

To the Australian Competition and Consumer Commission

Domestic Mobile Roaming Declaration Inquiry

Expert Report

1 DECEMBER 2016

DR. DEREK RITZMANN

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Section 1

Introduction

I act as an economic expert witness in relation to the domestic mobile roaming declaration inquiry of October 2016 (the **Inquiry**) being conducted by the Australian Competition and Consumer Commission (**ACCC**). This expert report (the **Report**) outlines my opinions in my capacity as an economic expert in response to certain questions in relation to the Inquiry that I have been asked to answer. A brief summary of the Report is contained in Section 2 immediately below.

1.1 My instructions

I have been provided with the following instructions (the **Instructions**) by Norton Rose Fulbright Australia (**NRFA**) on behalf of Vodafone Hutchison Australia Pty Ltd (**VHA**).

Please provide a Report, to be attached to VHA's submission to the Discussion Paper that addresses the following matters:

1 *Natural monopoly: Is the supply of mobile telecoms services in regional Australia subject to a natural monopoly? If so:*

(1) *what are the salient features (including geographic scope) of this natural monopoly?*

(2) *are the natural monopoly areas contestable in the absence of regulation?*

(3) *what are the key implications for efficient investment in, and use of, regional mobile infrastructure?*

2 *Spillover effects: If a natural monopoly exists in areas of regional Australia, what impact (if any) is that natural monopoly having on the supply of mobile services in Australia outside the natural monopoly areas? To the extent any impact arises:*

(1) *what is the nature of that impact and the causal mechanism by which that impact arises?*

(2) *how is that impact affected by the existence of a uniform national price?*

(3) *what are the long-term welfare implications for end users?*

3 *Impact of declaration: Assuming the supply of mobile roaming services is mandated in areas of regional Australia with less than three mobile networks, what impact is such mandated supply likely to have on efficient investment in, and use of, mobile network infrastructure? In particular:*

(1) *would mandated roaming encourage efficient investment in infrastructure?*

(2) *would mandated roaming encourage efficient use of infrastructure?*

(3) *to the extent any detriments may arise, can they be mitigated by appropriate wholesale pricing and/or delaying the wholesale supply of upgrades or new sites?*

A full copy of the Instructions is attached to this Report as Annex A.

This Report provides my objective expert opinion in response to these questions in accordance with the Instructions and with the Federal Court of Australia's (**FCA**) Harmonised Expert Witness Code of Conduct (the **Code**).

1.2 Structure of the Report

A brief summary of the Report is contained in Section 2. In Section 3, the Report considers the question of whether there is a natural monopoly in the supply of mobile telecommunications services in regional Australia. In Section 4, the Report considers what impact such a natural monopoly would have on the supply of mobile services in Australia outside the natural monopoly areas. In Section 5, the Report considers the potential impact that the declaration of mobile roaming would likely have on efficient investment in, and use of, mobile network infrastructure.

1.3 Information provided in accordance with the Code

This Report states my opinions in my capacity as an economic expert regarding the questions in the Instructions.

In accordance with the Code, I provide the following information and statements intended to apply to the entirety of the Report.

1.3.1 The name and address of the expert

My name is Dr. Derek Peter Hemann RITZMANN. I am Senior Vice President at Compass Lexecon. My business address is Compass Lexecon, The Center Level 22, 99 Queen's Road Central, Hong Kong.

1.3.2 An acknowledgement that the expert has read the code and agrees to be bound by it

I acknowledge that I have read the Code and I agree to be bound by it.

1.3.3 Qualifications of the expert to prepare the report

I attach a copy of my curriculum vitae as Annex B.

1.3.4 Assumptions and materials facts

I attach a copy of the Instructions as Annex A. The Instructions contain a complete list of the accompanying materials provided to me along with the Instructions.

1.3.5 The reasons for and any literature or other materials utilized in support of each opinion

I state the assumptions and material facts on which each opinion in the report is based within my responses to the specific questions below. I attach a copy of the scientific, professional, and other references consulted as Annex C.

1.3.6 Any issue or matter falling outside the expert's field of expertise

Where applicable, I state where a particular question, issuer or matter falls outside my field of expertise.

1.3.7 Any examinations etc. relied upon

Where I have relied on any examinations, tests or other investigation, I identify the person who carried them out and that person's qualifications in the Report below.

1.3.8 Acceptance of another person's opinion (if any)

I specify the extent to which any opinion which I have expressed involves the acceptance of another person's opinion, the identification of that other person and the opinion expressed by that other person, during the course of my responses below.

1.3.9 A declaration that all desirable and appropriate inquiries have been made

I declare that I have made all the inquiries which I believe are desirable and appropriate (save for any matters identified explicitly in the Report), and that no matters of significance which I regard as relevant have, to my knowledge, been withheld from the Report.

1.3.10 Any qualifications on an opinion

Where applicable, I have specified in the Report whether any qualifications on an opinion expressed in the Report without which the Report is or may be incomplete or inaccurate.

1.3.11 Any opinion that is not a concluded opinion

Where applicable, I have specified in the Report whether any opinion expressed in the Report is not a concluded opinion because of insufficient research or insufficient data or for any other reason.

1.3.12 A brief summary of the report

I provide a brief summary of the Report in Section 2 immediately below.

Section 2

Brief Summary of the Report

This brief summary outlines the opinions I provide to the Inquiry in my capacity as an economic expert in response to the questions in the Instructions.

I conclude that the supply of mobile telecommunications in regional Australia is likely to be a natural monopoly in those areas with thin populations spread over wide areas. This conclusion is based on my examination of the supply costs and demand profiles for mobile telecommunications services in representative regional areas of Australia. More broadly, there is likely to be a strong general relationship between the economic viability of duplication of those facilities in a geographic area and the population density of that area. This means that, in addition to the natural monopoly areas, there are also areas where the duplication of facilities is theoretically feasible but where infrastructure-based entry is unlikely to be economic (and therefore unlikely to emerge in practice); this is due to the high sunk fixed costs of entry, network effects, and the requirement to capture large market share for viability which give rise to high risks of entry. Infrastructure-based competition is unlikely to emerge in these natural monopoly and non-contestable areas.

Moreover, there are likely to be competition spillover effects from the natural monopoly and non-contestable areas into the potentially competitive, genuinely contestable areas. Customers who require regional coverage must choose a provider who can supply coverage in the entire “bundle” of regions. The consequent horizontal bundling or tying effect helps Telstra to leverage its market power from the natural monopoly and non-contestable areas into the contestable areas. This bundling mechanism for leveraging of market power, well recognized in the literature, softens competition in the contestable areas, including likely in urban areas. Telstra’s uniform national price acts as a transmission mechanism to exacerbate this effect. An enhancement of competition in the natural monopoly areas would therefore also likely enhance competition in the competitive areas.

Mandated access to roaming would likely encourage the efficient use of, and investment in, infrastructure in the natural monopoly areas and in the other non-contestable areas. In the natural monopoly areas, efficient use of the facilities would be encouraged by mandating the use of the facilities across the entire demand, in accordance with commonly accepted natural monopoly concepts. In the areas that are not natural monopolies but are in practice non-contestable absent regulation, mandated access would encourage the efficient use of facilities in the short-term before infrastructure-based competition is viable, and would encourage the efficient investment in infrastructure in the long-term by facilitating the long-term investment in competing infrastructure. Efficient incentives for the access provider can be maintained through appropriate wholesale access pricing, and other targeted measures

such as focused access holidays for certain new facilities, in the hands of an experienced regulator taking into account the appropriate incentives considerations.

Section 3

Natural Monopoly

This section provides my opinion on:

- Whether or not mobile telecommunications services in regional Australia are a natural monopoly;
- What the salient features of this natural monopoly are;
- If the natural monopoly areas are contestable in the absence of regulation; and
- What the key implications of these conclusions are for efficient investment in, and use of, regional mobile infrastructure.

3.1 Is the supply of mobile telecommunications services in regional Australia subject to a natural monopoly?

It is my opinion that the supply of mobile telecommunications services constitutes a natural monopoly in those areas of regional Australia that are least densely populated. Based on the reasoning outlined in this section, this conclusion likely holds for at least those areas containing the least densely settled 20% of the population. Moreover, I conclude that it is likely that there is a strong relationship between the population density of an area and the number of mobile network operators (MNOs) that are capable of operating mobile infrastructure in the area with economic viability. These conclusions support the ACCC's recognition that "there are significant differences between regional, rural and remote areas of Australia"¹ in respect of the supply of mobile telecommunications.

3.1.1 What is a natural monopoly?

The common definition in the scientific literature is that a natural monopoly exists in a particular market where a single firm can serve that market at lower cost than any combination of two or more firms.² An equivalent definition is that "When total production costs would rise if two or more firms produced instead of one, the single firm in a market is

¹ Australian Competition & Consumer Commission (2016), *Domestic mobile roaming declaration inquiry: Discussion Paper*, October 2016.

² Sharkey, W.W. (1982), *The Theory of Natural Monopoly*, Cambridge University Press. pp. 12-20; P.L. Joskow (2007) *Regulation of Natural Monopolies*, in *Handbook of Law and Economics, Volume 2*, A.M. Polinsky and S. Shavell, editors, Elsevier, B.V.

called a “natural monopoly”³. Closely related to this is the definition that “An industry is a natural monopoly if ... one firm is viable, but not two or more”.⁴ The ACCC’s definition of natural monopoly is entirely consistent with this generally accepted definition.⁵

Natural monopolies typically exist because of the structure and properties of the production technology in that market and the cost properties associated with that technology. Generally speaking, natural monopolies are characterized by steeply declining long-run average and marginal-cost curves over the range of the reasonably foreseeable demand. As such, there is room for only one firm fully to exploit available economies of scale, economies and scope, and network economies, and to supply the market in question.⁶

Natural monopoly is commonly considered to exist by reference to the reasonably foreseeable range of demand within that market.

In order to consider whether or not the supply of mobile telecommunications services in regional Australia constitutes a natural monopoly according to these, it is necessary to consider the following:

- The costs of production of mobile telecommunications services in regional Australia;
- The population distribution of regional Australia and the demand characteristics of mobile telecommunications services in regional Australia; and
- The interaction of these costs of production and relevant demand characteristics.

The interaction of these costs of production and demand characteristics enables a determination of whether or not there exists a natural monopoly in mobile telecommunications in regional Australia.

3.1.2 The relevant production costs and demand characteristics of mobile telecommunications services in regional Australia

This section outlines the information I have used and the calculations to which I have referred to in determining the relevant production cost and demand characteristics of mobile telecommunications services in regional Australia.

I have received information from my instructing solicitors NRFA that I am instructed originates from NRFA’s client VHA, which provides factual data regarding the production

³ Carlton, D.W. and J.M. Perloff (2005), *Modern Industrial Organization*, Pearson, p.104.

⁴ Tirole, J. (1988), *The Theory of Industrial Organization*, MIT Press, pp. 19-20.

⁵ See for instance Australian Competition & Consumer Commission (2016), *Domestic mobile roaming declaration inquiry: Discussion Paper*, October 2016, at pp. 8-10.

⁶ Sharkey, W.W. (1982), *The Theory of Natural Monopoly*, Cambridge University Press. pp. 12-20; P.L. Joskow (2007) *Regulation of Natural Monopolies*, in *Handbook of Law and Economics, Volume 2*, A.M. Polinsky and S. Shavell, editors, Elsevier, B.V.

costs and demand characteristics of mobile telecommunications services in regional Australia. This information is in the form of an economic financial model (the **Economic Model**) in Microsoft Excel format. I received the Economic Model from NRFA on 3 November 2016; I then closely and critically examined the Economic Model on 4 and 5 November 2016, and subsequently discussed the model by telephone conference on 7 November 2016 with representatives of VHA (Mr Sean Alexander, Head of Corporate and Industry Strategy at VHA, and Mr Josh Snow, Senior Financial Manager – Strategy and Support Functions at VHA) during which I had further opportunity to critically test the assumptions and data going into the Economic Model. I am informed that the model was prepared by or under the instructions and oversight of Mr James Marsh (Chief Financial Officer at VHA), Mr Dan Lloyd (Chief Strategy Officer and Corporate Affairs Director at VHA), Mr Alexander, and Mr Snow.

I am informed that the Economic Model was created to explore whether or not it would be economic for VHA to duplicate the existing coverage of the incumbent Telstra Corporation Limited (**Telstra**) in each of three population density bands in Australia. These three population density bands are (1) the regions with the least densely populated 10% of the population, (2) the regions with the second-least densely populated 10% of the population, and (3) the regions with the third-least densely populated 10% of the population. The Economic Model evaluates these population density bands and selects three representative areas (the **Representative Areas**) of regional Australia, one for each of these population density bands:

- The Cairns & Port Douglas Statistical Area 3 (**SA3**) region in regional Queensland – as being representative of the Australian regions with the third-least densely populated 10% of the population (the **Third Lowest Density Band**);
- The Goulburn-Yass SA3 region in regional New South Wales – as being representative of the Australian regions with the second-least densely populated 10% of the population (the **Second Lowest Density Band**); and
- The Kalgoorlie-Boulder SA3 area in regional Western Australia – as being representative of the Australian regions with the least densely populated 10% of the population (the **Lowest Density Band**).

It is my opinion that the three Representative Areas are appropriately representative of the areas of Australia that are the least, second-least, and third-least densely populated areas of the country.

The Economic Model essentially rests on two core groups of factual inputs:

- Regional Australian population statistics, which I am informed are sourced directly from the Australian Bureau of Statistics (**ABS**) population statistics as disaggregated to the Statistical Area 2 (**SA2**) and SA3 levels.
- Estimated production costs for different categories of cost required to produce the services at issue to the Representative Areas and commensurate demand and revenue forecasts, which I am informed originate from VHA's internal accounts and management processes. These production costs include assumptions regarding what level of capacity investment and similar expenditure would be required to duplicate Telstra's current mobile telecommunications facilities in the Representative Areas. I rely on these inputs numbers as provided in the Economic Model and have not independently verified them.

The Economic Model then processes these data to provide estimates of the economic viability of duplicating Telstra's mobile telecommunications facilities in the Representative Areas. The technique used is the orthodox technique of analyzing future cash flows as appropriately discounted by a risk-adjusted discount rate. This technique analyses investment costs and the future cash flows arising from these investment costs, in order to determine whether or not the investment is economically viable based on the net present value (**NPV**) of the investment. This general approach is the most orthodox and most widely used technique to determine whether or not an investment or similar economic decision is viable⁷. I am satisfied that it is appropriate in this context.

Having concurred with the general approach, I have also examined the details of the implementation of the approach by examining the Economic Model closely (as specified above). I am satisfied that the implementation is technically correct and appropriate and yields results that are likely to be accurate within reasonable bounds of modeling accuracy. In particular, I am satisfied regarding the appropriateness of the following modeling choices:

- Assumptions of market share growth, which I am informed are taken from benchmarks of new entrants into comparable markets overseas. I am satisfied that this creates a realistic benchmark for the Economic Model;
- Assumptions of revenues per customer, which I am informed are based on VHA's comparable revenues in comparable circumstances. I am satisfied that this is an appropriate basis to estimate revenues per customer;
- The assumptions of construction costs, backhaul costs, and other costs of supply, which I am informed are based on VHA's historic costs in comparable circumstances. I am satisfied that this is an appropriate basis to estimate costs of supply;
- Discount rate assumptions. I am satisfied that the Economic Model makes an appropriate choice regarding the discount rate and that an appropriate sensitivity analysis with respect to this choice has been conducted. This model does not consider discount rates based on a Weighted Average Cost of Capital (WACC) approach, which may also have been considered. However, given the results of the sensitivity analysis around the discount rate, I am satisfied that this modeling choice is not materially relevant to the nature of the results obtained; and
- The analysis of the population density numbers and selection of the representative regions appears to be accurate and appropriate for the purposes of this analysis.

Finally, I have examined the sensitivity of the results of the Economic Model with respect to:

- The risk premium contained in the discount rate;
- The transmission costs;
- The EBITDA per customer; and
- The projected market share growth rates;

⁷

See R. Brealy, S. Myers and F. Allen (2016) *Principles of Corporate Finance*, McGraw-Hill/Irwin, 10th edition; A. Damodaran (2006) *Damodaran on Valuation: Security Analysis for Investment and Corporate Finance*, Wiley, 2nd edition.

and I am satisfied that the central results of the Economic Model, in particular the signs and parameters on the NPV analysis, are robust to realistic variations in each of these model inputs.

In conclusion, based on the information provided, I am satisfied that the model represents an appropriate examination of the issue of whether or not it would be economically viable for VHA to construct the infrastructure required to duplicate Telstra’s mobile telecommunications services in the Representative Areas.

A presentation prepared by VHA for presentation to the ACCC in March of 2016 that, among other things, outlines the relevant results of the Economic Model, is attached as Annex D. The Economic Model is also attached as Annex D.

3.1.3 Is it economically viable for VHA to duplicate Telstra’s mobile telecommunications infrastructure in the Representative Areas?

The Economic Model shows that the profitability in NPV terms of matching Telstra’s mobile infrastructure in the three Representative Areas is as follows:

	Cairns & Port Douglas (3 rd Lowest Density)	Goulburn-Yass (2 nd Lowest Density)	Kalgoorlie-Boulder (Lowest Density)
NPV	[C-I-C]	[C-I-C]	[C-I-C]
Positive or negative?	[C-I-C]	[C-I-C]	[C-I-C]

As described above, the signs and magnitudes of these points estimates are robust with respect to an appropriate sensitivity analysis carried out on the key parameters. This means that in each case the general conclusion of whether or not the investment is economically viable, and the magnitude of its economic viability / non-viability, does not materially change when key assumptions are varied within reasonable bounds. The conclusion is that choices regarding the key assumptions do not influence the central results within their reasonable bounds.

It is important to note that the economic viability of the infrastructure duplication deteriorates in direct relationship with the population density: the less dense is the population, the less economically viable is the infrastructure duplication. For the area representative of the Third Lowest Density Band, the infrastructure duplication is moderately economically viable (although this does not directly examine if the duplication would still be economically viable if there were already two competing infrastructure-based MNOs in that area). For the area representative of the Second Lowest Density Band, the infrastructure is uneconomic to duplicate (as discussed above, this result is robust to all realistic sensitivity analyses performed). For the Lowest Density Band, the infrastructure is uneconomic to duplicate by a significant margin.

Based on these results:

[C-I-C]

3.1.4 Is the supply of mobile telecommunications services in regional Australia a natural monopoly?

Based on the analysis in this section, the supply of mobile telecommunications in the least densely populated areas of regional Australia is highly likely to be a natural monopoly. This means that it is unlikely to be economically viable for a second set of competing infrastructure replicating the entire existing infrastructure footprint to be built in these areas, and that total production costs (ultimately borne by end-users) would rise in those areas if a second, competing set of infrastructure were to be built. The interaction of supply side cost factors and the reasonably foreseeable demand profile dictates that it is likely that the demand in those areas can be served at lower cost by one set of infrastructure rather than by two or more sets of infrastructure. This in turn implies that a second infrastructure-based provider covering the entire existing infrastructure footprint would be unlikely to be viable in those areas. In conclusion, the supply of mobile telecommunications in those least-densely-populated areas is likely to be a natural monopoly.

3.2 What are the salient features (including geographic scope) of this natural monopoly?

The core feature of the natural monopoly is that there are certain areas of Australia where it is likely to be uneconomic for there to be more than one set of mobile telecommunications infrastructure covering the entire existing infrastructure footprint in those areas. More broadly, the analysis supports a conclusion that there is a strong relationship between the population density of an area and the likelihood of economically viable duplication of infrastructure (and therefore of viable infrastructure-based competition) in that area. Population density is likely to be a central determinant of the economic viability and likelihood of infrastructure duplication in an area.

This relationship between population density and economic viability of duplicate infrastructure arises because both cost-side factors and demand-side factors are in part determined by the population density. Costs of supply in geographically large areas are significantly higher than in geographically more compact areas. More towers and associated architecture must be built to serve larger areas, and significantly greater lengths of expensive backhaul infrastructure are required, among a range of costs that increase substantially with geographical dispersion. Similarly, the demand-side element of this conclusion flows from the geographic dispersion of the population in these regions. For any given geographic footprint, the remote areas have significantly fewer potential customers than more urban areas, meaning that the potential customer revenues required to pay for infrastructure costs are significantly lower.

This relationship means that there is likely to be a spectrum of economic viability of infrastructure-based competition in different areas of Australia, where this spectrum of viability has a strong relationship with the population density of the respective areas.

Specifically, economic viability is likely to span across the following range of results, in order of increasing economic viability of duplication of infrastructure:

- **No operators viable:** the areas where the reasonably foreseeable demand is so low and the costs of serving the area so high (in both cases, because the population density is extremely low) that not even a single local monopoly supplier would be economically viable and profitable. In consequence, these are the areas where subsidies are likely needed to entice even one infrastructure-based operator to enter profitably. These areas are consistent with being natural monopoly areas – duplicating infrastructure in these areas would result in higher costs of supplying the foreseeable demand. This can be seen in the existence and stated rationale for the Australian Government’s Mobile Black Spots Programme and similar programs, which essentially provide subsidies for the construction of mobile telecommunications infrastructure to previously unserved parts of the country in order to ensure that at least one mobile provider exists in those regions to serve its users.⁸
- **Natural monopoly areas:** the areas where the reasonably foreseeable demand is sufficient to enable one infrastructure-based operator to be economically viable, but not a second operator. In consequence, these are the areas where profitable entry by one operator would be likely, but entry by a second operator would be highly unlikely. These areas are consistent with being natural monopoly areas – duplicating infrastructure in these areas would result in higher costs of supplying the foreseeable demand.
- **Not natural monopoly but likely non-contestable:** the areas where a second infrastructure-based operator may be viable to operate, once that operator has reached sufficient scale and market share, but where competitive entry is nevertheless unlikely or will be limited. These areas are not technically natural monopoly areas, because a second operator would be feasible, *once it has reached a certain scale* or market share. However, the highly significant fixed sunk costs associated with infrastructure-based investment, combined with the time-horizon and uncertainty of reaching a minimum viable market share, mean that entry is likely to be deterred, even if it might be economically viable in the longer term.
- **Not natural monopoly, competitive entry is feasible and likely:** the most densely-populated areas of Australia, including the urban areas. These are the areas where the interrelationship between costs and demand mean that competitive co-existence of multiple MNOs is economically viable and feasible. There are still likely to be certain, limited and well-defined natural monopoly elements in the supply chain, but not a natural monopoly over supply more generally.

I reach these conclusions based on the economic concepts of natural monopoly as they apply to mobile telecommunications in Australia generally and to the detailed cost and demand estimates for the Representative Areas in the Economic Model more specifically. Based on my examination and analysis of the Economic Model, and in the time available, I

⁸ See Australian Competition & Consumer Commission (2016), *Domestic mobile roaming declaration inquiry: Discussion Paper*, October 2016, at pp. 16-17.

have not had sufficient information or time to delineate the precise boundary of the population density beneath which natural monopoly in the supply of mobile telecommunications is likely to occur.⁹

Based on my examination I conclude that the natural monopoly areas (including those areas where no single operators are economically viable) are likely to extend, at a minimum, to those areas with a population density equal to or less than that of the Kalgoorlie-Boulder SA2 area.

3.3 Are the natural monopoly areas contestable in the absence of regulation?

It is my opinion that the natural monopoly areas are not contestable in the absence of regulation. On the information I have, I conclude that these areas are only capable of sustaining one infrastructure-based service provider having essentially the entirety of user demand in those areas, and may need subsidies to sustain even one infrastructure-based supplier. The results of the analysis above lead me to conclude (as already discussed) that these areas are natural monopolies that are not likely to be capable of sustaining two or more sets of mobile telecommunications infrastructure.

Moreover, there are also likely to be areas which are in theory contestable but in reality are unlikely to see material infrastructure-based entry. These areas cannot strictly be characterized as natural monopolies, as a second entrant might be economically viable on a costs basis; however, entry would only occur if the entrant could capture sufficient market share sufficiently quickly after infrastructure-based entry. This means that, in these areas, competitive infrastructure-based entry is likely to be absent or limited by barriers to entry arising from large fixed and sunk costs and uncertainties of future market shares, despite the theoretical possibility of economic viability. In these areas, for an entrant to contest these areas effectively, it would need to build a new set of infrastructure capable of meeting the entire footprint currently served by the incumbent – this would require incurring significant capital costs, large proportions of which are sunk. The entrant would *then also* need to capture the great majority of the users currently served by the incumbent in order to make the entrant's costly and risky infrastructure investments viable, which implies that the entrant would have to capture exceedingly unrealistic market share growth rates. The entrant would need to accomplish these two highly unlikely events *all the while* bearing significantly increased *ex ante* risks of entry due to it not knowing whether or not it would be able to

⁹ The national statistics relied upon in the Economic Model are the ABS's population and area statistics at the SA2 disaggregation. This analysis considers the economic viability of duplicating mobile telecommunications infrastructure covering a SA2 area based on the ABS's SA2 classifications. The analysis does not consider the viability by MNOs of providing coverage in sub-sections of these statistical area classifications. As a consequence, because of the different nature of the question being asked, there may be some superficial differences between the results in this Report and the national coverage statistics obtained for different purposes and using different methods.

capture the market, which means that that would have a significantly raised project-based cost of capital, with clear negative implications for NPV viability analysis. All of these factors combined make the likelihood of contestability even more unlikely in these areas. The confluence of events required for entry to be feasible is highly unlikely in the typical case in relation to the question at issue. It is therefore my opinion that there exists a category of area which is not technically a natural monopoly but which is nonetheless not realistically contestable in the absence of regulation because of the unlikelihood of entry.

Finally, there are likely to be areas where competitive infrastructure-based entry is feasible but is likely to be limited, by the interaction of costs and demand, to entry by one other MNO. As a consequence, these are areas which are likely to be served by infrastructure-based duopolies and entry by a third infrastructure-based MNO is unlikely. These areas similarly cannot be characterized as natural monopolies, but are unlikely to support a third (or more) MNOs with economic viability. I have not been asked to examine and provide an opinion on the prospects for anti-competitive strategic behavior such as tacit coordination in the case of industries where supply is structurally limited to two suppliers. However, based on my substantial experience of the grounding principles and application of competition and regulatory analysis and economics, it is my opinion that this issue merits further investigation.

3.4 What are the key implications for efficient investment in, and use of, regional mobile infrastructure?

There are likely to be areas of Australia where there is a regional natural monopoly in the supply of mobile telecommunications services. The key implications of a finding that there is a natural monopoly in respect of regional mobile infrastructure are that:

1. Duplication of mobile networks in the relevant areas is unlikely to be economically efficient, and
2. Competition between competing networks in those areas is highly unlikely to occur and will not be the economically efficient outcome in the long-term.

Moreover, there are likely to be areas which are not natural monopoly areas, but where the costs and risks of entry create such high barriers to entry that duplication of facilities by entry is nevertheless unlikely to occur. The key implications of this finding are that:

1. Duplication of mobile networks in the relevant areas is unlikely to occur in the short-term, and
2. Infrastructure-based competition is unlikely to emerge in the long-term without the temporary entry assistance afforded by mandated access to roaming.

The key implication of this in turn is that mandated access to roaming would likely encourage the efficient use of, and investment in, infrastructure in the natural monopoly areas and in the other non-contestable areas. In the natural monopoly areas, efficient use of the facilities would be encouraged by mandating the use of the facilities across the entire demand, in accordance with commonly accepted natural monopoly concepts. In the areas that are not natural monopolies but are not in practice contestable absent regulation, mandated access would encourage the efficient use of facilities in the short-term before infrastructure-based

competition is viable, and would encourage the efficient investment in infrastructure in the long-term by facilitating the investment in competing infrastructure in the long-term. Efficient incentives on the access provider can be maintained through appropriate wholesale access pricing, and other targeted measures such as focused access holidays for certain new facilities, in the hands of an experienced regulator taking into account the appropriate incentives considerations. These implications are analyzed in greater detail in Section 5 below.

Section 4

Spillover effects

This section provides my opinion on:

- If a natural monopoly exists in areas of regional Australia, what impact this natural monopoly has on the supply of mobile services in Australia outside the natural monopoly areas;
- What the nature of this impact is and the causal mechanism by which that impact arises; and
- What the long-term welfare implications for end-users of these spillover effects are.

4.1 If a natural monopoly exists in areas of regional Australia, what impact (if any) does this natural monopoly have on the supply of mobile services in Australia outside the natural monopoly areas?

4.1.1 National coverage as bundles of regional coverage in different areas

The salient feature of the current mobile telecommunications market is that some consumers value regional coverage abilities significantly, but that not all networks can provide the same regional coverage abilities to consumers. This asymmetry in regional coverage ability is likely to be permanently entrenched due to the natural monopoly features discussed in the previous Section 3.

The ACCC recognizes the high degree of importance of regional coverage abilities to some consumers when it writes that “the geographic coverage or a network will be particularly important to consumers who live in areas where coverage may be more limited, or to consumers who travel frequently”.¹⁰ The ACCC also recognizes that all other MNOs are unable to match Telstra’s coverage, when it writes that “Telstra’s mobile network covers a considerably larger area than Optus’ or VHA’s mobile networks, such that for over 1 million km² Telstra is the only MNO with mobile coverage”.¹¹ Moreover, this situation will likely remain entrenched for the foreseeable future – the previous Section 3 of this Report demonstrates that it will be uneconomic for MNOs other than Telstra to invest in

¹⁰ Australian Competition & Consumer Commission (2016), *Domestic mobile roaming declaration inquiry: Discussion Paper*, October 2016, at p.13.

¹¹ Op cit, at p.14.

infrastructure to match Telstra's coverage areas in large areas of Australia with the lowest population densities.

The broad picture is therefore one where a single MNO, Telstra, can offer mobile telephony in essentially all locations in which consumers might potentially wish to access services. In contrast, the other MNOs are, absent roaming, only able to offer these services in a subset of those locations, but not in the natural monopoly or otherwise non-contestable locations.

4.1.2 Regional natural monopoly is likely to spill over into a softening of competition in contestable areas

The nature of consumer demand for mobile telecommunications services means that there will likely be spillover effects from the natural monopoly areas into other, potentially contestable areas.

These spillover effects are likely to include the softening of competition in potentially contestable areas, in particular the softening of price competition, including in regional centers and in urban areas. The following section outlines the likely mechanism by which this takes place.

4.2 What is the nature of that impact and the causal mechanism by which that impact arises?

The asymmetry in regional coverage abilities, entrenched by regional natural monopoly, is likely to lead to a softening of competition by two causal mechanisms.

First, it will lead to a softening of competition for consumers located primarily in the natural monopoly and non-contestable locations, as those consumers only have one service provider to choose from in their primary location. This is the well-understood mechanism by which monopoly leads to restrictions in output and increases in price relative to a more competitive counterfactual, leading to a decrease in consumer welfare.¹²

Second, and perhaps even more importantly, it will lead to a softening of competition in the *other*, potentially competitive and contestable locations. These are the spillover effects into other markets of relevance to this section. This second mechanism, which I will call the "**horizontal bundling effect**", is the transmission of a lack of competition in the natural monopoly areas into other, potentially contestable, adjacent areas, and to some extent even into the highly dense urban areas.

4.2.1 Horizontal Bundling or Tying as a mechanism that softens competition

This mechanism of anti-competitive bundling / tying is well-grounded and generally accepted in the academic economic literature and has influenced legal precedent and scholarship.

¹² See Tirole, J. (1988), *The Theory of Industrial Organization*, MIT Press, among others.

“Bundling” is the practice of selling two or more products in a single package¹³ – in this case, the ability to receive service in two or more locations as part of a single service.

Horizontal bundling is a different (although related) effect to *vertical* bundling/unbundling in telecommunications. The competition benefits of *vertical* unbundling, i.e. the ability for the technical and economic unbundling of different elements of the vertical production chain to open up some elements of the chain to competition in the interests of consumers, are long- and well-known to competition regulators. The *horizontal* bundling effect in this case is a different but related concept: it is the horizontal bundling (or tying) of different products (in this case coverage locations) into one bundle containing both potentially competitive elements and monopoly elements. The concept and potentially anti-competitive consequences (the leveraging of market power) of such horizontal bundling or tying are well understood in competition economics and law.

The economic literature supports the conclusion that bundling can have different effects, including anti-competitive effects. Bundling can, in some circumstances have a pro-competitive effect, including where it can have the arguably pro-competitive effect of enabling providers to sort between different customer groups and to price discriminate between them.¹⁴ However, horizontal bundling can enable an operator to leverage market power from one market (A) into another market (B) by a process of inducing exit from or deterring entry or expansion into (or more generally, deterring more aggressive competition in) the market B. As a consequence, competition is softened in the potentially competitive markets.

There are a range of different economic models that support this notion capturing a range of slightly different mechanisms.¹⁵ Tying and bundling as anti-competitive mechanisms in different fact scenarios have also been recognized in legal precedent in the United States and elsewhere.¹⁶ However, by all of these mechanisms, the essential mechanism is that the competitive process is either softened or entirely extinguished in the potentially competitive

¹³ Belleflamme, P., and M. Peitz (2010), *Industrial Organization: Markets and Strategies*, Cambridge University Press, Chapter 11 and p. 417.

¹⁴ *Ibid.*

¹⁵ See Whinston, M.D. (1990), “Tying, Foreclosure, and Exclusion”, *American Economic Review*, 80:837-859; J.P. Choi and C.Stefanidis (2001), “Tying, Investment, and the Dynamic Leverage Theory”, *Rand Journal of Economics*, 32; B. Nalebuff (2004), “Bundling As An Entry Barrier”, *The Quarterly Journal of Economics*, 119(1); B. Nalebuff (2005), “Exclusionary Bundling”, *Antitrust Bulletin* 50(3); D.W. Carlton and M. Waldman (2002), “The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries”, *Rand Journal of Economics*, 33.

¹⁶ See e.g. *Eastman Kodak Co. v. Image Technical Services Inc.*, 504 U.S. 451 (1992); Case T-30/89 *Hilti AG v Commission* [1990] ECR II-163, [1992] 4 CMLR 16; Case T-201/04 *Microsoft Corporation v Commission* ECR II-3601, [2007] 5 CMLR 846.

market B, through the process of bundling of B with the monopoly product A. The result is a classic example of what is more broadly known as “leveraging of market power”.

4.2.2 Horizontal Bundling of mobile supply across natural monopoly and contestable areas

This horizontal bundling effect will likely to lead to softer competition and higher prices even in those areas where there is currently more than one MNO operating, including the urban areas. In my opinion, the “price premium” that Telstra is able to command relative to other MNOs is likely to be caused at least in part by this horizontal bundling effect. Moreover, in the long term, this horizontal bundling effect has the potential to deter or eliminate competitive entry or expansion in those adjacent markets, with further negative consequences to the long-term welfare of end users.

This horizontal bundling effect operates as follows. Not all mobile consumers are interested in regional coverage – some care only about coverage (and price, etc.) in their primary location. But for other consumers, regional coverage is highly important – this includes those consumers who travel frequently (as the ACCC recognizes). Because network coverage differs among locations, those inter-regional consumers must effectively choose a “bundle” of products consisting of coverage ability in different geographic locations. At the time they choose a mobile telecommunications service provider, they will seek to choose (among other things) a provider who can provide coverage services in the locations that matter to those consumers, rather than a provider who can only serve a subset of those locations. If only one provider serves all those areas, then the consumer can only effectively choose from among one bundle for her entire coverage.

For instance, a consumer might live in regional center A, frequently visit clients in the small remote towns B, and regularly visit friends in large city C. In line with the general observation that the density of providers decreases with the density of population, and that 20% or more of the least-densely populated population lives in areas that are unlikely to be able to sustain two or more operators, then it is likely that this consumer will have the most provider choice in large city C, and a choice of only one provider to provide coverage in the small remote towns B. For a life-long urbanite this may not matter – but for this consumer, it does. This consumer’s ability to receive coverage in the small remote towns B is sufficiently important to them (e.g. because they regularly must visit clients there), meaning that they will realistically only choose among those providers who can provide coverage in all of A, B, and C. Due to the nature of regional Australian coverage, they will only have a choice of one provider for their entire service package – importantly, not only for B, but for potentially highly competitive city C and moderately competitive regional center A.

As a consequence and through this horizontal bundling effect, the competition for *this* consumer’s custom across *all* locations is substantially softened, not just in remote town A, but *also* in the city C and regional center A. This has the anti-competitive consequence that the consumer will effectively pay more for her service in city C and regional center A in addition to paying more in the non-contestable remote area B (absent regulation).

When taken across consumers as a whole, the horizontal bundling effect is a mechanism for the leveraging of market power and softening of competition by the incumbent operator from

the natural monopoly areas into the potentially competitive areas. This horizontal bundling effect is likely to occur in regional and urban mobile telecommunications because of the combination of:

- 1) the existence of both natural monopoly areas and potentially competitive areas, areas which in the absence of roaming are not directly substitutable from an end user's perspective, and
- 2) the existence of substantial groups of consumers who require coverage in different areas, some of which are not competitive.

It is furthermore likely that this horizontal bundling effect will soften competition and raise prices in regional and also urban centers compared to the situation absent the bundling effect.

The potential for this phenomenon appears to be implicitly recognized by the ACCC in its discussion of the population centers in rural areas arguably constituting "islands", with consumers traveling between these "islands" but still requiring coverage as they do so.¹⁷ Further support for the significant differences between urban areas, regional centers, and remote areas in the concentrations of market shares of the MNOs can be seen in the following chart:

[C-I-C]

This chart demonstrates the extent to which Telstra is far more likely than the other MNOs to be able to provide network coverage in the remote and regional areas where Telstra has the dominant market share by network. This means that consumers requiring remote and regional coverage are much more likely to require a bundle offered by Telstra and far less likely to have their requirements met by a bundle offered by another MNO.

These market shares underscore the likelihood of a horizontal bundling effect taking place that softens competition and raises prices in potentially and actually competitive areas. An important consequence of this horizontal bundling effect is that the transmission mechanism is likely to consist, at least in part, of a transmission of higher prices in remote local natural monopolies into higher prices in regional centers and cities.

Moreover, the existence of a uniform national price may *exacerbate* this anti-competitive transmission mechanism of higher prices from remote to urban areas. It may be argued in other circumstances that uniform national pricing can transmit competitive pricing from urban to remote areas. However, in this instance, it is more likely that a uniform national price will transmit non-competitive pricing from natural monopoly areas into potentially competitive areas – this is the anti-competitive "leveraging of market power" consequence of this bundling effect. The horizontal bundling mechanism, with its accepted foundations in the

¹⁷ See Australian Competition & Consumer Commission (2016), *Domestic mobile roaming declaration inquiry: Discussion Paper*, October 2016, at p. 25.

economic literature and acceptance in legal precedent, would suggest that the transmission mechanism is most likely to be from remote natural monopolies into competitive markets, with the consequence of higher prices in competitive markets.

In my opinion, the likelihood of this effect taking place implies that some, or all, of Telstra's "price premium" may in fact be attributable to a softening of competition for Telstra's product through a horizontal bundling effect. There are substantial consumer groups who require regional coverage in a mixture of contestable areas and natural monopoly areas. For these consumer groups, the bundle of different regional coverage that Telstra can offer is essentially the only offering they can choose – Telstra therefore has a high degree of market power over these consumers, even if their primary location is in an urban area. These consumers, through the horizontal bundling mechanism and a uniform national price, are the transmission mechanism for higher-than-competitive prices from natural monopoly areas into potentially competitive areas.

4.3 What are the long-term welfare implications for end users?

The spillover effects of the regional natural monopoly likely decrease competition and increase prices. Furthermore, it may potentially deter competitive entry in adjacent markets, in particular in potentially competitive regional centers, and likely also in urban areas. In accordance with generally accepted principles of consumer surplus and economic welfare analysis, the consequence of these spillover effects is to decrease the long-term welfare of end users.¹⁸ An enhancement of competition in the natural monopoly areas would therefore also likely enhance competition in the competitive areas by expanding the choice of coverage by end-users into the natural monopoly areas and thereby eliminating this anti-competitive transmission mechanism.

¹⁸

See Mas-Colell, A., M.D. Whinston, and J.R. Green (1995), *Microeconomic Theory*, Oxford University Press; Tirole, J. (1988), *The Theory of Industrial Organization*, MIT Press.

Section 5

Impact of declaration

This section provides my opinion on:

- The likely impact of mandated supply of mobile roaming services in areas of regional Australia with less than three mobile networks on the efficient investment in infrastructure and the efficient use of infrastructure; and
- To the extent that any detriments arise, whether these detriments can be mitigated by appropriate wholesale pricing or delaying the mandated wholesale supply of upgrades or new sites.

5.1 Assuming the supply of mobile roaming services is mandated in areas of regional Australia with less than three mobile networks, what impact is such mandated supply likely to have on efficient investment in, and use of, mobile network infrastructure?

In my opinion the mandated supply of mobile roaming services in areas of regional Australia with less than three mobile networks is likely to encourage the efficient investment in, and use of, mobile network infrastructure in those areas.¹⁹ This section outlines the reasons for my opinion.

Section 3 of this Report concluded that there is likely to be a strong relationship between the population density of an area and the number of competing infrastructure-based MNOs that are economically viable in that area. Specifically, there are areas with each of the following features:

- No operator is viable: subsidies are required even for one MNO to enter the area.
- Viable natural monopoly: one MNO is viable, but entry by a second MNO is highly unlikely and would not be economically efficient.
- Not natural monopoly but likely non-contestable: this is not a natural monopoly because demand is in theory sufficient for a second MNO but entry is unlikely in reality. A second MNO may be viable *ex post* once it has captured sufficient market share, but entry with duplication of facilities is *ex ante* unlikely to be privately profitable and therefore unlikely to occur *ex ante*, given that the risks and

¹⁹ Cambini, C., & Jiang, Y. (2009), "Broadband investment and regulation: A literature review", *Telecommunications Policy*, 33(10), 559-574.

uncertainties of entry and time frame required to capture sufficient market share will likely be a highly significant barrier to entry.

- Competitive entry is viable and feasible: demand is sufficient to support multiple MNOs and to make the risks of entry plausibly realistic and therefore likely.

This Section of the Report focuses on the first three of the above types of areas of regional Australia, i.e. those areas where entry is not feasible because of natural monopoly, and those areas where infrastructure-based entry is theoretically feasible but practically highly unlikely because of the entry barriers.

5.2 Would mandated roaming encourage efficient use of infrastructure?

Mandated roaming would likely encourage the efficient use of the existing infrastructure. An important policy rationale of mandated access to facilities which are unlikely to be duplicated (such as natural monopoly facilities) is that this can promote service-based competition in the short run, thereby enhancing the economic welfare of end users. The principal mechanism in this is that the mandatory access promotes the efficient use of natural monopoly infrastructure by allowing the infrastructure to serve the entire demand base (through competition or otherwise), thereby promoting allocative and productive economic efficiency.

The areas in question are those areas where mobile telecommunications infrastructure is likely to constitute a natural monopoly and those areas where duplication of facilities is otherwise not feasible because of high entry barriers. This means that it is unlikely that the infrastructure will be duplicated. A widely accepted result in economics is that in situations of natural monopoly the most economically efficient result is for the set of natural monopoly infrastructure to be shared among all users, rather than to force or hope for the infrastructure to be duplicated.

The shared use of the infrastructure therefore leads to the most efficient use of that infrastructure from an economic perspective. The shared use of infrastructure means that the economies of scale (the central characteristic of the natural monopoly) in that infrastructure can be most efficiently and most fully exploited, leading to more efficient use of the infrastructure. When the access provider's network is under-utilized, and there is sufficient excess capacity available to serve additional traffic (which is likely to be the case in the sparsely populated regions where a domestic mobile roaming could be declared) e.g. by way of roaming, the provision of roaming enables the access provider to explore economies of scale to a greater extent, which leads to more efficient use of its infrastructure.

The end result is greater static economic efficiency. The increased static (productive and allocative) efficiency due to the mandated access to natural monopoly facilities is broadly

accepted in the academic literature and is reflected in the ACCC discussion paper to the Inquiry.²⁰

5.3 Would mandated roaming encourage efficient investment in infrastructure?

Mandated roaming would also likely encourage the efficient investment in infrastructure. An important policy rationale for mandated access to facilities which are unlikely to be duplicated because of entry barriers is that mandatory access can foster facilities-based competition in the long-term, thereby further enhancing the long-term welfare of end users. The principal mechanism in this process is that mandatory access can promote efficient investment in natural monopoly infrastructure.

One important mechanism is that mandated access is likely to facilitate and encourage a movement over time towards sustainable facilities-based competition in areas where this is potentially feasible but faces significant barriers. The optimal development of, investment in, and upkeep of infrastructure over time is referred to as being “dynamically efficient”.²¹ For instance, the development of infrastructure towards facilities-based competition in telecommunications is understood by many regulators and economists to be a desirable and dynamically efficient means of achieving sustainable competition in the circumstances where this is feasible.²²

However, there are markets where facilities-based competition is highly unlikely to develop of its own accord without regulatory or other intervention.

As outlined in Sections 3.2 and 3.3 of the Report above, there are areas of Australia characterized by natural monopoly, meaning that it is unlikely (and arguably undesirable from the perspective of productive efficiency) that facilities-based competition should emerge; the most efficient outcomes are likely achieved by accepting that there will only be one set of infrastructure and mandating access to that infrastructure.

However, as outlined, there are also areas of Australia where infrastructure-based competition is in theory feasible, but is in practice unlikely to emerge on its own. In these areas, mandated access is likely to encourage the long-term emergence of infrastructure-based competition in a manner that benefits the long-term interests of end users. As outlined in Sections 3.2 and 3.3 above, these areas are likely to be areas which are not natural monopolies (because in theory demand can be efficiently spread across two MNOs),

²⁰ Australian Competition & Consumer Commission (2016), *Domestic mobile roaming declaration inquiry: Discussion Paper*, October 2016.

²¹ *Op cit*, pp 16-17.

²² Oldale, A., & Padilla, J. (2004), “From state monopoly to the “investment ladder”: competition policy and the NRF”, *The Pros and Cons of Antitrust in Deregulated Markets*, pp. 51-77.

but where such entry is nevertheless highly unlikely because of the insurmountable entry barriers created by the requirements to capture a large share of the market and the substantial *ex ante* uncertainty and risk that this creates.

A longer-term movement towards facilities-based competition can be assisted by some forms of temporary entry encouragement – this is the widely known “ladder of investment” concept. Mandated access regulation is commonly regarded in the economic literature as being an effective temporary entry measure which can encourage movements to longer-term sustainable facilities-based competition, with consequently strong pro-competitive prospects in the longer term. The mechanism is that the mandated access measure provides a “stepping stone” on the “ladder of investment” – the mandated access spurs market entry in a way that (1) increases competition in the shorter term, and (2) provides a “foot on the ladder” by way of entry-level market share, which in turn then enables future expansion of market share by way of infrastructure-based investment. By this mechanism, potential entrants are permitted to lease some network elements that are particularly difficult to replicate at the initial stages of competition, which in turn provides an impetus for them to invest in their own facilities some time later.²³

There are several specific mechanisms by which this broader process operates. Each of these mechanisms potentially encourages the efficient investment in infrastructure.

First, potential entrants face significant uncertainty and risk, which is a significant barrier to entry. Mandated access can mitigate this significant barrier to entry. Entrants typically face uncertainty regarding the state of demand or their own costs, which make the returns to their investments highly uncertain. Mandated access permits entrants to first enter a market based on services-based competition, which assists them to mitigate a significant proportion of their entry risk. This can thereby sharply reduce the barriers to entry and thereby encourage the efficient investment in infrastructure.²⁴

Second, if entrants are able to access an incumbent’s infrastructure (at appropriate wholesale access prices), this will enable entrants to develop their user base, e.g. by increasing consumer awareness of the new/differentiated services they offer. Moreover, this can also assist the access seeker to build its reputation, which can in turn expand potential demand by increasing consumers’ willingness to pay for the new entrant’s services.²⁵

²³ Cave, M., & Vogelsang, I. (2003), “How access pricing and entry interact”, *Telecommunications Policy*, 27(10), 717-727; Cave, M. (2006). “Encouraging infrastructure investment via the ladder of investment”, *Telecommunications Policy*, 30(3–4), 223–237; Bourreau, M., Doğan, P., & Manant, M. (2010), “A critical review of the “ladder of investment” approach”, *Telecommunications Policy*, 34(11), 683-696.

²⁴ Vareda, J. (2007), “Access Regulation under Asymmetric Information about Demand”, Working Paper.

²⁵ Bourreau, M., & J. Drouard, (2014), “Stepping stone or stonewall? Progressive entry and the incentives to invest in alternative infrastructures”, *Journal of Regulatory Economics*, 45(3).

Equipped with a customer base, a rival may then be ready to undertake further, much more significant infrastructure-based investments. This further reduces the barriers to entry and encourages the development of longer-term sustainable facilities-based competition and thereby encourages the efficient investment in infrastructure.

Third, a further barrier to entry may arise from the information asymmetry whereby an incumbent has superior knowledge of the market and its characteristics due to its accumulated experience in the market over the years. Without acquiring comparable experience, potential entrants might not find facilities-based entry viable. However, a phase of service-based competition can give them a chance to invest in experience before investing in their own physical infrastructure. Again, this reduces barriers to entry and thereby facilitates the longer term development of sustainable facilities-based competition and thereby encourages the efficient investment in infrastructure. It is a process by which intra-infrastructure competition would in the longer run lead to an inter-infrastructure competition.

For these reasons, mandated access is likely to encourage the efficient investment in infrastructure by lowering barriers to entry to potential entrants, increasing the scope for economically viable infrastructure investment in the relevant areas, thereby expanding the scope for the development of future facilities-based competition. In my opinion this process is likely to encourage the efficient investment in infrastructure in a way that is likely to encourage dynamic efficiency in mobile telecommunications in regional Australia.

The conclusions expressed above are reliant to a significant extent on a commensurate access price being determined. There is an extensive economic literature on the methods for determining efficient access prices that preserve the efficient incentives for access providers (and in the long-term the incentives for access seekers) to encourage the outcomes described above. I have not been asked to consider the specific mechanisms of setting access prices and therefore do not discuss this further. However, I state clearly that the opinion expressed in this section, namely that mandated access can encourage the efficient use of and investment in infrastructure, is reliant on an appropriate access pricing level and structure which preserves the desirable incentives (such as the incentives for the access provider to upgrade its network, upgrade extend its network, and invest in cost-saving technology, and for the access seeker to invest in its own infrastructure in the long term) being determined.

5.4 To the extent any detriments may arise, can they be mitigated by appropriate wholesale pricing and/or delaying the mandated wholesale supply of upgrades or new sites?

The conclusions expressed above rely significantly on a commensurate access price being determined. In the absence of an appropriate wholesale access pricing mechanism, detriments may arise. However, an appropriate wholesale access price can to a significant extent mitigate and countermand any potential detriments by preserving desirable and efficient investment incentives for the access provider; other measures such as targeted access holidays for upgrades or new sites can also potentially assist.

From a policy and economic efficiency perspective, the potential detriments are that mandatory access may give rise to a negative trade-off between static and dynamic efficiency. Specifically, while mandated access to mobile roaming services may stimulate competition in the short-run at the retail level, it may inefficiently reduce the access provider's incentives to invest in infrastructure, in particular in the period where facilities-based competition is not yet viable.²⁶ However, appropriate wholesale access pricing can mitigate a large proportion of this potentially detrimental effect.

First, an appropriate access price can preserve the access provider's incentives to invest in quality upgrades of its own infrastructure, upgrades which benefit both the access provider and the access seeker²⁷. In particular, when the access seeker is operating in a differentiated market or is more efficient, investment spillovers may have a positive effect on access provider's investment incentives.²⁸ The fact that rivals also benefit from the investment is therefore not in itself detrimental to the access provider's investment incentives; there is no detrimental "free-rider" effect in this sense.

Second, the declaration of mobile roaming infrastructure can enhance the access provider's incentives to engage in efficient cost reduction, in particular if access prices are set at appropriately low levels. An appropriate access price can incentivize the access provider to invest more in cost reduction in order to maintain a competitive advantage at the retail level.²⁹

Third, the declaration of mobile roaming infrastructure can maintain appropriate incentives for the access provider to invest in extending its network reach. It is important to note that access providers commonly have two incentives for new investment in infrastructure: a stand-alone incentive; and a pre-emption incentive. The stand-alone incentive arises from the expected increase in profits after investment – absent strategic effects, firms would choose investment timing by trading off earlier gains in profit against lower investment costs later on. The pre-emption incentive to invest is the advantage from being the first to invest. If being a leader is more profitable than being a follower, then each firm has the incentive to pre-empt the other firm's investment. It is likely that both incentives exist in relation to the

²⁶ Klumpp, T., & X. Su, (2010), "Open access and dynamic efficiency", *American Economic Journal: Microeconomics*, 2(2), 64-96.

²⁷ De Bijl, P. W., & M. Peitz (2007), "Unbundling the local loop: One-way access and imperfect competition, in J. Haucap, & R. Dewenter (Eds.), *Access Pricing: Theory and Practice* (pp. 91–117). Amsterdam: Elsevier.

²⁸ Kotakorpi, K. (2006), "Access price regulation, investment and entry in telecommunications", *Journal of Industrial Organization*, 24(5), 1013–1020; Foros, Ø. (2004), "Strategic investments with spillovers, vertical integration and foreclosure in the broadband access market", *International Journal of Industrial Organization*, 22(1), 1–24.

²⁹ Vareda, J. (2007, "Unbundling and incumbent investment in quality upgrades and cost reduction", Portuguese Competition Authority.

supply of mobile telecommunications infrastructure in regional Australia. It is therefore my conclusion that incentives to invest in network extension can be maintained if access is mandated in the presence of an appropriate wholesale access price.

Beyond appropriate wholesale access, other measures may also assist in preserving efficient incentives on the access provider, in particular access holidays where these are appropriately narrowly targeted and time-limited. An “access holiday” is simply a period of time during which a new infrastructure facility would not be subject to any access regulation; during this time, the owners of the new facility would be free of mandated access and other regulation. Access holidays may be appropriate in circumstances where it is difficult to preserve the correct investment incentives on the access provider through the wholesale access price; they can potentially operate as tools to remove economically inefficient delays in infrastructure investment by the access providers that would otherwise occur as a result of the regulatory truncation of profits problem.³⁰ They do this by enabling the regulatory authority to overcome an inability to commit to *ex post* access prices, which prevents a hold-up problem and enables the socially-desirable investment to proceed. It is important to note that the limited purpose of access holidays is to preserve the access provider’s *forward-looking* investment incentives, which means that their application should be limited to certain upgrades and new sites at a maximum; they are not generally appropriate for already existing infrastructure.

In conclusion, potential detriments can be accounted for and off-set by appropriate wholesale access pricing and wholesale arrangements.

There is an extensive economic literature on the methods for determining efficient access prices that preserve the efficient incentives for access providers (and access seekers, in particular in relation to their incentives to invest in infrastructure after they have entered the market) to encourage the outcomes described above.³¹ I have not been asked to consider the specific mechanisms of setting access prices and therefore do not discuss this further. I state clearly that the opinion expressed in this section, namely that mandated access can encourage the efficient use of and investment in infrastructure, is reliant on an appropriate

³⁰ See Sidak, J. G., & D.F. Spulber (1997), *Deregulatory takings and the regulatory contract: the competitive transformation of network industries in the United States*, Cambridge University Press; J. Gans & S. King (2002), “Access holidays and the timing of infrastructure investment”, Melbourne Business School Working Paper No.2002-14.

³¹ See for instance Laffont, J., & J. Tirole, (2000), *Competition in telecommunications*, The MIT Press; Armstrong, M. (2002), “The Theory of Access Pricing and Interconnection”, in M. Cave, S. Majumdar, and I. Vogelsang (eds.), *Handbook of Telecommunications Economics*, Amsterdam, pp. 295-384; Jorde, T., Sidak, G., & Teece, D. (2000), “Innovation, investment and unbundling”, *Yale Journal on Regulation*, 17(1), 1–37; Pindyck, R. (2007), “Mandatory unbundling and irreversible investment in telecom networks”, *Review of Network Economics*, 6(3), 274–298. Camacho, F.T., & Menezes, F.M. (2009), “Access pricing and investment: a real options approach”, *Journal of Regulatory Economics*, 36(2), 107–126.

access pricing level and structure which preserves the desirable incentives (such as the incentives for the access provider to upgrade its network, upgrade extend its network, and invest in cost-saving technology) being determined. An experienced telecommunications regulator will commonly be in a strong position to understand the various considerations relevant to setting an access price that preserves the desirable incentives on access providers and access seekers that result in efficient and desirable outcomes in the long-term interests of end-users.

Annex A

Copy of the Instructions and complete
list of accompanying materials
provided

Annex B

Curriculum Vitae of Derek Ritzmann

Annex C

List of scientific, professional, and other references consulted

- Armstrong, M. (2002), “The Theory of Access Pricing and Interconnection”, in M. Cave, S. Majumdar, and I. Vogelsang (eds.), *Handbook of Telecommunications Economics*, Amsterdam, pp. 295-384.
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Annex D

Presentation prepared by VHA for presentation to the ACCC in March 2016 and the Economic Model.