service providers in order to help promote competition in the retail market for NBN services.

Proposed recommendation 8

In the absence of a genuinely competitive wholesale aggregation market NBN Co should consider provision of transitional products or pricing measures, for no longer than the NBN build period that facilitate the entry of smaller or niche service providers to provide a further competitive dynamic.

5.3.2 Transmission services

As outlined above and in section 4.4, in some cases NBN wholesale aggregation services are being used by tier 2 service providers prior to reaching the scale at which directly connecting to the NBN and acquiring transmission services is commercially viable. For a period of time service providers may use a hybrid model of acquiring some NBN wholesale aggregation services and also directly connecting to the NBN and acquiring transmission services in order to do so.

From our survey of the twelve service providers, five were using this hybrid approach, all with the intentions to move to a full direct connection model.²⁴² This was primarily because they considered direct connection to be more cost effective than NBN wholesale aggregation services and to provide greater ability to supply a differentiated service.

A key consideration in making this decision is the cost of directly connecting with the NBN (see section 5.1 for discussion of the issues associated with this) and the cost of transmission services. We estimate transmission costs are relatively less than NBN access costs in relation to the total wholesale costs of supplying a retail fixed line broadband service, although the extent of this differs depending on the number of access services per transmission service, location of the transmission service and the extent of competition on the route where it is being supplied (this is discussed further below).

As outlined in section 4.4, we have estimated a range of scales (in terms of the number of services in operation) over which we consider it is commercially viable for a tier 2 service provider to directly connect to the NBN and acquire transmission services. These differ across metropolitan and regional and rural NBN POIs (300–500 services in operation for metropolitan NBN POIs and 500–1000 services in operation for regional and rural NBN POIs). This reflects that the unit costs for transmission services decrease with more services in operation (as a result of the large fixed costs involved with supplying transmission services) and that there are higher costs the greater the distance regional and rural transmission services cover.

Table 5.6, Table 5.7 and Table 5.8 illustrate this and that when the key wholesale costs (AVC, CVC and transmission) of supplying a broadband service are broken down to a per service in operation basis, the absolute transmission service costs are greater in regional and rural areas and make up a larger percentage of the total costs of supplying a retail fixed line broadband service. We have modelled these estimated costs based on averages of the transmission pricing information we have obtained informally, noting that in regional and rural areas there is greater variability in prices that will affect these averages.

²⁴² Responses to ACCC survey in relation to NBN wholesale aggregation services.

Table 5.6: Estimated transmission costs across all metropolitan areas^{243*}

Services in operation at an NBN POI	Assumed capacity (Mbps) required at NBN POI and for transmission per service	Transmission costs per service	Total wholesale costs per service	Transmission costs as a percentage of total wholesale costs
200	200	\$4.50	\$46.75	10%
500	500	\$2.66	\$44.31	6%
1000	1000	\$1.44	\$43.09	3%

* Assuming 1 Mbps is provisioned per service for a 25/5 Mbps plan.

Table 5.7: Estimated transmission costs across all regional and rural areas*

Services in operation at an NBN POI	Assumed capacity (Mbps) required at NBN POI and for transmission per service	Transmission costs per service	Total wholesale costs per service	Transmission costs as a percentage of total wholesale costs
200	200	\$11.13	\$53.38	21%
500	500	\$6.33	\$47.98	13%
1000	1000	\$3.77	\$45.42	8%

* Assuming 1 Mbps is provisioned per service for a 25/5 Mbps plan.

Table 5.8: Estimated transmission costs in least competitive regional and rural areas* #

Services in operation at an NBN POI	Assumed capacity (Mbps) required at NBN POI and for transmission per service	Transmission costs per service	Total wholesale costs per service	Transmission costs as a percentage of total wholesale costs
200	200	\$30.32	\$72.57	42%
500	500	\$17.13	\$58.78	29%
1000	1000	\$9.48	\$51.13	19%

* Assuming 1 Mbps is provisioned per service for a 25/5 Mbps plan.

²⁴³ These tables are based on the latest NBN pricing information and transmission information obtained informally from providers.

This reflects the average cost to supply to the following NBN POIs: Darwin, Bundaberg, Cairns, Mackay, Rockhampton, Townsville, Hobart, Launceston, Geraldton, Katanning which from the information we have obtained informally have prices which are higher than those set by the ACCC in the DTCS Final Access Determination.

The potential for transmission services to be a barrier to directly connecting to the NBN was noted in section 4.5 and is often raised as an issue, particularly where service providers intend to supply a national retail fixed line broadband service and therefore must be connected to all NBN POIs. However, the above modelling suggests that while the costs of regional and rural transmission services are greater than those in metropolitan areas, and can represent a not insignificant percentage of total wholesale costs, particularly on the least competitive routes, it is not clear to us that these costs and the scale required are an absolute barrier to entry.

We are continuing to work with industry to understand scale issues at NBN POIs, including over the transitional period prior to the NBN being fully deployed in 2020.

Further, although the extent of countervailing power that tier 2 service providers have in negotiating the prices for transmission services is unclear, and particularly for regional routes where there is limited competition in the supply of these services, several commercial arrangements have been established. For example, Aussie Broadband has recently established an agreement with Telstra for the supply of transmission to all NBN POIs. We also understand there are other service providers that as they build scale are increasing the number of NBN POIs where they are directly connecting, supported by commercial agreements to supply transmission services to those POIs.

These agreements are likely to be negotiated as a package of prices for transmission services across the metropolitan, regional and rural NBN POIs. As a result, there may be instances where some prices are lower than those established in our Final Access Determination for transmission services and instances where some prices are higher. To the extent these arrangements are commercially negotiated and support competitive supply of services by services providers they do not raise any concerns.

It is also interesting to note that in examining the data collected under the NBN service in operation record keeping rule, there are instances where tier 2 services providers are directly connecting to metropolitan, regional and rural NBN POIs before reaching the scale we have estimated is required for services to be commercially viable. This may be occurring for a variety of reasons, but is further evidence that transmission services, and the scale required to acquire those services at an NBN POI, is not acting as an absolute barrier to entry.

The modelling undertaken to support the above analysis is based on the assumption that 1 Mbps of capacity is required for each service in operation and that this is mirrored in terms of the NBN and transmission capacity required. This is approximately the current average capacity being provisioned on the NBN—the latest estimate as at 30 June 2017 was 1.09 Mbps per service in operation.²⁴⁴ However, reflecting increasing customer demand for data we have also analysed the implications if an assumption of 1.5 Mbps of capacity is acquired for each service in operation.

Under this assumption, scale remains important and transmission services continue to demonstrate economies of scale as the number of services in operation and capacity increases. However, based on our modelling, with this assumed capacity, at the lower numbers of services in operation there would be minimal or no margins for a retail price of \$60. This is largely driven by the NBN access costs and in particular, the CVC charge (see section 5.1 for further discussion).

²⁴⁴ ACCC, [NBN Wholesale Market Indicators Report](#), 30 June 2017.

At this stage, reflecting the above analysis, we do not consider there is a need to intervene in or specifically monitor the supply of transmission services to NBN POIs beyond those considerations which will occur as a part of our reviews of the DTCS declaration and Final Access Determination. These issues will include:

- consideration of transmission services in regional and rural areas in general, particularly those routes where there is not currently significant competition, and the associated pricing on those routes
- the extent of any further entry by tier 2 service providers supplying retail fixed line broadband services by directly connecting to the NBN and acquiring transmission services from NBN POIs and the success of those service providers with current direct connect arrangements and their ability to supply competitive retail fixed line broadband services. This will be used to understand the level of competition in the supply of transmission services to NBN POIs
- whether transmission services to NBN POIs need to be examined separately from other DTCS services and in particular whether there is a need to add a specific NBN POI transmission route classification.

We will be commencing the review of the DTCS declaration before the end of 2017 (the declaration expires in 2019).

Proposed action 9

We will examine the supply of transmission services to NBN Points of Interconnection (POIs) as part of the Domestic Transmission Capacity Service (DTCS) declaration and Final Access Determination.

5.3.3 Dark fibre

In directly connecting to the NBN, some service providers may seek to use dark fibre services as an alternative to transmission services. We note that in the 2014 DTCS declaration decision we considered dark fibre and transmission services are not direct substitutes as additional connecting equipment and management systems are required with dark fibre as compared to transmission services.²⁴⁵

As outlined in section 4.5, we have limited information about dark fibre services (suppliers, availability and location of services, including at NBN POIs, and price and non-price conditions). However, in the context of its availability at NBN POIs, several service providers have submitted to the market study that dark fibre is a pre-requisite for managing exponentially growing consumer demand. They argue dark fibre is cost effective at scale, provides flexibility to respond to changing customer requirements and allows for better differentiation of services.

Supporting this, in the survey of service providers acquiring transmission and dark fibre services, of twelve providers, seven indicated that they are acquiring dark fibre and four indicated that they would consider purchasing it from NBN POIs as a part of their future business models for supplying fixed line broadband services.²⁴⁶ Further, of the seven service providers acquiring dark fibre services, five indicated that it comprised less than 10 per cent

²⁴⁵ ACCC, [Domestic Transmission Capacity Services - An ACCC Final Report on the review of the declaration for the Domestic Transmission Capacity Services](#), March 2014, p. 29.

²⁴⁶ Responses to ACCC survey in relation to transmission and dark fibre services.

of the costs to supply a fixed line broadband service²⁴⁷ (noting that service providers will, however, incur additional costs to enable the dark fibre).

Contrasting this, we also received one view that the economics of dark fibre services need to be right and that the effective cost per customer can be high. In particular, if redundancy/diversity from NBN POIs are required, then at least two dark fibres will be required per NBN POI and that managed Ethernet or wavelength (transmission) services would provide superior economics, availability and reliability.²⁴⁸

Further, in its submission to the market study Vocus was of the view that as a matter of principle there can be no basis for mandating regulated access to dark fibre in areas where DTCS is available because there is an effective substitute (i.e. there is no need to regulate the same bottleneck twice).²⁴⁹ Telstra also considered that the dark fibre market is responding to increasing demand for data, with a number of providers, including Vocus, Superloop and until recently Nextgen expanding their product range and winning business from larger providers.²⁵⁰

We are also aware that in some jurisdictions dark fibre services are regulated for open access by service providers. For example, in the Netherlands and Sweden dark fibre backhaul services are made available at regulated prices.²⁵¹ We note that in March 2016 Ofcom mandated that Openreach (BT's functionally separate wholesale arm) provide access to dark fibre services at a specified price in areas where there was seen to be less competition (essentially outside London).²⁵²

While Openreach had decided to make available a national Dark Fibre Access product²⁵³ in both the area regulated by Ofcom and non-regulated areas and routes from 1 October 2017²⁵⁴, it also appealed Ofcom's decision to the Competition Appeal Tribunal. The Tribunal found that Ofcom had made errors in its market definitions and that it would need to reconsider the matter.²⁵⁵ Responding to this Openreach has indicated that it will not be supplying a Dark Fibre Access Product on 1 October 2017.²⁵⁶

Given all of this, including the potential importance of dark fibre services in promoting competition in the supply of fixed line broadband services, and the contrasting perspectives currently presented to us, we consider it is important to better understand the market in which dark fibre is being supplied to NBN POIs. Without this information it is difficult to determine any potential market failure.

At a high level we are proposing to use a similar approach to that proposed for NBN wholesale aggregation services, in particular that we consult on the need to seek, as part of the same RKR to carriers seeking information about aggregation services, information about the provision of dark fibre services. This would require:

²⁴⁷ Responses to ACCC survey in relation to transmission and dark fibre services. Two service providers did not provide a response to this question.

²⁴⁸ Responses to ACCC survey in relation to transmission and dark fibre services.

²⁴⁹ Vocus, *Submission to the ACCC Communications Sector Market Study*, p. 8.

²⁵⁰ Telstra, *Telstra submission to the ACCC competition in evolving communications markets issues paper*, Public version, November 2016, p. 19.

²⁵¹ WIK-Consult, *Regulatory approaches to risky bottleneck assets: International case studies*, February 2016 and BEREC, *Annex to the BEREC Report Next Generation Access – Implementation Issues and Wholesale Products*, 2010.

²⁵² Ofcom, *Business Connectivity Market Review Final Statement – Volume 1*, 28 April 2016, pp. 6–9.

²⁵³ It described this as an 'uncontended, unmonitored, unlit optical path over an end to end radial distance of up to 45km and a maximum route distance of 86km between two sites. This will be a passive service and no equipment will be provided to light the fibre provided.'

²⁵⁴ Openreach, [Dark Fibre Access Update](#) 15/08/2017, viewed on 26 October 2017.

²⁵⁵ Competition Appeal Tribunal. *Ruling (market definition)*, *British Telecommunications PLC v Office of Communications*, 26 July 2017, p. 4.

²⁵⁶ Openreach, [Dark Fibre Access Update](#) 15/08/2017, viewed on 26 October 2017.

- collection of quarterly supply information
- the ability to remove or add information requests
- collection of information up to the expected completion of the NBN rollout in 2020 followed by a review of ongoing information needs.

Further, subject to consultation, we consider the information of the following nature would be required:

- from each provider supplying dark fibre services to NBN POIs:
 - the specific NBN POIs at which dark fibre services are available
 - the customers being supplied, the number of services in operation for each customer and the NBN POIs at which dark fibre services are acquired
 - the wholesale list prices for dark fibre as well as wholesale prices for a representative sample of customers and any subsequent changes
 - the terms and conditions for the list/negotiated wholesale prices and any subsequent changes
 - any details about the dark fibre product supplied, the associated non-price terms and conditions, and any subsequent changes
 - details of any technical limitations associated with dark fibre when it is used over longer distances, e.g. its ability to provide services to regional or rural NBN POIs where the distances are greater than, say 40 km.
- for each provider capable of, but not currently supplying dark fibre services to NBN POIs²⁵⁷:
 - the specific NBN POIs at which dark fibre services are available
 - the wholesale list prices for dark fibre and the associated terms and conditions
 - any details about the dark fibre product available and the associated non-price terms and conditions
 - details of any technical limitations associated with dark fibre when it is used over longer distances
 - the reasons why no services are being supplied.

Proposed action 10

We will consult on the need to obtain information from industry via a record keeping rule to monitor the supply of dark fibre services to determine whether any regulatory intervention is required.

5.3.4 Internet interconnection

As described in section 4.6 the ACCC considers that competition in the supply of transit (the commercial wholesale interconnection service), which is an essential wholesale input for almost all downstream services, does not appear to be working effectively. Market participants have told us that transit prices remain much higher than overseas and this is impacting on their ability to compete in downstream retail markets. We note that this is a longstanding competition issue in Australia and the peering structure between TTOV has endured for two decades despite significant market and structural developments in the

²⁵⁷ From our survey in relation to transmission and dark fibre service we know that two providers have provided service providers with quotes but that no one is utilising the services offered in those quotes.

communications sector. In addition, in contrast to many large networks overseas, there is little visibility over what criteria networks would need to satisfy in order to negotiate a peering relationship with each of TTOV.

Proposed recommendation 11

Telstra, TPG, Optus and Verizon (TTOV) should maintain on their website a comprehensive set of criteria and any other relevant policies to which they have regard when assessing peering requests from other networks. This would provide prospective peering parties some guidance on the criteria they are required to meet with each of the TTOV networks.

We understand that developments such as the growth of independent content providers may have alleviated the adverse impact on costs for smaller networks competing in downstream markets to some extent, particularly in the residential broadband market. However, relatively high transit costs may still adversely impact competition in other downstream markets such as in the supply of broadband internet services to corporate customers. The extent to which competition is affected will depend on a number of factors such as the quantum of transit costs as a proportion of the total costs of supplying downstream services. There may also be other options or strategies that smaller networks targeting corporate clients can use to reduce transit requirements. As end-users' internet use and needs continue to evolve in response to new services and technologies, the level of transit costs and the advantages that TTOV have from their peering agreements may intensify the impact of inefficient transit pricing on competition in downstream markets.

Our preliminary view is that there appears to be little prospect of this issue correcting itself, such as by TTOV reviewing their peering relationships and extending these arrangements to other networks and/or transit prices declining to levels which reflect those in more competitive markets.

We will continue to assess whether access to internet interconnection is available on competitive terms to support effective competition in downstream markets, with a particular focus on the market for the supply of broadband internet services to corporate customers. As part of this assessment, we propose to:

- further assess the extent of effective competition in the supply of transit services by TTOV
- investigate further the pricing and structure of prices for transit services
- examine key corporate internet markets including assessing changing transit requirements and the component cost of transit in the supply of these services.
- investigate any specific allegations of anti-competitive conduct by TTOV.

Proposed action 12

We will assess and report on whether access to internet interconnection services is available on competitive terms to support effective competition in downstream markets, with a particular focus on the market for the supply of services to corporate customers.

5.4 Information and facilitating more informed consumer choice

In section 4.1 and 4.2 we examined competition in communications markets including voice and broadband services in terms of the number of service providers in the market as well as the extent of price and non-price competition.

In this section we will consider whether consumers are able to take advantage of this competition, through the ability to easily switch service providers and products as well as having sufficient information to make informed purchasing decisions.

Consumers can contribute to, and benefit from, competition in communication markets such as voice, messaging and broadband services, where it delivers positive outcomes in terms of choice of service provider, a range of product offerings that suit different consumer needs and an environment where consumer movement and switching is facilitated. When consumers are able to make good choices, this promotes efficiency and competition within communications markets.

In order to take advantage of the benefits generated by competitive communications markets, consumers must be able to access enough information to assist them to make purchasing decisions that best meets their needs and budget. Consumers also need to be free to take advantage of different product and service offerings as they arise, and as such require a market that facilitates consumer switching between service providers.

5.4.1 Consumer switching

Consumer switching is evidence that consumers are making active choices about products and service providers based on good information. Switching also encourages service providers to compete on price and quality in order to retain and attract customers, which contributes to good outcomes for consumers.

Australian households are not active switchers when it comes to home phone and fixed broadband services. For example in 2016, seven per cent of Australian households had switched fixed broadband service provider in the last 12 months, a slight increase from six per cent in 2013.²⁵⁸

For home phone services, there was an even lower incidence of switching, with three per cent of Australian households having switched home phone service provider in the last 12 months in 2016, compared to four per cent in 2013.²⁵⁹

When it comes to mobile phones 10 per cent of Australian consumers said they had switched mobile phone service provider in the past 12 months, compared to 12 per cent in 2013.²⁶⁰

Overall consumer attitudes towards switching are broadly in line with actual switching behaviour as discussed above.

Across home phone, mobile phone and fixed broadband services, consumers' likelihood to switch in 2016 was low, at 10 per cent, 15 per cent and 11 per cent respectively. Consumers who said they were unlikely to switch service providers was much higher, at 38 per cent, 49 per cent and 34 per cent respectively for home phone, mobile phone and fixed broadband services.²⁶¹

Our observations of consumers' attitudes towards switching could be the result of consumer preference to stay with the same service provider, for convenience or satisfaction with their

²⁵⁸ Roy Morgan Single Source (Australia), January to December 2013, n=18 576 and January to December 2016, n=14 330, Australian Households. We note there are also a small percentage of respondents who selected "can't say" when asked whether they had switched service provider in the last 12 months, hence these figures should not add to 100 per cent.

²⁵⁹ Roy Morgan Single Source (Australia), January to December 2013, n=18 576 and January to December 2016, n=14 330, Australian Households.

²⁶⁰ Roy Morgan Single Source (Australia), January to December 2013, n=18 576 and January to December 2016, n=14 330, 14+ Australian population.

²⁶¹ Roy Morgan Single Source (Australia), January to December 2016 n=14 330, Australian Households (home phone and fixed broadband) and 14+ Australian population (mobile phones).

current deal, or it may signal underlying issues such as a lack of sufficient information to facilitate switching or high switching costs (such as lock-in contracts, high early termination fees, perceived inconvenience), which might be influencing a low incidence of consumer switching.

This research suggests that there may be limited consumer switching between service providers of voice and broadband services, despite the substantial choice of service providers and product offerings available in these markets. This suggests that competition may not be working as well as it could for consumers.

As discussed in section 4.1 and 4.2, there is a high degree of concentration in the voice, messaging and broadband services markets, with three to four service providers capturing over 90 per cent of the consumer market in both fixed voice and broadband and mobile phone services.

When consumers did decide to switch, their movement was predominantly between the large service providers, which illustrates one possible reason for the limited change in market shares overall despite some consumer switching. For example, Roy Morgan Research finds that in 2016, of those Australian households that switched fixed broadband service providers in the last 12 months, the largest movement was from Telstra (28 per cent of total switchers). Of these former Telstra households, over three quarters switched to the other three largest services providers, 22 per cent went to Optus, 21 per cent went to iiNet, 17 per cent went to TPG, 11 per cent went to Dodo and five per cent went to Belong (Telstra’s budget brand).²⁶²

5.4.2 Reasons for switching

Roy Morgan Research finds that of those who switched mobile phone service provider in the last 12 months in 2016, the most common reasons for choosing their current service provider were related to price, data inclusions and network coverage, as shown in Table 5.9.

Table 5.9: Reasons for choosing current mobile phone service provider amongst switchers in last 12 months for 2016²⁶³

Current service provider	Most common reasons for choosing this service provider
Telstra	Better network coverage (66%) Better connection/reliability (27%) Bigger data allowance (25%)
Optus	Cheaper rates (40%) Bigger data allowance (36%) Clear pricing of the plan (27%)
Vodafone	Cheaper rates (55%) Bigger data allowance (46%) More calls included in plan (42%)

²⁶² Roy Morgan Single Source (Australia), January to December 2016, n=683, Australian Households.

²⁶³ Roy Morgan Single Source (Australia), January to December 2016, n=1011, 14+ Australian population.

Amaysim	Cheaper rates (71%) Bigger data allowance (42%) Not locked into a fixed-term contract (34%)
Overall	Cheaper rates (45%) Bigger data allowance (35%) Better network coverage (30%)

As shown in Table 5.10, according to Roy Morgan Research, of those households that have switched fixed broadband service provider in the last 12 months the most common reasons for choosing their current service provider were in relation to pricing, data allowance and connection/reliability. Interestingly, of those who selected 'have other services with that provider', 43 per cent are with Telstra and 25 per cent are with Optus, and of those who selected 'only provider in my area' 56 per cent are with Telstra and 16 per cent are with Optus.²⁶⁴ This illustrates the persistence of Telstra's incumbency advantage (and to a lesser extent Optus) and will need to be carefully monitored in the transition to the NBN, particularly to ensure consumers are aware of the different providers offering services in their area.

Table 5.10: Reasons for choosing current fixed broadband service provider amongst switchers in last 12 months for 2016²⁶⁵

Current service provider	Most common reasons for choosing this service provider
Telstra	Better connection/reliability (44%) Faster data connection and download speed (34%) Bigger data allowance (23%)
Optus	Cheaper rates (40%) Unlimited data allowance (37%) Faster data connection and download speed (31%)
TPG	Cheaper rates (60%) Unlimited data allowance (36%) Clearer pricing of the plan (28%)
iiNet	Cheaper rates (36%) Clearer pricing of the plan (33%) Better connection/reliability (31%)
Dodo	Cheaper rates (59%) Unlimited data allowance (31%) Clearer pricing of the plan (25%)
Overall	Cheaper rates (39%) Faster data connection and download speed (25%) Better connection/reliability (29%)

²⁶⁴ Roy Morgan Single Source (Australia), January to December 2016, n=744, Australian Households.

²⁶⁵ *ibid.*

From this research, we can observe that pricing and data allowance remain the key focus of consumers and points of competition in fixed broadband services. However, 'faster data connection and download speed' and 'better connection/reliability' are likely to become more important to consumers in the future, as they migrate to the NBN, better NBN performance information becomes available through the broadband performance monitoring and reporting program, and higher data rate uses (such as 4K and 8K TV) become more common.

5.4.3 Available consumer information

The ACCC is responsible for administering compliance with the ACL. The ACL establishes legal protections for consumers in their dealings with businesses, this includes ensuring consumers are not misled when purchasing goods and services and businesses have reasonable grounds for making representations about future matters.²⁶⁶ Businesses are responsible for ensuring compliance with the ACL when they provide information to consumers.

The Telecommunications Consumer Protections Code (the TCP Code), administered by the ACMA, complements the general consumer protection provisions in the ACL and provides safeguards for mobile, landline and internet customers.²⁶⁷ It outlines rules that telecommunications providers must follow when communicating and dealing with customers, including the provision of a Critical Information Summary (CIS) and a requirement for clear unit pricing for national calls, SMS and data in their advertisements.²⁶⁸

The review of the TCP Code commenced in September 2017. The ACCC is part of the Working Committee as an observing (non-voting) member. The ACCC has been a strong advocate for maintaining and strengthening the consumer protections in previous reviews of the TCP Code. We consider that there is potential for the TCP Code to be augmented to address a wide range of consumer issues particularly in light of the increasing prevalence of NBN telecommunications offers.

The TCP Code also sets out what information is required in the CIS so consumers can easily compare product offers of different service providers to determine which best suits their needs.²⁶⁹ A CIS provides customers with important information alongside the contract, and can assist consumers to make the most appropriate choice for their circumstances.

However, there are concerns some service providers may include poor information in the CIS and misrepresent some information, such as the performance of services over the NBN. Although we note that there are requirements in the TCP Code prescribing which information should be included in the CIS, not all service providers may fully comply with the CIS obligations under the TCP Code.

The ACMA proactively monitors telecommunications providers' compliance with the TCP Code.²⁷⁰ We note that the ACMA's 2016–17 audit focused mainly on NBN retail services due to the significant growth in the number of new providers in the market sector and the acceleration of the NBN rollout and reviewed 111 offers from 79 different service providers. The ACMA found that of these providers, 61 per cent had compliant CISs, 35 per cent had a CIS with some content or formatting deficiencies and four per cent had no CIS at all.²⁷¹ This

²⁶⁶ These requirements are contained in sections 4, 18, 29, 34 and part 3–2 of the ACL.

²⁶⁷ ACMA, [The TCP Code](#), 2017, viewed on 6 September 2017.

²⁶⁸ *ibid.*

²⁶⁹ Communications Alliance Ltd, [Industry Code: Telecommunications Consumer Protections Code](#), ACMA, viewed on 6 September 2017, p. 25.

²⁷⁰ ACMA, [iTalkBB warned: Wrong Information](#), 13 August 2015.

²⁷¹ ACMA, [Part 1: Australian Communications and Media Authority Annual Report 2016–2017](#), October 2017, pp. 70–71.

compares to 75 per cent who had a compliant CIS in 2015–16, and evidences a significant decline in industry compliance with this aspect of the TCP code.

Proposed recommendation 13

The Telecommunications Consumer Protection (TCP) Code review provides an opportunity to assess whether service providers meet their Critical Information Summary (CIS) obligations under the TCP Code and how this can be addressed.

5.4.4 Information issues

Information asymmetries may occur in communications markets when consumers do not have complete or sufficient information about service providers and product offerings to understand and identify what product or service best suits their needs, and facilitate informed purchasing decisions. This can lead to inertia lack of switching and may reduce competition in the relevant markets.

As noted by ACCAN, communications services are inherently technical and complex for consumers to understand.²⁷² Further, service providers may structure their products in a complicated manner or provide consumers with large amounts of information to make it difficult for consumers to compare offerings with those of other providers.²⁷³ It is important to find a balance between providing sufficient information to enable informed decisions but ensuring the level of detail is not too overwhelming.²⁷⁴

The NSW Farmers Association has raised particular concerns in relation to consumers in rural Australia, who have expressed their frustration in finding communications products and services that meet their individual needs, and are often sold unsuitable, expensive products because they do not have enough information available to easily compare products.²⁷⁵

More generally, consumers may also have difficulty finding and/or selecting a product or service that meets their needs in terms of usage, particularly as they may be unaware or have limited information about their own past usage.

By comparison, we note that consumers in the UK are able to access and download their own usage data from their service provider and upload to the Billmonitor website.²⁷⁶ This service then recommends appropriate plans based on current service offerings in the market based on analysis of their past usage.

On 8 May 2017 the Productivity Commission released a report on data availability and use.²⁷⁷ The report examines a range of issues including the benefits and costs associated with making public and private data more widely available, options for collecting, sharing and releasing data, how consumers can benefit from access to data and how to maintain individual privacy and control over data use.

A key recommendation from the Productivity Commission report was for a new economy-wide right for consumers to access and transfer their consumer data, including directing that data be provided to third-parties. The Productivity Commission also contemplated that

²⁷² Australian Communications Consumer Action Network, [Competition in evolving communications markets - submission by ACCAN to the ACCC](#), October 2016, pp. 14, 19, 37.

²⁷³ ACCC, [The comparator website industry in Australia](#), November 2014, p. 5.

²⁷⁴ Australian Energy Regulator, [Customer price information – issues paper](#), 26 September 2017, p. 9.

²⁷⁵ NSW Farmers Association, [Submission to ACCC Competition in Evolving Markets Issue Paper](#), October 2016, pp.11 –12.

²⁷⁶ [Billmonitor](#).

²⁷⁷ Productivity Commission, [Data Availability and Use – Public Inquiry](#), 31 March 2017, and [PC News August 2017: Data availability and use – capturing the opportunities of the digital age](#).

industry-specific arrangements could be developed to better target application of the right to particular sectors.

In response to a consumer questionnaire published by the ACCC as part of our market study consultation, some consumers noted that standard presentation of information by service providers with key metrics, such as minimum or average achievable broadband speeds by location and more updates about the arrival of the NBN, would be useful information to help them make more informed purchasing decisions.

We support the Productivity Commission proposals and agree that there are significant competition and consumer benefits to be realised from the greater availability and use of consumer data.²⁷⁸ We understand that the proposed reforms have the potential to provide an economy-wide framework for greater use of consumer data, and could therefore encompass communications usage data.

Case Study: Comparator websites—overcoming information issues?

Third-party comparator websites can be an extremely useful tool for consumers to view and compare different product offerings from a range of service providers in a particular market. In Australia, the main comparator websites for telecommunications services are Finder, WhistleOut and iSelect. There are also smaller websites such as Compare Broadband and You Compare.

These comparator websites can help to overcome information issues for consumers by presenting like-for-like comparisons of products and services, and in some cases providing needs based analysis, allowing consumers to select features most important to them.

Comparator websites can help consumers overcome choice paralysis as well as encourage consumers to shop around by raising their awareness of different service provider options, particularly small and medium service providers. This can help promote greater competition in the market and may create downward pressure on prices.²⁷⁹

As noted by ACCAN, despite these benefits, comparator websites should be treated with caution as some may fail to disclose commercial relationships, such as with particular service providers, which may bias the results presented to consumers and potentially breach the ACL.²⁸⁰

Comparator websites may also fail to acknowledge the extent of their market coverage, leading consumers to believe that the websites compare all offerings from all service providers in the market, when this is typically not the case. For example, as shown in Table 5.11, we have compared the proportion of service providers listed on the various comparator website (as offering NBN based broadband services) to the total number of service providers listed on NBN Co's website.²⁸¹

²⁷⁸ ACCC, [Submission to the Productivity Commission Draft Report on data availability and use](#), 11 January 2017.

²⁷⁹ ACCC, [The comparator website industry in Australia](#), November 2014.

²⁸⁰ Australian Communications Consumer Action Network, [Competition in evolving communications markets - submission by ACCAN to the ACCC](#), October 2016; Consumer Action Law Centre, [Submission to ACCC inquiry into retail electricity supply and pricing Issues Paper](#), 3 July 2017.

²⁸¹ We note that some of the NBN Co listed service providers may only provide business services and would not likely be listed on the comparator websites.

Table 5.11: Comparison of comparator website’s market coverage for NBN broadband services

Comparator Website	Number of service providers compared ²⁸²	Proportion of all service providers listed on NBN Co’s website ²⁸³
Finder	52	35%
WhistleOut	37	25%
iSelect	11	7%
You Compare	10	7%
Compare Broadband	10	7%

For the mobile market, Finder compares 34 service providers, WhistleOut compares 32 service providers and You Compare lists seven service providers. iSelect only shows plans from Optus.

These websites do not offer an option to compare standalone home phone voice services, which can only be viewed as a bundled home phone and broadband product. This further reflects the declining consumer preference for mobile voice services, as previously discussed in section 4.1.

While comparator websites may present information clearly to consumers, they may be limited by the way information is represented by different service providers and inconsistencies in product descriptions. For example, as noted by Finder the cost of data in mobile phone plans may not be clearly described by some service providers, making it harder for consumers to compare different offerings.²⁸⁴

While the TCP Code requires service providers to include particular information in their CIS, such as the cost of data per unit, we consider there is further scope to ensure this information is presented in a standardised way, particularly for price and usage metrics. If information is disclosed by each service provider in a different manner, this makes it difficult for comparator sites to effectively and accurately assist consumers to compare offerings.

Comparator websites can play a role in providing diverse information to consumers in an easily accessible format and, as such, we are interested to ensure that these websites work well for consumers. In 2014 we published a report into the general comparator website industry²⁸⁵ as well as further industry guidance for website operators and consumer specific guidance the following year.²⁸⁶ The industry guidance outlines some guiding principles for operators and suppliers to consider when designing their website, including the need to be transparent about commercial relationships and facilitate honest like-for-like comparison of products and services.²⁸⁷

In addition, we have taken action against a number of comparator websites including Compare the Market and iSelect, to ensure that these companies do not mislead consumers about the scope of comparisons when promoting or recommending products and to emphasise the importance of informed purchasing decisions.

²⁸² Compared using service providers listed on the relevant comparator website as at August 2017.

²⁸³ NBN Co, [List of phone and internet providers](#), accessed August 2017.

²⁸⁴ Hive Empire Pty Ltd t/a finder.com.au, [finder.com.au submission to ACCC Communications Market Study](#), 14 October 2016, p. 2.

²⁸⁵ ACCC, [The comparator website industry in Australia](#), November 2014, viewed on 27 July 2017.

²⁸⁶ ACCC, [ACCC releases comparator website guidance](#), August 2015.

²⁸⁷ ACCC, [Comparator websites: a guide for comparator website operators and suppliers](#), 3 August 2015, p. 2.

Draft finding

There is scope to improve the disclosure of business models, commercial relationships, ranking methods and market coverage on comparator websites, as these may not always be sufficiently transparent and can mislead consumers as to the extent of the comparison service, the amount of savings that could be achieved and the impartiality of the comparisons.

In the course of the market study, some stakeholders have called for an accredited price comparison scheme for communications services to overcome the potential information issues associated with existing comparator websites and provide an independent avenue for consumers to research available product offerings based on their individual needs.²⁸⁸

International regulators have undertaken a range of regulatory approaches to comparator websites. In New Zealand, for example, there are several non-government comparator websites including Telme, a communications specific comparator site run by Consumer NZ²⁸⁹ with financial assistance from the Consumer Protection, the consumer regulator.²⁹⁰

In the UK, communications regulator Ofcom oversees an accreditation scheme for price comparator websites, aiming to provide consumers with a level of confidence and reassurance when comparing service offerings.²⁹¹ The European Commission has published best practice guidelines for comparator websites, and recognised that while there is value in accreditation schemes for consumers, there are also risks, including that consumers may be unaware of or lack understanding of how the accreditation schemes work, and that websites could use accreditation logos without authorisation.²⁹²

In addition, we note that the UK Competition and Markets Authority is conducting a market study into digital comparison tools to consider how the benefits of these tools can be maximised.

Proposed action 14

We will review the scope, transparency, and ease of use of comparator websites for communications services and consider the need for further intervention in addition to our existing guidance for comparator websites. If intervention is needed, we will consult with industry and government to develop an appropriate course of action.

5.4.5 Potential barriers to switching

We have identified a number of potential barriers to switching for consumers that could disadvantage some consumers and potentially inhibit future competition in communications markets.

Contracts

Contracts may limit consumers' ability to easily switch service providers in the short-term as they typically lock-in consumers for 12 or 24 months, and attract a fee for early exit. This

²⁸⁸ NSW Farmers Association, [Submission to ACCC Competition in Evolving Markets Issue Paper](#), October 2016, pp. 11 –12.

²⁸⁹ [Consumer NZ](#) is an independent organisation funded by membership fees, business programs and government contract work.

²⁹⁰ Scoop Business, [Consumer NZ launches telecommunications comparison website](#), 25 August 2011, viewed 9 August 2017.

²⁹¹ Ofcom, [Accreditation scheme for price calculators: A review of the scheme](#), 29 May 2013, viewed on 10 August 2017, p. 3.

²⁹² European Commission, [Comparison Tools: Report from the Multi-Stakeholder Dialogue – Providing consumers with transparent and reliable information](#), Report presented at the European Consumer Summit, 18–19 March 2013, viewed on 10 August 2017, p. 32.

may be inhibiting competition in the migration to the NBN, in particular, as service providers can sign consumers up to contracts on legacy broadband services and then transfer them to the NBN when their area is connected (such as by marketing 'NBN-ready' plans).

This means some consumers may be unknowingly unable to take advantage of the price competition currently occurring in the NBN broadband services market, and new service provider entrants on the NBN may have less opportunity to attract customers. We note that in general most service providers now offer both contract and no lock-in contract options to consumers, so in the long-term, lock-in may be less of a barrier to switching. However, they may continue to cause concern where no contract options may have a higher monthly cost or offer fewer inclusions. This could mean many consumers may opt for a long-term contract on the basis of price and/or inclusions.

Contracts presented by retailers to consumers may often include terms and conditions such as early termination fees (discussed further below) and automatic renewal clauses, which further lock-in consumers. If consumers are unaware of these terms and conditions, or lack a thorough understanding of the contract they are entering into, they may experience negative outcomes and be unable to take advantage of competitive benefits available in the market.

In addition to this, consumers may not be able to easily identify when their contract ends which could further act to lock the consumer in to their current service provider. Service providers generally do not include the contract end date on the bill, and may not notify the customer when their contract is nearing the end date. Consumers may be able to check the end date by logging into an online account associated with their service, or may have to contact customer service to clarify when their contract ends.

Early termination fees

Early termination fees for contracts may act as a deterrent for consumers who wish to switch service providers as fees may be difficult for consumers to estimate, or consumers may be unaware that a fee exists until they want or need to exit the contract.

Early termination fees usually involve the consumer having to pay out the entire contractual period on a pro rata basis. As ACCAN has noted, formulas for calculating these fees may not be well publicised and even when available may not effectively convey early exit charges to consumers.²⁹³

For example, a Telstra legacy broadband services customer (ADSL or HFC) on a 12 month contract will have to pay a cancellation fee of up to \$360 depending on the time left to run on their contract.²⁹⁴ An iiNet customer who wants to prematurely end their legacy ADSL contract will have to pay fees of up to \$300 if they have more than six months left to run on a 24 month contract or \$100 if they have six months or less to run on their contract.²⁹⁵

High early termination fees for mobile phone services are also a strong potential deterrent for consumers seeking to end their contract early to switch to a new or better service. For example, if a Telstra customer wants to exit their mobile phone plan, they must pay out the remaining cost of the contract phone plan as well as the remaining cost of the mobile device, if this was included in their plan.²⁹⁶ For a customer on a Telstra \$75 per month plan plus device repayments on a 24 month contract who wishes to exit their contract after six months,

²⁹³ Australian Communications Consumer Action Network (ACCAN), [Competition in evolving communications markets - submission by ACCAN to the ACCC](#), October 2016, pp. 9–10.

²⁹⁴ Telstra, [ISP Consumer Guidelines](#), p. 3, viewed on 5 September 2017.

²⁹⁵ iiNet, [ADSL2+ Broadband Terms, Fees & Guarantees](#), viewed on 5 September 2017.

²⁹⁶ Telstra, [Account & Billing – Manage Your Account](#), viewed on 5 September 2017.

this would equate to \$1699 to terminate the contract or \$995 to recontract by upgrading or changing to an eligible plan.

Other service providers may have different conditions, which can make it confusing for consumers when comparing offerings. Early termination fees can include paying the balance owing for a device, and fees that act to lock a customer in, such as a payment for service for each month remaining on the contract.

For example, Vodafone calculates any mobile phone 'early exit fees' at 50 per cent of the consumers monthly spend multiplied by the number of months left on the contract, plus any device repayment fees.²⁹⁷ Dodo charges early termination fees for its 12 and 24 month plans, which it calculates at 50 per cent of the monthly charge multiplied by the length of time remaining on the contract.²⁹⁸ Dodo also charges an early termination fee for any mobile handset device included in the contract.²⁹⁹

Draft finding

Early termination fees may be difficult for some consumers to understand and calculate. These fees may be an impediment to switching providers, particularly in relation to post-paid mobile phone services.

In addition, under the ACL, early termination fees may be unfair if the consumer contract is not sufficiently balanced and/or the fee permits or has the effect of permitting the consumer to be penalised.³⁰⁰

While the TCP code includes some rules about early termination fees, they relate to the disclosure of termination fees in communications offers and advertising, rather than the level of the fee.

Ensuring early termination fees are adequately disclosed to consumers during the advertising and contracting process is important to ensure consumers are aware of and understand the conditions of the contract and how this might restrict future ability to switch providers.

Proposed action 15

We will monitor consumer complaints about unfair terms in communications contracts. We will also work with industry and government stakeholders to ensure consumers are informed about the potential benefits of short-term or no contract options when migrating to the NBN. We will also consider whether service providers should be obliged to more clearly identify the contract end date to consumers.

Case study: Email portability

Service providers may offer consumers or small businesses a service provider based email address (such as @bigpond.com) when they sign up for a broadband service, which is typically tied to that service provider. If a consumer or small business wishes to change service providers, they may lose this email address or face high fees to retain the email address. Consumers may immediately lose access to their emails or contacts associated with this email account when they end their contract with the service provider. This could act as a barrier to switching for consumers and small businesses who wish to retain their email

²⁹⁷ Vodafone, [Early Exit Fees](#), viewed on 5 September 2017.

²⁹⁸ Dodo, [Mobile Plans – Terms and Conditions](#), 2015, viewed on 5 September 2017.

²⁹⁹ Dodo, [Critical Information Summary – Mobile 4G Small](#), 9 January 2017, viewed on 5 September 2017.

³⁰⁰ *Competition and Consumer Act 2010*, schedule 2, section 25.

address. The New Zealand Productivity Commission and European Commission note that the absence of email portability is a barrier to consumer switching.³⁰¹ However consumers' increasing use of email services separate from their service provider may reduce the impact of email portability issues.³⁰²

For example, Telstra charges \$79 per mailbox (email address) per year, while iiNet charges \$25 per year to retain an email address and access to a mailbox.³⁰³ In addition to cost, consumers may also experience the closure of their email accounts for a short period of time during the transition between service providers. When a Telstra customer closes their account and does not pay the fee to continue their email address, their email address is suspended and any stored emails may be deleted after 30 days.³⁰⁴ Similarly, TPG may terminate email account access immediately upon conclusion of the contracted service.³⁰⁵ If consumers and/or small businesses are unaware of these conditions, they may face potentially substantial losses from the deletion of their email accounts.

A consumer may have hundreds of online accounts linked to their service provider based email address, such as online banking, insurance, and online billing for services such as electricity. Updating the email address details linked to various online accounts usually requires a consumer to 'confirm' the update of an email address using their previous email address. In addition, a business with a service provider based email address will typically have invested a significant amount of time promoting their contact details to customers and clients. If a business or consumer is not able to easily migrate their contacts and past emails, and is locked out of the account immediately or soon after their contract ends, this may present a significant number of problems which may act as a barrier to switching.³⁰⁶

In comparison, when a consumer switches from one mobile phone service provider to another, it is easy for them to retain their mobile number. There are rules and obligations in place, such as the Mobile Number Portability Industry Code³⁰⁷ and the Telecommunications Numbering Plan 2015³⁰⁸ which govern mobile number portability to ensure a customer's mobile number is moved between providers within a reasonable time.³⁰⁹

There are similar rules and obligations governing local number portability, which enable consumers to retain their home phone number when changing service provider. This promotes competition by enabling consumers to easily switch service providers as they do not face losing their phone number and encourages any administrative costs of porting to be absorbed by the service provider that gains the customer,³¹⁰ so consumers do not face any fees for switching in this regard.

Service providers may be able to better facilitate forwarding of contacts and archived emails to a customer's nominated new email address if the customer does not wish to retain their service provider based email address beyond the end of their contract.³¹¹

³⁰¹ New Zealand Productivity Commission, [Boosting productivity in the services sector: 2nd Interim Report Competition and ICT Topics](#), January 2014, p. 4, viewed on 26 July 2017; European Commission, [Commission adopts regulatory proposals for a Connected Continent](#), 11 September 2013, viewed on 27 July 2017.

³⁰² New Zealand Productivity Commission, *ibid.*

³⁰³ Telstra, [Critical Information Summary: Paid Email](#), viewed on 14 July 2017, and iiNet, [Closing an account or changing account ownership](#), 2017, viewed 14 July 2017.

³⁰⁴ Telstra, [Support: Email](#), viewed on 14 July 2017.

³⁰⁵ TPG, [Service Description and Terms – NBN, clause 13](#), viewed on 27 July 2017.

³⁰⁶ Axiom Economics, [Is it time to introduce email portability?](#) 19 April 2017, p. 2.

³⁰⁷ [Mobile Number Portability Industry Code](#).

³⁰⁸ [Telecommunications Numbering Plan 2015](#).

³⁰⁹ ACMA, [Mobile number portability information](#), 31 July 2017, viewed on 11 September 2017.

³¹⁰ Axiom Economics, [Is it time to introduce email portability?](#) 19 April 2017, p. 1.

³¹¹ Axiom Economics, [Is it time to introduce email portability?](#) 19 April 2017, p. 3.

Proposed action 16

We will review the email retention options that service providers offer to consumers and determine whether the charges they impose are reflective of the underlying cost of providing the standalone email service. As part of this review, we propose to consider the potential costs and benefits of introducing an email portability regime.

Bundling of telecommunications and other services

Bundling may provide consumers with a convenient 'one-stop-shop' option or oblige them to purchase services they do not want (such as fixed line phone services). Bundling can offer benefits to consumers, such as discounted services, convenience of a single bill and provider, as well as access to services otherwise unavailable. However, consumers may be disadvantaged by bundling if the inclusions are not transparent or easily comparable, and/or include unwanted or unnecessary services.

For example, a common bundle offering is a home phone and broadband service, with home phone services increasingly unavailable as a standalone service. This bundle offering may benefit some who require both services, but it could be disadvantageous (financially and otherwise) to consumers who only want one of these services. The individual cost of each service may also be unclear and may impede consumers' ability to accurately compare product offerings.

Bundling can allow service providers to spread their fixed costs over a number of different services. This may result in savings for consumers, making it cheaper for them to purchase a bundle as opposed to purchasing each service separately.³¹² OECD research in 2011 found across OECD countries including Australia, on average it was 26 per cent cheaper to purchase a bundle compared to purchasing each service individually.³¹³

Bundling may also benefit consumers by offering the integration of services and the ability to use one service on multiple devices.³¹⁴ For example, Telstra offers a bundle that includes broadband and 'Smart Home' which allows the customer to remotely control their home power and electronic devices using their smartphone.³¹⁵ Optus offer bundles which include broadband and Yes TV, which allows the customer to watch streaming services including Netflix and Stan from one device.³¹⁶ iiNet also provide similar bundles which combine broadband with entertainment.³¹⁷

However the integration of products can be a barrier to consumer switching when bundles require consumers to commit to a long-term contract. If a consumer wants to exit all or part of their bundled services, they often need to navigate numerous product specific processes to change their bundle or service provider.³¹⁸ This further leads to the consumer potentially being 'locked in' to their bundled contract because they cannot easily switch provider and at a minimal expense.

Bundling may also reduce competition by allowing a service provider to leverage their market power from one market to another, and reduce the ability of competitors to efficiently compete. Smaller service providers may offer bundles but may be unable to offer the same

³¹² Organisation for Economic Cooperation and Development (OECD), [Broadband Bundling: Trends and Policy Implications](#), 21 February 2011, viewed on 20 September 2017.

³¹³ *ibid.*, p. 3.

³¹⁴ OECD, [Triple and Quadruple Play Bundles of Communication Services](#), 18 June 2015, viewed on 20 September 2017, p.7.

³¹⁵ Telstra, [Personal – Smart home bundles](#), viewed on 20 September 2017.

³¹⁶ Optus, [Broadband & NBN Plans](#), viewed on 20 September 2017.

³¹⁷ iiNet, [TV – Fetch](#), viewed on 20 September 2017.

³¹⁸ OECD, [Broadband Bundling: Trends and Policy Implications](#), p. 36.

level of services or add-ons as a larger service provider. In this situation bundling may limit competition when service providers cannot replicate bundles because they do not have access to certain networks, content, or important inputs such as the rights to offer certain streaming services, sports, or movies.

Where bundling is used for anti-competitive purposes or there is limited competition this can diminish the benefits bundling may offer consumers in terms of price, choice, and service integration. A lack of competition may result in limited incentives for service providers to compete on price and offerings, which is especially relevant in geographic areas where competition may already be limited.

For example, consumers in regional and rural areas may feel constrained in their choice of service provider if they wish to obtain all their communications services as a bundle. As noted by the NSW Farmers' Federation, in some areas, Telstra is the only mobile phone service provider with any (or has superior coverage), thus limiting choice for these consumers.³¹⁹

The OECD notes that complex bundles and communications services have made it increasingly difficult for consumers to understand and compare the price and service characteristics of bundles.³²⁰ A number of factors make it difficult for consumers to compare bundled offerings, such as unclear or insufficient information from service providers about the price and characteristics of the individual services in a bundle.³²¹ Services may also be packaged in different ways, for example some service providers may only sell their services in a bundle whereas others may offer services individually and in a bundle.³²² In addition to this, service providers rarely offer identical bundled products

In summary bundling may act as a disincentive for consumers to switch service provider if most service providers are unable to offer a similar package or inclusions, or if consumers are unable to easily compare service offerings. In addition, as noted by Finder, bundles often require consumers to enter into a long-term contract, making it harder for them to take advantage of any competition that drives down prices.³²³

Consumers need clear and easily comparable information about bundled services and inclusions to ensure they are able to identify what product bundle provides the best value for them in terms of price and service inclusions.

Proposed action 17

We will monitor consumer complaints about bundling and take enforcement action where necessary. We will also consider issuing guidance to consumers regarding bundled telecommunications products.

5.4.6 Promoting competition in the supply of broadband services on the NBN

There is significant structural change occurring in the fixed broadband services market driven by the rollout of the NBN, which recently passed its half-way point. In recognition of this key transition period and the increasing speed of consumer migration to the new network, we have given a specific focus to the supply of broadband services on the NBN to ensure that efficient competition evolves.

³¹⁹ NSW Farmers Association, [Submission to ACCC Competition in Evolving Markets Issue Paper](#), October 2016, p.12.

³²⁰ Organisation for Economic Cooperation and Development, [Broadband Bundling: Trends and Policy Implications](#), p. 4.

³²¹ Hive Empire Pty Ltd t/a finder.com.au, [finder.com.au submission to ACCC Communications Market Study](#), p. 2.

³²² OECD, [Broadband Bundling: Trends and Policy Implications](#), 21 February 2011, viewed on 20 September 2017, pp. 5–6.

³²³ Hive Empire Pty Ltd t/a finder.com.au, [finder.com.au submission to ACCC Communications Market Study](#), p. 2.

In particular, we have examined issues that have arisen in relation to consumer migration to the NBN, such as consumer expectations about speed, service quality and performance on the NBN, which could influence negative outcomes for competition and consumers in the long-term.

A key policy objective of the NBN is to promote greater competition in the supply of retail broadband services by creating a level-playing field through the structural separation of Telstra and creating a new wholesale-only service provider to build and operate the new network. As discussed in section 4.2, we have seen many new service providers enter the NBN broadband market, as well as the expansion of existing, smaller service providers. This means there is more choice for consumers in terms of service providers and product offerings.

However, at this stage, it is unclear whether consumers are able to take advantage of this greater choice, as market shares of service providers on the NBN remain similar to those for legacy broadband services. Furthermore, while we are seeing strong price competition in this market at the moment, there has been limited non-price differentiation (apart from the established focus on data quotas) in terms of speed or service quality and performance, which are key features of the new network.

5.4.7 Consumer migration to the NBN

By mid-October 2017 over three million premises had migrated their broadband services to the NBN.³²⁴ This represents just less than half of the 6.2 million premises that are currently ready to connect to the NBN. There may be issues which hinder timely migration of the NBN amongst households that are ready to connect and could cause future issues with NBN uptake.

Timely migration of services to the NBN may enable smaller service providers to build scale faster, which will help facilitate greater competition as more providers enter the market and compete on price and service offerings, and will also contribute to efficient use of the new network infrastructure.

The key issues for consumers migrating to NBN include:³²⁵

- delays in installation which appear to result from missed appointments with technicians, complex installations, unexpected repairs and miscommunication about the availability of the NBN
- insufficient or inaccurate information provided to consumers leading to service performance and speeds below consumer expectations, including reports from some consumers that their NBN service is below the speeds advertised by or purchased from service providers
- lack of clarity as to who is responsible for resolving issues including NBN installation and performance problems, and a lack of coordination by NBN Co and service providers to resolve consumer concerns.

It is evident that the NBN consumer experience can be affected by various factors within the control of NBN Co, wholesale service providers, RSPs and/or consumers themselves. This makes it difficult to determine the exact cause of any network issues experienced by a consumer and making fault attribution and resolution difficult and time-consuming. .

³²⁴ NBN Co, [Weekly rollout progress report](#), week ending 12 October 2017, viewed on 18 October 2017.

³²⁵ ACCC complaints data and TIO, [Six monthly update – July to December 2016](#).

We consider that the TIO has a pivotal role to play in monitoring and resolving consumer issues in relation to services delivered over the NBN, and in identifying systemic issues and emerging trends within the broader regulatory framework. The TIO is particularly well placed to navigate complex service relationships and help achieve resolutions in response to individual complaints involving multiple parties and achieve cooperative outcomes with industry in circumstances where numerous individual complainants are experiencing a recurring issue.

In October 2017 the TIO amended its terms of reference to address the increasing complexity of the telecommunications supply chain arising from the rollout of the NBN. The amended terms of reference:

- reflect the legislative requirement for carriers and intermediaries in the supply of telecommunications services (such as aggregators) to belong to the TIO
- strengthen the obligation on members to provide information requested by the TIO in order to resolve a complaint, and
- strengthen the obligation on members, including members other than the RSP, to cooperate with TIO decisions.

In addition, the TIO is well placed to collect granular complaints data that is useful in tracking the performance of RSPs as well as NBN Co from a consumer's perspective. This information is also important to the ACCC and other regulators in identifying and prioritising NBN consumer issues as they emerge.

Proposed recommendation 18

We support the recent amendments to the Telecommunications Industry Ombudsman's (TIO) terms of reference which empower it to require all relevant parties in the supply chain, including NBN Co, to cooperate with the TIO in order to resolve consumer complaints. To further improve the effective operation of the TIO Scheme we recommend that the TIO collect and report on a clear data set of NBN-related complaints and collect NBN complaint data according to technology type.

While consumer awareness of the NBN and the need to migrate is increasing, there is still some confusion amongst consumers. For example, NBN migration may be hindered by information asymmetries such as a lack of information about the expected processes for connection, fault rectification and complaint handing as well as who are the appropriate parties to approach or avenues of recourse to pursue, when seeking to resolve NBN-related issues considering the varying responsibilities of the retail and wholesale suppliers.

We note that the ACMA is collecting information to further examine the NBN supply chain and the roles of various parties including NBN Co and service providers.³²⁶ We also note NBN Co is working on internal measures to improve consumer experience when migrating to the NBN as well as working with service providers on a number of strategies to address consumer information, migration and complaints issues. Some of these potential strategies include:

- adopting a procedure for NBN Co and service providers to clearly outline what information is required and who should provide it a streamlined process for appointments and greater real time information sharing to address problems with installation and disconnection issues, and
- implementing a formal process for NBN Co and service providers to handle and manage consumer complaints.

³²⁶ ACMA, [ACMA focus on the NBN customer experience](#), viewed on 13 September 2017.

There are a number of other initiatives currently underway by industry and regulators to address the poor NBN migration experience of many consumers and promote migration to NBN based broadband services.

Proposed action 19

We will work with the Telecommunications Industry Ombudsman (TIO), the ACMA and other government agencies to improve information provision to consumers, particularly complaints data.

5.4.8 Consumer expectations of speed, service quality and performance on the NBN

In 2016–17 the TIO received over 27 000 complaints about services delivered over the NBN. Of these complaints, 16 221 were about services delivered over the NBN and 11 224 were about delays in connection to the NBN.³²⁷

The top complaint issues about NBN services in 2016–17 were about connection delays, unusable internet services and slow data speeds.³²⁸ In 2015–16 the TIO reported 13 406 overall complaints about NBN services, and increase in complaints about NBN service faults such as slow data speeds and unusable services.³²⁹

While an increase in complaints is somewhat expected given the increasing number of households connected to the NBN, the TIO considers that the large number of complaints about service and connection issues is cause for concern.³³⁰ Even adjusted for the increase in activations, there was a 79 per cent increase in complaints to the TIO about faults and connection per premises activated between July—December 2016 and January—June 2017.³³¹

Of complaints about the NBN to the ACCC in the first half of 2017, approximately 69 per cent related to service performance issues. The most common complaint about service delivery issues relate to data throughput speeds being below those advertised by, or purchased from, service providers.

Additionally, we have received significant anecdotal evidence through the market study about service performance issues on the NBN in terms of slow speeds and drop outs, leading to complaints from consumers that they are not receiving what they are paying for.³³²

As discussed in section 5.1, there are a number of issues occurring at the wholesale level that are influencing speed and performance issues at the retail level.

However, consumers may be adversely affected by insufficient information and/or a lack of understanding about different speed tiers available on the NBN, leading to mismatched expectations around speed and performance. The move to the NBN and the introduction of a choice of speeds for broadband means service providers must re-assess how they market their products.

³²⁷ ACMA, [ACMA focus on the NBN customer experience](#), viewed on 13 September 2017.

³²⁸ *ibid.*, p. 29.

³²⁹ Telecommunications Industry Ombudsman, [Telecommunications Industry Ombudsman 2016 Annual Report](#), November 2016, p. 15

³³⁰ Telecommunications Industry Ombudsman, *Media release - Complaints from residential consumers and small businesses about landline phones, mobile phones and internet services increase*, 18 October 2017

³³¹ Telecommunications Industry Ombudsman, [Telecommunications Industry Ombudsman 2017 Annual Report](#), October 2017, p. 28.

³³² Telecommunications Industry Ombudsman, [Telecommunications Industry Ombudsman 2016 Annual Report](#), November 2016.

Issues flowing from a lack of consumer awareness about different speed tiers are exacerbated by inconsistent promotion of the available speeds by service providers. Vague speed claims by service providers means consumers do not have accurate or useful information to compare broadband speeds.

Service providers currently base their advertising on the maximum off peak headline speeds that can be achieved rather than expected speeds. For example, consumers may not realise that the average speeds achievable during typical busy periods may be lower than expected or advertised, as current marketing material focuses on price and download quotas, and lacks quantified information about what advertised service speeds mean in practice. In addition, some service providers are not actively promoting the choice of different speed options available to consumers.³³³ For example, most service providers promote the 25/5 Mbps and 100/40 Mbps plans, but do not appear to as widely advertise the 50/20 Mbps plan option.

We consider that service providers should make clearer statements about typical speeds consumers can expect during typical busy and non-busy periods to achieve greater transparency around broadband speeds.³³⁴ This will enable consumers to make clearer comparisons between products and further encourage service providers to compete on speed, as well as price and download quotas. This will also encourage service providers to differentiate their services based on non-price factors, for example Aussie Broadband currently differentiates itself as a premium speed service provider by purchasing CVC directly from NBN Co and connecting to all 121 POIs to ensure a reliable service for its customers.³³⁵

Draft finding

Service providers are not presenting complete and accurate information to consumers when advertising broadband services. Consumers are at risk of being misled by service providers about expected speed and performance, and lack adequate information to make informed purchasing decisions.

5.4.9 Our role in monitoring broadband speeds

In an effort to enhance consumer awareness and understanding of broadband speeds on the NBN, the ACCC is implementing a broadband performance monitoring and reporting program, which will provide consumers with accurate, independent and comparable information about broadband speeds. Once the testing provider is appointed, we will be able to provide more detail about when we will start collecting data and when will release a report.

The broadband performance monitoring and reporting program will give service providers independent performance information to draw on, and will help determine whether any speed issues result from performance of the NBN or service providers not buying sufficient capacity.

It will also highlight whether service providers deliver what is promised in their advertising or at the point of sale, and provide consumers with the information to check they are getting what they pay for. This information will also make it easier for consumers to engage with different offerings and make informed purchase decisions based on non-price factors, such as typical speeds and reliability of performance.

³³³ NBN Co, [Learn about our access network - Choosing the right speed to suit your needs](#), viewed on 7 September 2017.

³³⁴ ACCC, [Confusion about broadband claims prompts ACCC guidance](#), 10 February 2017.

³³⁵ Campbell Simpson, [NBN Congestion is forcing ISPs to build their own private networks](#), Gizmodo, 11 April 2017.

Our broadband performance monitoring and reporting program will be similar to established programs in the [UK](#) (2008), [United States](#) (2010), Singapore (2011), and [Canada](#) (2016). Such programs have led to improved transparency of information and increased performance-based competition for broadband services.³³⁶

The international experience confirms that monitoring programs drive retail competition and differentiation in the broadband market. They also deliver benefits to consumers including lowering barriers to consumer switching, enabling consumers to more easily assess the value of a service, and prompt retailers to compete on performance as well as price and inclusions.

In August 2017 we published guidance for retail service providers on how to advertise typical busy period speeds for broadband services.³³⁷ We want to ensure the industry is part of good outcomes for consumers, by publishing accurate information about broadband speeds in their advertising materials.

The guidance is designed to improve information available to consumers and promote competition amongst service providers.³³⁸ There are six guiding principles for service providers to follow when advertising broadband speeds. These include providing accurate information about typical busy period speeds, disclosing any known factors that may affect performance, and presenting performance information in a way that is easily comparable by consumers.

Broadband issues are a 2017 compliance and enforcement priority for the ACCC, and we will continue to monitor compliance in this area and take action where necessary.³³⁹ Following the release of the broadband speed claims guidance we are looking closely at advertising and whether service providers are complying with their obligations under the ACL. This monitoring includes conducting compliance sweeps to determine whether broadband advertising has improved significantly following the guidance, such as service providers moving away from easily misconstrued claims about 'up to' and 'superfast' speeds.

We have already identified compliance problems in the advertising of minimum and maximum achievable speeds. For example, in 2017 Telstra publicly acknowledged that some of its NBN customers were not receiving the speeds they signed up for and offered reimbursement to these customers.³⁴⁰

Proposed action 20

We will address concerns about the performance of broadband services on the NBN through our broadband performance monitoring and reporting program, broadband speed claims guidance, and enforcement action in response to practices that contravene the Australian Consumer Law. We propose to review the broadband speed claims guidance in August 2018 to determine whether it has been effective in addressing consumer concerns about broadband speed claims.

³³⁶ ACCC, [ACCC to monitor Australia's broadband performance](#), 7 April 2017.

³³⁷ ACCC, [Broadband speed claims – Industry Guidance](#), August 2017.

³³⁸ ACCC, [ACCC wants NBN plan advertising overhaul](#), viewed on 21 August 2017.

³³⁹ ACCC, [2017 ACCC Compliance and Enforcement Policy](#), 24 February 2017.

³⁴⁰ Telstra, [Understanding speed performance on the NBN](#), 11 May 2017.

6 Medium to longer term issues requiring monitoring and potential future action

6.1 Competition between technologies in the supply of broadband services

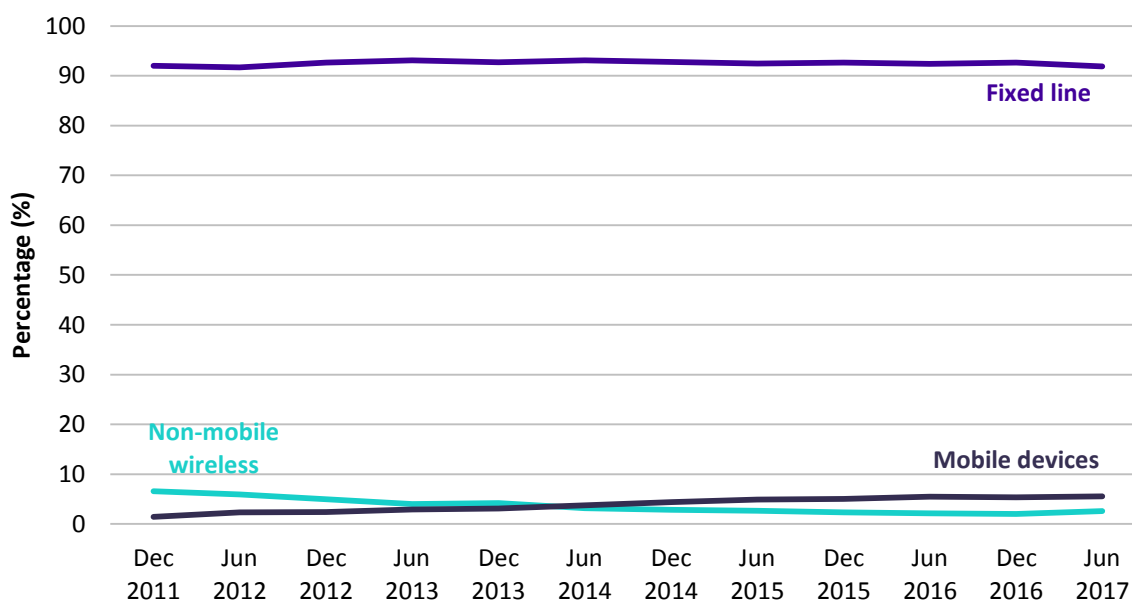
Greater substitution between fixed line (including fibre, coax and copper networks) and wireless technologies (including mobile and fixed wireless) will lead to greater competition between broadband providers and better consumer outcomes. However, greater substitution may also pose some challenges for industry, the Government and NBN Co.

As identified in section 4.2, substitution of fixed broadband to mobile is already occurring for portions of the population. Roughly 20 per cent of the Australian population is a mobile only broadband user.³⁴¹ The rate of substitution appears to have increased with 4G and we consider this is likely to be by consumers with low usage needs or a desire to incur costs for only one service.

However, fixed line services are still important for many consumers, particularly households with data intensive activities. While mobile handsets are now the most popular way for consumers to access the internet, most data is still downloaded over a fixed line.

Should greater substitution occur, wireless services will account for a greater proportion of total downloads. However, this has yet to occur. Since 2011 the proportion of total downloads attributed to mobile handsets has risen from one to six per cent.³⁴² However, this has mostly been at the expense of non-mobile wireless devices (dongles, satellite, tablet SIM cards, etc.). Wireless (mobile and non-mobile devices) continues to make up roughly the same proportion of downloads as it did five years before about eight per cent.

Figure 6.1: Volume of data downloaded by connection type, percentage of total downloads³⁴³



³⁴¹ ACCC calculations based on Roy Morgan Single Source. Roy Morgan Single Source (Australia), January to December 2016, n=14 966, 14+ Australian population.

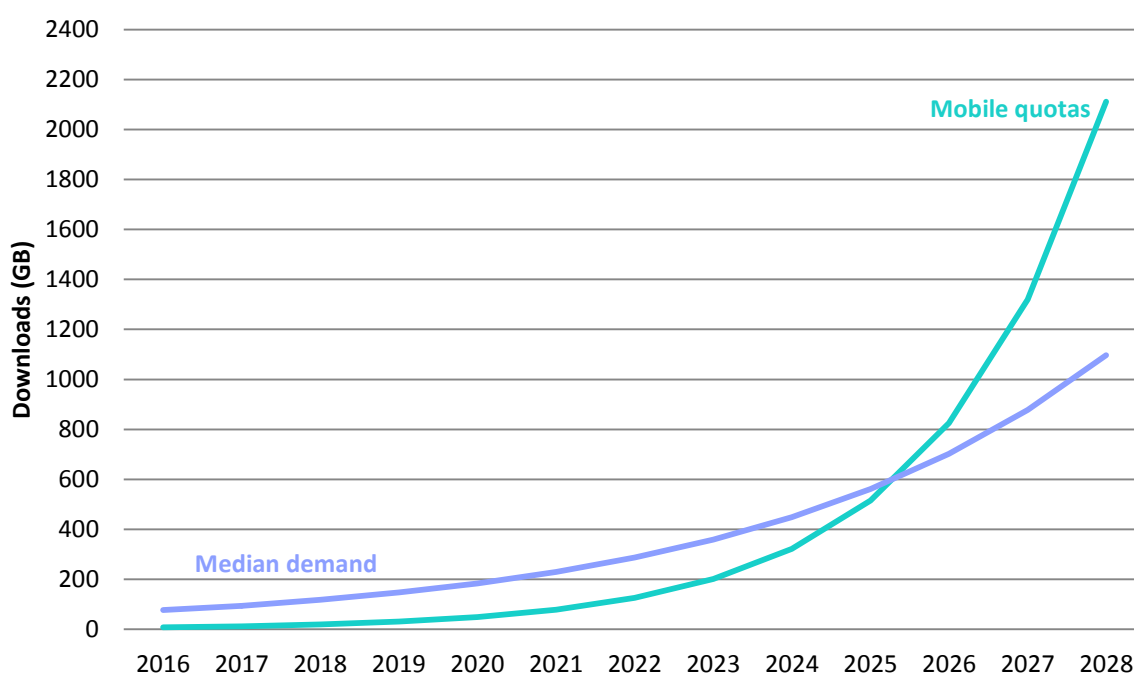
³⁴² ABS, [8153.0 - Internet Activity, Australia](#), June 2017.

³⁴³ *ibid.*

For increased substitution to occur wireless plans, either fixed or mobile, must provide a similar or greater value proposition than fixed line plans. We estimate that 50 per cent of Australians connected to the NBN currently download less than 95GB per month.³⁴⁴ While the average mobile plan as of 2016 only offered around 7GB per month,³⁴⁵ a limited number of recently introduced wireless plans meet these needs today, at prices similar to fixed line connections. For example, Optus provides a 200 GB home wireless broadband plan for \$70 per month, though speeds are limited to 12/1 Mbps. OVO has recently released a 100 GB home wireless broadband plan for \$70 per month, with no speed restrictions. Both of these plans use a SIM installed in a 4G modem that can be moved and used anywhere in Australia that has access to the Optus 4G network.³⁴⁶

NBN Co forecasts data demands will grow at 20 to 30 per cent a year until 2025.³⁴⁷ At 25 per cent annual growth, median data demands are expected to be around 285 GB per month in five years. The amount of data on affordable mobile broadband plans will need to rise to meet these needs. There are signs that the growth in mobile quotas may be capable in catching up to this rising demand. Average mobile quotas have grown by about 60 per cent from 2012–13 to 2015–16.³⁴⁸ Should quotas sustain this growth rate, the average mobile plan may be able to satisfy the median Australian download demand within the decade (shown in Figure 6.2).

Figure 6.2: Potential growth in mobile data quotas and median demand³⁴⁹



³⁴⁴ Average downloads in Australia are 157 GB per month on the NBN, based on the NBN Corporate Plan 2018. Because wireless providers will be directly competing with the NBN, using the average NBN figure is a reasonable comparator. However this figure, a mean average, is skewed by heavy downloaders at the top end – it is estimated that the top 50 per cent of users use about 90 per cent of total downloads. To gain a better understanding of a typical internet user, it is better to rely on the median amount downloaded. According to research undertaken by the United States Federal Communications Commission in its Measuring Broadband America 2015 report, the median broadband user downloads about 60 per cent of the mean average downloads.

³⁴⁵ ACCC, [Telecommunications report 2015–16](#), 8 March 2017.

³⁴⁶ Company websites.

³⁴⁷ NBN Co, [Corporate plan 2018](#), August 2017.

³⁴⁸ 35 per cent if you use 2011–12 as the base year.

³⁴⁹ ACCC, [Telecommunications report 2015–16](#), 8 March 2017.

We recognise that this analysis is limited—it is based on just one estimate of future demand, and relies on an overly simple model of growth in mobile data allowances into the future. Neither of these are easy to forecast. Nevertheless, it shows how mobile data allowances will need to increase substantially to substitute for fixed line services.

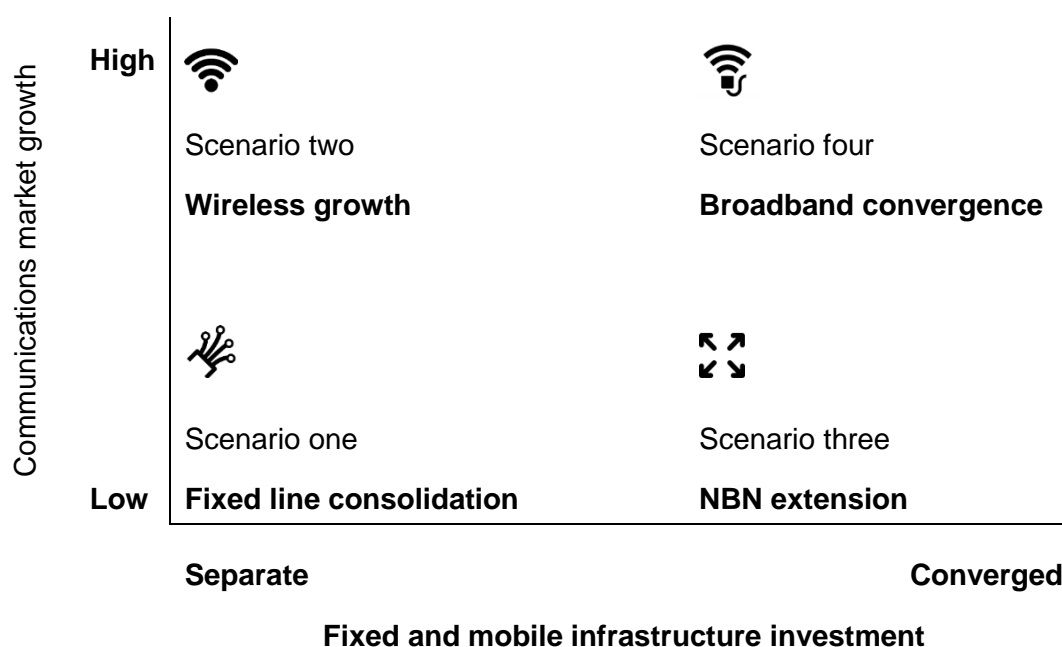
Looking forward, the extent of substitution from fixed line to wireless services is difficult to predict. A variety of views are held about the role technologies will play in the delivery of broadband services in the future. Attendees at the market study stakeholder forum held differing views on the extent to which fixed wireless and mobile services compete with and substitute for fixed line services. While there was agreement that some substitution is occurring, there was disagreement as to whether this substitution would increase in the short to medium term. Some participants noted that fixed line services provided technically superior products that could not be replicated by mobile technologies. Other participants suggested the number of people choosing to go ‘mobile-only’ is not an insignificant proportion of the population, and considered that the rise in data allowances on mobile plans would see this proportion increase.

Various factors will influence how both industry will enable and consumers will demand different technologies. It is nevertheless important to understand these possible futures to consider the issues they present.

6.1.1 Scenarios

In work commissioned by the ACCC, Robert James of iMediate Consulting has considered potential future scenarios for the Australian communications industry, and how competition between different technologies may unfold.³⁵⁰ This analysis has led to the development of four scenarios based on emerging trends in fixed line and wireless broadband technologies.

Figure 6.3: Communications market scenarios³⁵¹



³⁵⁰ These scenarios are based on those originally discussed by Robert James in “How NBN will be shaped by wireless competition & opportunity”, Communications Day, 18 April 2017. The scenario names and discussion have been summarized and adjusted for the purposes of this report.

³⁵¹ Scenario analysis by iMediate Consulting, prepared for the ACCC.

The main differentiating factors of these four scenarios are plotted on the horizontal and vertical axes. Overall market growth, on the vertical axis, identifies whether there is an expansionary economic environment in terms of revenue, costs, profits and margins for those in the telecommunications market. Infrastructure investment, on the horizontal axis, identifies the possible separate or converged infrastructure models the market can develop, partly in response to market growth on the vertical axis.

These scenarios rely on several assumptions. Some of these assumptions may seem unlikely; however their use enables us to test different market forces and outcomes. Importantly, none of the assumptions made in the building of these scenarios represent the ACCC's views on whether or not they will occur.

Scenario one: fixed line consolidation

The 'fixed line consolidation' scenario describes a market that experiences low communications earnings growth across both the fixed line and mobile sectors. NBN Co delivers broadband services largely as expected in its recent corporate plans, and meets forecast revenue growth. These services are delivered over fixed line, fixed wireless, and satellite. Fixed line technologies connect 92 per cent of NBN households.³⁵² Fixed wireless and satellite technologies connect remaining households in regional and remote areas where fixed line technologies are uneconomical. Non-NBN fixed wireless and other alternatives to the NBN capture a small market share only. The Government places a priority on managing the returns from the NBN to recover costs.

In this scenario, mobile wireless does not make major inroads into the residential or business sector. A confluence of adverse factors such as international standard development and spectrum harmonisation delays slow the development of wireless alternatives, which in turn slows infrastructure investment. Low technological substitution is a result. No mobile network develops a dense small cell layer (small radio nodes often mounted on light poles and buildings with only a limited range, but at high density provide greatly increased capacity), and therefore convergence between fixed line and mobile networks is not realised. NBN Co does not look to expand its wireless products further than the fixed wireless intended for regional areas. Given lack of investment into wireless, fixed line technologies continue to connect the majority of premises, and provide the vast majority of network traffic.

Scenario two: wireless growth

This scenario considers a higher market growth alternative to scenario one. Adoption of NBN services and mobile broadband are both robust. 5G shows considerable promise. Availability of spectrum suitable for 5G (including the 3.6 and the 26 GHz bands), international agreement on standards, and strong consumer demand all enable strong 5G infrastructure investment. The mobile network operators commence developing a fibre backhaul network to support dense small cell infrastructure. This network supports both mobile devices—tablets, phones and dongles—as well as 5G modems dedicated for fixed home internet usage.

These small cell networks begin overbuilding the NBN in high revenue areas. The NBN does not directly respond to the growing competition. Significant technological substitution occurs. Customers move from the fixed line NBN networks to private sector wireless networks that are able to offer better value propositions. However while convergence occurs between private sector fixed line wireless networks, convergence on the NBN remains limited to where some POIs currently support both fixed wireless and fibre connections. 5G fixed

³⁵² NBN Co, [Corporate Plan 2018](#), August 2017.

wireless slowly becomes the favoured option of broadband retailers to reduce their costs of delivering broadband to the home.

Scenario three: NBN extension

This scenario is the second to consider a low market growth environment, but considers how NBN Co could potentially respond to support investment in wireless technologies. The mobile network operators are unable to efficiently invest in small cell infrastructure within this environment. Instead, the NBN invests in upgrading its fibre network to include 5G small cells, which it wholesales to mobile network operators. Mobile network operators continue to own their macro-cell infrastructure.

Such a scenario would see NBN Co providing wholesale access to both fixed line and small cell mobile networks.

Scenario four: broadband convergence





Commercial operators build the next generation of fixed wireless broadband, at an accelerated rate to that of scenario two. This is dubbed 'wireless fibre' by some international operators due to the high penetration of wireless small cells being enabled by large scale fibre backhaul networks. The Government decides to accelerate the sale of the NBN ahead of schedule to support this investment, and to maximise profits from the sale of the assets. Following the sale, commercial operators incorporate the previous NBN assets as the fibre in 'wireless fibre' and add their own small cell wireless on the end. Not all of the NBN assets are sold to commercial operators. Some of NBN Co's assets are instead used to continue to provide broadband services in economically unviable areas such as in regional and remote Australia.

6.1.2 Contributing factors

These scenarios allow us to consider a number of variables that are difficult to forecast. Instead of making predictions on the state of the Australian communications industry in five years, we have used these scenarios to better understand the opportunities and the barriers to competition between communication technologies.

There are many factors that will contribute both directly and indirectly to wireless substitution. These include factors like overall investment, market concentration, the introduction of new competitors, a consumer's willingness to pay, and the continued role of the NBN. Table 6.1 focuses on the three major factors that will influence technological substitution from fixed line to wireless technologies—wireless capacity, relative costs, and consumer experience with the NBN. We explore these factors in more detail, as their development will directly affect the level of substitution in clear ways.

Table 6.1: Major contributing factors³⁵³

	Fixed line consolidation	Wireless growth	NBN extension	Broadband convergence
				
Substitution from fixed line to wireless	Low	Med	Med	High
Wireless capacity	Low	Medium	Medium	High
Relative costs for wireless	High	Medium	Low	Low
Consumer experience with NBN	Medium	Low	Medium	NA

Wireless capacity

As discussed in section 4.2, fixed line broadband is still predominantly used to deliver data intensive activities like streaming, gaming and downloading large files—it is less costly to deliver data over a fixed line network than wirelessly. 92 per cent of downloads are made over fixed line networks.³⁵⁴

Wireless capacity is expected to significantly increase with the deployment of 5G technology. It is estimated that the arrival of 5G will bring US \$28.5 billion (AU \$36.5 billion) of new ICT revenue in Australia by 2026³⁵⁵ and will add to the \$34 billion in long-term productivity benefits already due to 4G investment.³⁵⁶

However at this stage it is unclear whether increases in capacity due to 5G will enable wireless to meet the demands currently experienced on fixed line broadband, providing a substitute for high broadband usage.

Greater capacity of mobile networks depends on three factors: the spectral efficiency or rate of information that can be transmitted over a signal, the overall bandwidth of spectrum available, and the number and density of cells and antennas used to transmit that signal. Or simply:

$$\text{Capacity} = \text{spectral efficiency} \times \text{spectrum bandwidth} \times \text{density of cells}$$

As envisaged in all scenarios, each of these three factors will increase over the next five years, leading to increases in the capacity of wireless networks for both mobile and cellular fixed wireless applications. Some scenarios anticipate greater gains in some of these factors. The scenarios do not anticipate significant substitution from fixed line to satellite, although satellite will continue to play an important role in the provision of services to regional and remote Australia. Across all four scenarios, non-cellular fixed wireless (through Wi-Fi or point-to-point technologies) will continue to operate in niche markets providing some

³⁵³ Scenario analysis by iMediate Consulting, prepared for the ACCC.

³⁵⁴ ABS, [8153.0 - Internet Activity, Australia](#), June 2017.

³⁵⁵ Ericsson, *5G-enabled digitalization*, 2017.

³⁵⁶ Deloitte, [5G mobile – enabling businesses and economic growth](#), analysis, October 2017.

competitive tension, but do not benefit from the move to 5G given their use of alternative wireless technologies.

Spectral efficiency

Current 4G mobile technology can technically achieve speeds at or above NBN fixed line broadband services. 5G is anticipated to deliver over 10 Gbps once standards are implemented and deployment commences in 2020. Technological advances over the next few years will also include developments like 'massive multiple-input and multiple output (MIMO)', which allows for the transmitting and receiving of more than one signal over the same channel. These developments will allow greater speeds, improve latency, and increase the number of devices able to be simultaneously connected to each cell. A limiting factor for the increase in spectral efficiency is the speed that the International Telecommunication Union, an international body governing telecommunication standards, reaches agreement on the proposed 5G standard. This in turn will affect how fast Australian retailers are able to roll out 5G on their networks.

Spectrum bandwidth

One limiting factor is the spectrum required to deliver 5G. More spectrum will generally enable greater substitutability, as more spectrum provides more bandwidth to deliver data to consumers.

Scenarios one and two consider how divergent approaches to spectrum allocations could lead to separate industry outcomes. Scenario one considers how delays in international spectrum harmonisation, and the resulting delays in domestic allocation of spectrum could impede greater substitution in Australia. Scenario two considers the reverse, where 5G spectrum made quickly available to mobile operators enables greater provision of high speed, high capacity wireless products.

The ACMA has recently stated its intention to auction the rights to a significant amount of spectrum in the 3.6 GHz band. It has also indicated it will fast track allocation of spectrum in the 26 GHz band. While no standard for 5G has currently been decided upon, and therefore no bands are yet identified for 5G, both these bands have been identified internationally as particularly suited for 5G applications.

Attendees at the market study stakeholder forum expressed divergent views on whether spectrum allocated in the 3.6 GHz band should be reallocated for mobile broadband use or remain allocated for use by wireless internet service providers. Some suggested the option of using dynamic spectrum management and sharing as a potential resolution.

We discuss in section 7 the importance considering the impact of spectrum allocations on downstream markets, and how spectrum sharing and secondary trading will have the potential to improve allocative and dynamic efficiency.

Density of cells

The scenarios suggest that for substitution and convergence to occur in the broadband market, significant densification of small cell infrastructure will be required on top of those efficiency and quantity improvements discussed above. Densification has been occurring in recent years as mobile network operators increase their coverage and capacity.

Scenarios two, three and four each consider different approaches to densification. Scenario two considers a gradual, organic approach led by the private sector. Scenario three considers an approach led by NBN Co as a wireless wholesaler. Scenario four considers how NBN assets, following the sale of the NBN, could enable an accelerated transition to a high density small cell infrastructure.

The move to higher band spectrum allocations will require greater cell densities. This is because high spectrum bands have lower ranges, which requires use of the spectrum with a greater number of low-range cells.

One concern about greater cell density is around citizen acceptance. Participants at the market study stakeholder forum noted that the increasing number of small cell antennas already being built for mobile networks has raised concerns in residential areas. Some small cell manufacturers and installers have turned to disguising small cell towers to increase community acceptance. How citizen acceptance evolves for a greater density of small cell towers, given the benefits of greater download speeds and capacity, is also likely to have a bearing on wireless network evolution in Australia.

Relative costs

We discussed NBN Co's cost structures earlier in section three. To recover costs, NBN Co has estimated it will need to raise ARPU to \$52 by 2021, a growth of around five per cent per year. NBN Co originally forecast that revenue will rise to \$100 per user by around 2040.³⁵⁷ These estimates are based on NBN providers continually purchasing more capacity to respond to rising consumer demands.

We estimated in section 5.1 that retail margins on NBN products are relatively low due to high CVC and AVC wholesale charges. Analysis by several commentators has suggested that NBN reseller margins will fall as NBN nears its ARPU target of \$52 in 2021.³⁵⁸ Low margins on the NBN are likely to create an incentive for service providers to pursue lower cost alternatives.

Mobile operators are likely to invest in upgrading their networks as 5G comes online regardless of whether substitution is occurring. With these upgrades in place, the economics of these networks may influence an operator's 'build or buy' decision where these operators are also involved in the fixed line broadband market—connecting an additional home through an existing wireless base station may present only small marginal costs. This would remove the need to pay for capacity on the NBN network. The ability for wireless to bypass NBN access charges may be a cost efficient proposition for mobile operators where capacity is available.

Verizon, for example, has plans to greatly expand its broadband footprint in the United States with 5G to directly connect to premises, which it says will dramatically change its cost structure.³⁵⁹ Verizon CEO Lowell McAdam has stated that revenue generated from fixed wireless services alone justifies the investment required for a 5G network.³⁶⁰ Some however have suggested converged networks may not be the most economically efficient approach. Analysys Mason predicts that "5G will not replace existing fixed next generation access" suggesting it will remain more expensive than fixed line connections.³⁶¹

5G mobile networks may also enable network operators to partially bypass the NBN network with combined service offerings. For example, hybrid modems could allow service providers to provide additional bandwidth at peak evening times without purchasing additional CVC on the NBN. 4G hybrid modems have already been introduced by mobile operators. Vodafone and Telstra have both either announced or have available hybrid modems to connect customers more quickly. The deployment of hybrid modems enables greater non-price differentiation and provides a number of potential consumer benefits. These include reducing

³⁵⁷ NBN, *Corporate Plan 2012*, August 2011 (not adjusted for inflation).

³⁵⁸ For example, Shaw and Partners 'The Shaw Line', report, 4 September 2017.

³⁵⁹ Verizon, '[Verizon's CEO: Our strategy to deliver the promise of the digital world](#)', Investor call, July 2016.

³⁶⁰ R Wood 'The investment case for 5G mobile is more distant without fixed wireless', article, Analysis Mason, 19 August 2016.

³⁶¹ R Wood '5G fixed-wireless: the investment case for operators', Research Strategy Report, Analysis Mason, 2017.

congestion issues, increasing speeds, the provision of internet connectivity prior to fixed line activation, and providing a backup service when a fixed connection is unavailable due to network outages.

Scenarios two and four consider how mobile operators may be able to lower their overall costs by connecting homes over the 'last mile' with wireless instead of fixed line technologies.³⁶² Scenario three considers the potential natural monopoly characteristics of dense small cell infrastructure, where NBN provides this infrastructure to allay concerns of one mobile operator gaining significant market power in the wholesale mobile market.

Consumer experience on the NBN

Finally, the level of substitution will be directly related to the experience of consumers on the NBN. We discussed in section 5.1 how many consumers claim to be worse off on the NBN compared to their legacy broadband service. NBN Co acknowledges these problems and estimate that 15 per cent of users are dissatisfied.³⁶³ In October 2017, the TIO announced that complaints about the NBN had risen 159 per cent in the last financial year.³⁶⁴

Attendees at the market study stakeholder forum suggested that as dissatisfaction with the NBN was rising, consumers would look more towards substitutes that do not face similar performance shortcomings. Such an approach is already happening with providers like BigAir, Spirit Telecom and Uniti Wireless providing high speed fixed wireless services to urban communities, in competition with NBN fixed line services. These providers offer similar speeds to the NBN at comparable prices.

Should NBN performance continue to deteriorate, consumers will look more towards non-NBN services like fixed wireless.

Other contributing factors

There are a number of other factors that are likely to influence the costs of deploying mobile and fixed wireless technologies and whether these will prove economic compared to deployed fixed line technologies. These include:

- whether the focus of 5G infrastructure investments will be separate or converged with fixed line networks
- whether local municipalities will seek to facilitate or oppose the deployment of small cell infrastructure
- whether private or public organisations will lead investment in large scale small cell networks in the future
- whether the NBN will meet its target of five per cent annual growth in ARPU
- whether rising NBN Co wholesale ARPU will lead to significant retail margin reductions for NBN retail service providers
- whether NBN retail service providers will provision adequate CVC for forecast increases in demand, and whether additional CVC will see reduced margins, increased retail prices, or both.

³⁶² This 'last mile' refers to the final leg of telecommunications infrastructure directly connecting an end-user. Its range varies, between a few metres to several kilometres.

³⁶³ Jennifer Dudley-Nicholson, News Corp Australian Network, *NBN Co admits more users 'than ever' are suffering slow downloads as consumer groups call for reform*, viewed on 11 October 2017.

³⁶⁴ TIO, [Annual Report 2017](#), 18 October 2017.

Draft finding

In addition to technical factors such as wireless capacity, the degree of future substitution to wireless technologies will in part depend on the performance of NBN services in terms of price and service quality.

6.1.3 Implications of substitution on the communications sector

As discussed above, the scenarios developed reflect upon the challenges and opportunities in achieving greater substitution, and therefore greater competition, between communication technologies. However, should greater substitution occur between fixed line and wireless products, a number of implications remain for the sector.

Implications for competition and consumers

Currently consumers are able to choose between fixed line and mobile broadband packages for their internet needs, especially where their data demands are low. However, overall substitution is low. With the introduction of 5G from around 2020, the capacity of wireless technologies (including both fixed wireless and mobile) will increase. Three of the four scenarios envisage wireless capacity and performance improving to the point of being able to be substituted for fixed line services.

Depending on the contributing factors discussed above, this increased substitution is likely to lead to increased competitive tension across all communication technology providers, which should result in downwards pressure on prices, and improvements in service quality and choice.

Draft finding

Technological evolution, particularly the advent of 5G, creates considerable uncertainty for the telecommunications sector. There is potential for disruption to existing network operators and the opportunity for investment in new technologies and supporting transmission networks. This will enable greater competition, and therefore a reduction in prices, improved quality of services, and greater consumer choice.

6.1.4 Implications for the NBN

Scenarios one and two consider how increased substitution away from the NBN will lead to a reduction in its revenues and profit margins. Scenario one deals with consumers choosing low capacity mobile plans due to constrained household budgets limiting preparedness to pay for fixed line products. Scenario two specifically considers how improvements to mobile technology will lead to wireless 'overbuilding' the NBN network. These scenarios reflect on how increased substitution may lead to NBN Co not meeting its long-term ARPU growth rates. This will negatively affect NBN Co's ability to recover its efficient costs within the Initial Cost Recovery Account. NBN Co has acknowledged this risk in its latest corporate plan.

"nbn will also be increasingly exposed to rapidly evolving competition, and competitors who will seek to leverage emerging technology for new business models and products. Although this industry disruption represents significant opportunities for nbn, there are also a number of emerging challenges. In the short-term, these include responding to increasing competition, and longer term, management of the impact of technology convergence, which will require nbn to adapt its network to a wide range of future use cases, business models and product innovations."³⁶⁵

³⁶⁵ NBN Co, [Corporate Plan 2018](#), August 2017.

As discussed above, greater competition from new technologies will lead to positive outcomes for consumers. This includes introducing competitive constraint on the NBN's provision of wholesale services. We consider that, where it is economically efficient, infrastructure based competition is clearly preferable and will promote the long-term interests of end-users. Actual or even potential competition between communications networks can help drive dynamic efficiencies in terms of price competition, product differentiation, innovation and timely investment.

For these reasons, we consider that non-NBN network operators (both fixed and wireless) should not be constrained from competition with the NBN unless there are particular circumstances which clearly suggest it would not be in the long-term interests of end-users. However, to ensure this competition remains sustainable, NBN Co will require pricing flexibility (as discussed in section 5.1) and continued technology flexibility (as in, the ability to deploy different technologies where most economically efficient) to respond to market developments.

Draft finding

For NBN Co there will be the threat from increasing substitution to wireless technologies but also the opportunity to use the new technology in its service provision.

Proposed recommendation 21

Regulation should not constrain competition with the NBN. Instead, NBN Co will require both greater pricing flexibility and continued technology flexibility to respond to market developments.

6.1.5 Implications for the ACCC

In ACCC regulatory processes, wireless and fixed line markets are generally treated as separate markets given the limited substitutability between the two.³⁶⁶ Should this substitution increase or the technologies converge, separate definitions of the wireless and fixed line markets may no longer be appropriate. It will also be important that regulatory settings do not unnecessarily distort economic efficiency outcomes. This will require that regulation is designed to avoid such distortionary outcomes.

Due to the extensive fibre network needed to support them, dense small cell networks may display natural monopoly characteristics. Attendees at the market study stakeholder forum suggested that as small cell architecture for 5G services will be critical to the convergence of fixed and wireless networks, open access to small cell wireless infrastructure may be important for competition.

Proposed action 22

We will consider stakeholder views as part of this market study on whether we should assess the merits of open access to dense small cell infrastructure assets.

³⁶⁶ See, for example: ACCC, [Superfast Broadband Access Service declaration inquiry final decision](#), July 2016.

Proposed action 23

We will closely monitor the uptake of different broadband technologies, and continue to reassess relevant market definitions in the communications sector as we undertake our regulatory functions.

6.2 Potential competition concerns relevant to the supply of newer communications

6.2.1 Over-the-top services

As described in section 4.7, OTT services cover a varied and dynamic range of services available to consumers and business. The emergence of OTT services has largely been a positive development for consumers. The availability of OTT services provides consumers with new services (such as entertainment, social media, ride-sharing, shopping, etc.) and innovative alternatives to traditional communications services (such as voice and text messaging) which are disrupting service delivery models.

In general we consider these developments have a strong pro-competitive impact on a variety of markets. OTT services have taken advantage of the lower barriers to entry created by broadband connectivity and technology to exert a new and innovative constraint on traditional service providers. In many cases, OTT services have circumvented long standing bottlenecks (such as the pay TV content market) to challenge incumbents.

We have observed that the current state of competition for OTT services is vigorous and dynamic, with continued new entry to the market, often from international firms, providing greater choice for consumers. Broadband and mobile service providers impacted by this new wave of competition appear to be reacting in a procompetitive manner. While we consider that the conditions and prospects for competition both within OTT services and between OTT services and traditional services are likely to remain strong, there are a number of low level risks including:

- the emergence of net neutrality issues, including arbitrary and undisclosed traffic management
- the potential for broadband service providers to defer or reduce network investment as OTT services capture an increasing proportion of consumers' spend
- OTT markets becoming concentrated due to network effects with the potential for individual players to acquire market power and potentially leverage into adjacent markets
- regulatory settings not keeping pace with the changing market and leading to distortions in competition.

While we consider that the risk of net neutrality issues emerging in Australia remain low due to the level of retail broadband competition and countervailing power of many OTT services, there is the potential for isolated instances of broadband and mobile service providers being able to foreclose innovative services in an opportunistic manner. The potential for broadband service providers to implement traffic management without fully disclosing this to consumers is also an ongoing concern to which we remain vigilant.

Despite the potential for tensions to emerge, the growing popularity of OTT services does not appear to have had a significant detrimental impact on network investment or the business models of broadband service providers who, to some extent, benefit from additional demand for connectivity.

We note that many of the concerns that may arise in relation to the growing platform dominance of some OTT service providers have an international dimension. While we are not considering these issues as part of the market study, we note that fast-changing technology and rapidly evolving digital markets can result in dominant players being challenged or displaced by rivals with technological or other innovations in a short space of time. Consequently, we consider that an evidence-based approach should be adopted in assessing any potential competition concerns in relation to digital markets and that (where necessary) ex-post intervention is likely to be better adapted to address such concerns than ex ante regulation.

While consumers are increasingly using OTT services to replace traditional services, particularly for content and communications, their use can often be complementary as well. As noted in the Stakeholder Forum, there are often quality and service standard differences between OTT and traditional services arising from the fact that OTT service providers do not control the access network and cannot make assurances about quality.

Draft finding

The competitive relationship between OTT services and the traditional communications services they replicate is likely to be different for each type of service. To the extent that competition from OTT services acts as a constraint on pricing, there may be a case for reducing or removing existing economic regulation of traditional communications services. For example, consumers' use of OTT messaging services may have diminished the need for ongoing SMS regulation.

Proposed action 24

We will explicitly examine competitive constraints posed by over-the-top (OTT) services on traditional communication services as part of future access regulation inquiries.

In addition, we will pay close attention to:

- any traffic and price discrimination of OTT services by broadband service providers (through blocking, throttling, prioritising and unmetering)
- the impact of traffic management practices by broadband service providers (in response to increasing traffic volumes), whether this is performed in a competitively neutral manner, and the adequacy of disclosure to their consumers. Should broadband service providers fail to fully disclose to new and existing customers how their traffic management policies may impact their services, we will consider the need to develop appropriate principles and industry guidance as well as consider enforcement action where appropriate
- the development of key OTT service markets, which we propose to report on as part of our annual telecommunications report
- potential harm arising from the ability of OTT platforms to amass market power (which we have excluded from this market study).

6.2.2 Internet of Things

As discussed in section 4.9 the IoT rubric captures a heterogeneous range of services of varying levels of development and competitive dynamics. While connectivity is a key element of IoT supply chains, connectivity requirements vary according to the needs of the IoT application. The current key unfolding development is the rollout of new specialised IoT networks (taking advantage of relatively low barriers to entry offered by the use of class

licensed spectrum) and in response, mobile service providers are making modifications to their networks to target these growing service markets.

We are currently observing entry from local and international IoT providers and strong demand from consumers, businesses and the public sector for productivity enhancing IoT applications. Given the relatively immaturity of IoT services, compounded by the broad and growing range of applications, it is difficult to assess the current state of competition. However, participants in the Stakeholder Forum noted that issues with accessing international roaming in Australia and resistance to the implementation of e-SIMs (as a replacement for physical SIM cards) posed a potential barrier to Australia keeping pace with IoT adoption overseas.

Case Study: e-SIMs

Traditional removable SIM cards are being replaced by dynamic reprogrammable e-SIMs embedded in wireless devices.

We consider that e-SIMs have the potential to greatly promote competition in the IoT sector (and the broader mobile sector) by facilitating consumer switching. However, we are concerned that restrictions associated with the e-SIM model are impeding the ability of MVNOs to compete with the mobile network operators, and reducing consumer choice.

As ACCAN has noted:

“there are clear competition issues, with the e-SIM and Apple SIM models. In Australia, consumers can only select a plan with Optus, Vodafone and Telstra. Consumers cannot sign up for a service with any MVNOs.”³⁶⁷

By way of example, we understand that Apple is offering connectivity to its Apple Watch 3 exclusively through the mobile network operators and that MVNOs are currently unable to provide services for this and other Apple e-SIM devices.

The large number of potential IoT applications that can be adopted across wide sections of the economy and latent demand for these solutions suggests that as a whole IoT services will continue to grow rapidly. We note that processes are in place to address many of the potential risks and inhibitors to the development of IoT identified in section 4.9. These tend to relate to policy, regulatory and standards matters (such as spectrum availability, interoperability, standards, resilience and consumer issues relating to data, security and privacy) largely associated with the novel nature of these services and their interaction with legacy frameworks. We consider that this range of matters will continue to be the key issues in relation to IoT competition and development over the medium term until the sector matures. At which point, key competition and consumer issues for the ACCC are likely to more closely resemble those of other digital and communications markets.

³⁶⁷ Australian Communications Consumer Action Network (ACCAN), [Competition in evolving communications markets - submission by ACCAN to the ACCC](#), October 2016.

Proposed action 25

We will:

- continue our involvement in relevant external processes in relation to Internet of Things (IoT) spectrum, NBN and consumer/data issues run by the ACMA, the Internet of Things Alliance Australia (IoTAA) and other government departments
- continue to work with IoTAA in its various work streams and engagement with NBN Co on IoT product issues
- explore concerns regarding restrictions associated with the e-SIM model which are impeding the ability of Mobile Virtual Network Operators (MVNOs) to compete with the mobile network operators
- more generally, periodically examine the development of competition in key IoT sectors for signs of concentration or conduct of concern. This would involve monitoring features of the market including the number of market participants and their market shares; the degree of interoperability at the network and service layers; and availability of suitable wholesale access products. We will consider the value of incorporating this monitoring activity as part of our annual telecommunications report.

6.2.3 Content delivery networks, cloud computing and data centres

We have not identified any current competition concerns in relation to the CDN, cloud computing and data centre markets. As discussed in section 4.8, 4.10 and 4.11, we observe that the markets for the supply of CDN, cloud computing and data centres services are growing rapidly to meet the demands of the digital economy and are characterised by entry and innovation. While there are local suppliers of these services, well-resourced international firms with expertise and strong brand recognition have been able to overcome the high sunk costs and risks associated with entry. As these markets mature and demand growth moderates, the relatively high level of entry and innovation may also slow.

While there are no immediate competition concerns, as with many of the markets examined, there are features and characteristics which may lead to low level risks of competition and consumer issues emerging over the medium to longer term. Broadly these relate to:

- Network effects—particularly for cloud computing and data centre markets which, as the markets mature, encourage concentration and the potential for market power issues to emerge.
- Consumer (and business customer) issues arising from the collection, storage and use of data—for example cloud computing service providers may be able to inhibit consumer switching through their control of their customers' data.
- Bundling (in conjunction with broadband service providers) and other lock-in strategies through the use of proprietary standards may also be employed by cloud service providers.

Proposed action 26

We will follow developments in the market for Content Delivery Networks (CDNs), cloud computing and data centre services to ensure that competition is not undermined over time and take appropriate competition enforcement action if necessary.

7 Policy implications and priorities

This section sets out our views in relation to communications sector policy issues which have interdependencies with competition, efficiency and consumer issues. We first consider policy implications for the current regulatory and competition arrangements which we administer. We then consider policy priorities more broadly. These relate to reviews either currently being undertaken, or that have recently been finalised. They have either immediate or longer term implications.

7.1 Current regulatory and competition arrangements

To a large extent the regulatory regime for communications has to date been one of up-front economic regulation, where we have set up-front terms and conditions of access to monopoly services to promote competition in related markets, and to set a price for the monopoly service that encourages efficiency and investment

However, we may also have recourse to the specific set of anti-competitive conduct rules applying to the communications sector and the general competition law provisions in the CCA to ensure that markets are competitive and delivering good outcomes for consumers.

We have noted a number of issues within the communications sector in the preceding sections that may require regulatory responses. However, we have not found any deficiencies in the current communications regulatory arrangements that we administer which require redress. On the contrary, our view is that the current arrangements have remained fit for purpose notwithstanding the evolution of the communications sector to date and appear to be well suited to deal with the immediate and longer term issues we have identified.

Importantly, we have a range of regulatory tools available, if required, to deal with issues identified with respect to NBN pricing and service standards, access to aggregation and other critical wholesale inputs, information gathering, market reporting and monitoring and consumer protection.

We consider there is far less need for us to step in and set terms and conditions up-front for newer communications services. Looking further ahead, should competition concerns arise in relation to the provision of these services, we will address these concerns in the first instance by enforcing the specific communications and general competition law provisions in the CCA.

Keeping ourselves informed of market developments is critical. Communications markets can develop rapidly, which means that sometimes problems can emerge very quickly. As a regulator we need to be informed so that we can engage effectively, whether that means responding to problems when they arise or advocating for competitive outcomes before then. To this end we have proposed that we undertake a number of additional information gathering and monitoring tasks within the communications sector.

Draft finding

The current communications regulatory and competition arrangements that we administer have remained fit for purpose despite the evolution of communications market to date and appear to be well suited to deal with the immediate and longer term issues we have identified in the market study.

7.2 Spectrum management

Spectrum is an essential input into wireless markets and services. Without access to adequate spectrum, industry participants cannot offer competitive services. In this environment, ensuring that the impact of spectrum allocation on downstream retail markets is given equal weight to upstream wholesale spectrum markets is vitally important.

A spectrum reform and legislation package is currently being progressed by the Department of Communications and the Arts. This package outlines how new legislative arrangements and proposals for spectrum pricing and the management of Commonwealth spectrum might operate together.

The spectrum reform package is occurring at a time when changes in the market structure and the potential rollout of new mobile networks are dependent on the availability of spectrum. For example, TPG's recent acquisition of spectrum and proposed entry into the provision of mobile services, as well as more broadly the increasing use of fixed wireless services.

As set out in our recent submission to the process considering the exposure draft for the Radiocommunications Bill 2017 we are encouraged by the proposed intent of the new spectrum management framework to simplify the licensing and allocation processes, to establish a more flexible and efficient regime, and to create the conditions to promote secondary trading.³⁶⁸

However, we consider it is essential that the proposed reforms take into account the impact on competition in the downstream markets for which spectrum is an input. In particular, there is a need to strengthen the proposed regime to include a competition assessment in allocation of spectrum that will, or is likely to, impact downstream retail markets. To achieve this we consider two essential elements should be included in the proposed Bill:

- The ACCC must be consulted regarding spectrum allocations that are likely to impact downstream markets. In the context of the Bill's requirement that the ACMA promote the long-term public interest derived from the use of the spectrum, we consider it essential that the ACMA has a positive obligation to consult with us when it is proposing to allocate spectrum where there are competing demands and interests for that spectrum.
 - Section 50 of the *Competition and Consumer Act 2010*, which prohibits acquisitions that would result in a substantial lessening of competition, should continue to apply in all circumstances where spectrum is allocated, including when a licence issue limit has been imposed. In a market that is changing rapidly, and in which spectrum scarcity could result in adverse outcomes for end-users, we strongly consider section 50 must continue to have broad application to create a disincentive for anti-competitive conduct and a means for the ACCC to intervene if necessary.

We note that regulatory measures such as spectrum set-asides and reduced fees are used by regulators internationally to promote competition in relevant wireless and mobiles markets

³⁶⁸ ACCC, [Submission in response to the Exposure Draft – Radiocommunications Bill 2017](#), 31 July 2017.

by assisting new entrants and smaller incumbents. It is not clear that if a need arose, they would be able to be used in Australia.

With regard to the proposed benefits of the regime, the ACCC strongly supports spectrum sharing and secondary trading, noting it has the potential to improve efficiency. For example, secondary trading could enable smaller wireless operators to gain access to the spectrum they need on the secondary market rather than compete with larger players for large geographic licences. Secondary trading may be assisted by licences issued for fixed terms or with clear renewal terms, although we recommend that the ACMA consult with us if such measures were going to be put in place.

We proposed to continue to engage with the Department of Communications and the Arts on these matters.

Draft finding

Spectrum allocation and management is increasingly important for communications markets. The value of spectrum lies in the economic and social benefits it supports, rather than in any revenue return to the Budget. The Government's proposed new radiocommunications regulatory framework does not explicitly recognise the impact of spectrum allocation and assignment on competition and efficiency in downstream retail markets.

Proposed recommendation 27

The ACCC strongly recommends that the radiocommunications regime explicitly recognise, and do more to promote, competition in relevant markets.

7.3 Data availability and use

The Government is also currently considering the recommendations from the Productivity Commission's Inquiry into Data Availability and Use.³⁶⁹ The Productivity Commission's recommendations reflect previous findings of both the Competition Policy Review (the Harper Review) and the Financial System Inquiry (the Murray Review) about the benefits to competition and consumers from increased use of data.

At a high level the Productivity Commission has proposed:

- a new legislated consumer right (the Comprehensive Right) enabling opportunities for data use by those who originate the data (i.e. individuals and businesses)
- a structure for data sharing and release that would allow access arrangements to be dialled up or down according to the different risks associated with different types of data, uses and use environments.³⁷⁰

The Productivity Commission considers the Comprehensive Right would represent fundamental reform to Australia's competition policy in a digital world. In particular, it would create:

- powers for consumers (including small businesses), to view, request edits or corrections, and be advised of trade to third parties of digital data held about them, similar to privacy rights but with a focus on supporting data use in the digital era

³⁶⁹ Angus Taylor 'Harnessing the incredible value of data', Minister's introduction, viewed on 12 October 2017.

³⁷⁰ Productivity Commission, [Data Availability and Use](#), Inquiry Report, No 82, 31 March 2017, and [media release](#).

- a new right for consumers to have a copy of their data provided either to them or directly to a nominated third party, such as a new service provider, in order to obtain a competitive offer or other benefit.

As outlined in section 5.4, we consider information can play an important role in facilitating competition and enabling consumers to make more informed choices and decisions.

We are supportive of the proposals by the Productivity Commission around greater availability and use of consumer data. These proposals have the potential to be applied across the economy, including to the communications sector. As we previously submitted to the Productivity Commission, we consider that consumers should have access to relevant data about themselves that will facilitate better purchasing decisions and encourage service providers to make more tailored offerings to consumers.³⁷¹ Greater access to consumer data may also generate wider benefits in terms of innovation, both within and outside the communications sector. In particular we note that:

- Giving consumers more access to data about themselves enhances consumer participation and assists consumers to make better purchasing decisions. It assists consumers to compare competing offers, to make a more informed choice about what best suits their needs, and to potentially switch service providers.
- In turn, this should encourage service providers to make more tailored offerings to consumers, and to innovate and market new or different products and services that better meet consumer preferences. This could also include new entrants, as empowering consumers to direct data to these start-ups would likely assist in lowering barriers to entry.

We are also of the view that giving consumers the ability to direct a service provider to transfer their consumer data to a third party is an important component of assisting consumers to compare competing offers and to make a more informed choice about what best suits their needs. Further, such data portability should also make easier the act of switching from one service provider to another, particularly for more complex products and services where there is a reluctance to change.

Submissions to the market study issues paper did not directly address this issue. However, some service providers submitted that consumers already have transparent access to information and can easily compare services. Consumers and consumer groups expressed a contrasting view, noting the difficulties experienced in effectively choosing service providers.

At the market study stakeholder forum there was broad recognition that consumers need clear, useful and relevant information to navigate the market. Some attendees suggested that any regulation giving consumers access to their own data should be limited to access to relevant information and appropriate regard must be given to industry costs in supplying this data.

We agree that the precise extent of any information that would be made available to consumers is an issue that will require careful consideration, and that implementation costs would need to be taken into account (as they would with any reform proposal).

³⁷¹ ACCC, [Submission on draft report on data availability and use](#), 11 January 2017.

Draft finding

Consumers do not have sufficient access to relevant data about themselves to facilitate better purchasing decisions and encourage service providers to make more tailored offerings to consumers.

Proposed recommendation 28

The proposals of the Productivity Commission's Inquiry into Data Availability and Use should be implemented to facilitate consumers having access to relevant data about themselves.

Draft finding

We support the roles recommended for the ACCC by the Productivity Commission in its Inquiry into Data Availability and Use.

7.4 Regional Broadband Scheme

The Regional Broadband Scheme (RBS) aims to establish funding arrangements to provide broadband services to regional, rural and remote Australians. Modelling by the Bureau of Communications Research has estimated that NBN Co fixed wireless and satellite networks will incur a net cost of around \$9.8 billion over 30 years. These costs are currently cross-subsidised by NBN's profitable fixed line connections. Under the proposed RBS, carriers that provide active high speed, fixed line broadband services to premises on their network would contribute to subsidising these services, through a charge of around \$7.10 per premises per month. The charge will not be imposed on fixed wireless or mobile broadband operators.

When we originally commented on this proposal, we accepted the Bureau of Communications Research view that only imposing the charge on NBN equivalent services so that it continued to bear most of the funding responsibility for non-commercial services would encourage NBN Co to contain costs to efficient levels because of the revenue uncertainty it faced.³⁷²

However increased substitution towards fixed wireless and mobile broadband services raises questions about the funding base of this scheme. Attendees at the market study stakeholder forum also suggested the scheme could distort market outcomes in favour of those networks the charge did not apply to such as fixed wireless and mobile broadband providers. NBN Co CEO Bill Morrow has recently suggested that NBN Co may need further protection from wireless competitors to sustain its financial viability.³⁷³

In its final consultation paper on NBN non-commercial services, the Bureau of Communications Research acknowledged that the introduction of 5G technology may see an increase in the level of substitution.³⁷⁴ It therefore indicated that future consideration will be required on how funding arrangements adjust over time. As the substitutability of wireless services increases, the fact that the RBS is not applied to these services may also distort market outcomes. However, our preference would be for direct budget funding of non-commercial services rather than an extension of the RBS charge to other types of

³⁷² ACCC, *Submission to final consultation: nbn non-commercial services funding options*, November 2015.

³⁷³ *Sydney Morning Herald*, 'NBN needs protection if it is to make a profit: CEO Bill Morrow', 23 October 2017.

³⁷⁴ Department of Communications and the Arts, *Final consultation: nbn non-commercial services funding options*, 13 October 2015.

services given that direct budget funding would be the least distortionary alternative and not serve as a means of protecting the NBN from network competition.

The draft legislation before Parliament requires that a review is undertaken in the first four years to ensure the funding base for the scheme remains appropriate. This review is separate to those undertaken by the ACCC to assess the charge amount every five years. The four year review will provide an opportunity for the Government to consider whether increased substitution across technologies brings into question the suitability of the RBS charge as a mechanism to fund non-commercial NBN services.

Proposed recommendation 29

The Regional Broadband Scheme (RBS) is only applied to fixed line services. It is not applied to wireless services and should not be in the future. The extent to which wireless services constrain fixed line broadband services is evolving and should not be inhibited by policy or regulatory changes to assist NBN Co. Greater substitution across technologies would also bring into question the suitability of the RBS charge as a mechanism to fund non-commercial NBN services. Our preference is for direct budget funding as it would be the least distortionary alternative and not serve as a means of protecting the NBN from network competition.

7.5 Mobile Black Spots Program

The Government's Mobile Black Spots Program aims to improve mobile coverage and competition in regional Australia by providing funds for MNOs to build or upgrade mobile base stations in regional, rural and remote areas of Australia which currently have poor, or no, mobile coverage. So far the government has allocated \$160 million in funds under two rounds of the program, with an additional \$430 of funds allocated by state and local governments, mobile operators, and local organisations. The Government has announced it will conduct a third round under which it will allocate a further \$60 million of funds.

We consider that funding programs of this nature have the potential to promote investment in mobile infrastructure in areas where there is no mobile coverage. However, the program appears to have been implemented with insufficient weight given to competition in allocating funding. In particular, there is no mandatory requirement to provide roaming at new mobile sites despite the significant public funds used to deliver the program.

We note that the co-subsidy nature of the program results in sites that are of marginal commercial value becoming commercially viable once capital costs are subsidised. This means that governments are subsidising individual commercial concerns and may be limiting the potential for these programs to promote competition for mobile services by providing an MNO with a competitive advantage in competing for customers in certain areas. Therefore we consider that open access requirements for these types of programs will deliver more benefits to those regional consumers who are seeking improved coverage and a better return for the public money expended.

Draft finding

We consider that government subsidies, like the Mobile Black Spots Program, are important in promoting investment in areas where there is no mobile coverage. However implementing open access requirements for such programs will deliver greater benefits to competition and consumers.