Regulating for Efficient and Competitive Utilities

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Introduction

Ladies and Gentlemen.

First up, I would like to welcome you to all to this regulation and competition conference organised by the Australian Competition and Consumer Commission.

I would like to claim that the conference offers exposure to thinkers, from both here and abroad, on the subject of regulation and competition law. These fellows will give you expert thinking on theory, and the practice in a number of jurisdictions.

Of course, it is invidious to pick individuals out from the pack, but it is only fair that I mention our guests from overseas.

Professor Frank Wolak from Stanford University, Professor Sanford Ber, Director Public Utility Research Centre, University of Florida; Dr Bill Tye from the Brattle Group in Boston; Dr Jonathan Levy of the Federal Communications Commission, Washington DC; and Dr Bob Cotterill, of the Civil Aviation Authority in the United Kingdom – you are very welcome.

Ladies and Gentlemen.

In the 1980s there was an accumulation of evidence of inadequate performance in the utility areas, including those now regulated or monitored by the Commission — telecommunications, electricity, gas and various transport components. This inadequacy took the forms of excessive costs and prices, poor service; poorly-structured prices and inefficient investment decisions.

As these industries provide vital inputs to all sectors, Australia's productivity performance was directly and indirectly lessened, and was placed at a considerable disadvantage in competing against imports and in export markets.

The accumulating evidence of inadequate performance was the catalyst for radical change away from statutory monopoly, public service operation, and full government ownership.

The approach to utility reform management that emerged in Australia drew from experiences in other countries, particularly New Zealand, the United States and the United Kingdom.

New Zealand's systematic "state owned enterprise reforms" beginning in the mid-1980s were influential in the early stages of Australia's "microeconomic reform program", including corporatisation and greater exposure to competition in some industries.

The reforms became more formal under the Council of Australian Governments (COAG) process, including the National Competition Policy reforms of the mid-1990s.

The establishment of an independent regulatory structure focussed on efficiency and competition, was another central part of the reform process. The Commission now plays an important role in that regulatory process.

When the current regulatory structure was established it was envisaged that it would be subject to review after several years of operation, and accordingly the Government began the review process in 2000. The Productivity Commission has now completed inquiries into telecommunications, the national access regime, airports and the Prices Surveillance Act, and is currently undertaking reviews of harbour towage and radiocommunications. A COAG Energy Review is also under way. The Government is now working its way through determining its position on the Productivity Commission's recommendations.

In today's presentation I will focus on three main areas.

First, I will review the fundamental economics of utility industries and the importance of understanding how small numbers of industry participants interact with each other. These considerations strongly suggest that the market cannot be left to its own devices in the utility context.

Secondly, I consider the key issues raised by the reviews and explain the role played by the Commission in the review process, through submissions, cooperation with the Productivity Commission and liaison with Government. In particular I want to highlight the reasons why I believe it is important to Australia's economic future to retain a strong regulatory structure focussed on efficient and competitive processes.

Thirdly, I will talk a little about the processes of successful reform and the challenges of restructuring industries in a federation. In particular, I will consider the problems that have arisen in forming the national electricity market (NEM).

Physical Characteristics and Market Behaviour

To place the reviews and structural issues in context, it is necessary to consider the characteristics of utility industries; particularly the role of competition in achieving enhanced outcomes. This requires focussing on the underlying natural monopoly characteristics of these industries and the economics of interactions between firms where there are only small numbers of participants.

Natural Monopoly Characteristics

Natural monopoly stems from the underlying physical characteristics of utility industries, and, indeed, are their defining features. The underlying high capital intensity, high degrees of commonality of production facilities and great reliance on distribution and other networks manifest themselves as economies of scale, economies of scope and network economies.

Put simply, natural monopoly in the single-product case occurs where a given quantity of a particular good can be produced at a lower cost by one producer than if the quantity were produced by more than one producer. Traditionally this was thought of in terms of "economies of scale" —

decreasing long-run average costs as output increases. However, it is now recognised that natural monopoly can occur without economies of scale.

"Sub-additivity" of the cost function is the crucial concept. Global sub-additivity requires that every conceivable way of dividing the output among two or more producers must lead to a higher total cost than if the output were produced by the single firm. So single-product natural monopoly may be associated with decreasing long-run average cost, but it can also occur with long-run average cost rising. In the first case it is known as "strong natural monopoly" as compared with "weak natural monopoly" where long-run average cost is rising.

For example, in telecommunications the Commission's cost modelling suggests very high economies of scale in the basic network. Holding everything else equal, the public switched telephone network or "PSTN" can produce an additional 10 per cent of output (measured in minutes) while only increasing total cost by less than one per cent. This is particularly strong natural monopoly.

In the case of producing some bundle of two or more goods, the traditional concept of natural monopoly has been that of "economies of scope" — the bundle of outputs can be produced at a lower cost by a single producer than by two or more producers.[1] Intuitively, these economies arise through the sharing of facilities used in producing the different goods.

Again the basic fixed-line network in telecommunications provides an interesting example, where the PSTN shares many costs with the ISDN,[2] DSL,[3]and other services. This results in economies of integrated production as against stand-alone production.[4]

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[1] See S. Berg and J. Tschirhart, *Natural Monopoly Regulation Principles and Practice*, Cambridge University Press, 1988, pp. 34-44, for a detailed treatment of multi-product natural monopoly.

[2] ISDN — integrated services digital network.

[3] DSL — digital subscriber line.

[4] *Technical note*: Economies of scope and multi-product sub-additivity are not exactly the same thing. Economies of scope and declining average incremental cost for each service are sufficient for sub-additivity. However, while economies of scope are necessary for sub-additivity, declining average incremental cost is not.

Another distinguishing feature of utilities giving rise to natural monopoly is the existence of networks. Utility operations involve one or more of the following three types of network:

First, there are *distribution networks* for the retail or downstream distribution of the product to final consumers. Typical examples are the customer access network or "CAN" in telecommunications, the system of wires in the local reticulation of electricity; and the postal distribution network.

Second there are *collection networks*; such as those for the removal of waste water and sewage; garbage collection and the gathering of recyclable materials.

Third there are long-distance *transmission networks*, most notably the electricity grid, gas pipelines, water, telecommunications and posts.

Production processes in utility industries may also be characterised by "lumpy" and sunk investments. An investment is lumpy if capacity can only be added economically in large increments. It is sunk if it cannot readily be converted to another use. The combination of these characteristics can deter entry and constitute a source of market power to an incumbent.

Australia's relatively small markets and dispersed population mean that natural monopoly characteristics are present in most physical distribution networks. While technological change is breaking them down in significant parts of some markets (such as in downstream telecommunications), in others (such as power distribution and long-distance transport networks) they are likely to persist more or less indefinitely under known technologies.

The Consequences of Natural Monopoly for Government Policy

The presence of natural monopoly characteristics and network externalities in utility industries means that their free operation will not result in socially-agreeable outcomes and therefore there are strong *prima facie* grounds for government intervention to achieve enhanced outcomes.

It must be said at the outset that those formulating government policy face a substantial dilemma. On the one hand, because of natural monopoly a function or group of functions can be carried out at a lower overall cost by a single producer than by more than one producer. On the other hand, the

realisation of these economies runs the danger of allowing the exploitation of monopoly power and the failure to realise various other benefits from more competitive arrangements such as driving down prices and costs, encouraging innovation, etc.

The existing regulatory regime tries to capture the best of both these worlds.

Fortunately, not all production components in utilities exhibit strong natural monopoly characteristics, and an important part of the regulatory design process is to identify those parts which are "essential" or "bottleneck" facilities, as distinct from more naturally competitive production components where two or more firms can produce at minimum costs.

An essential facility has two important characteristics:

First, it is an element of a production process that can be reproduced only at very high cost.

Secondly, without the essential facility, a service (or alternative services) cannot be produced by a rival at comparable cost to the incumbent. Therefore it is a production component to which access by rivals is essential for the development of competition.

Local distribution networks (for example in gas, electricity, water, posts and telecommunications) provide most examples, but the bottleneck may also be created through control of patents or rights-of-way by the incumbent producer.

On this basis, competition is seldom introduced by the complete removal of statutory monopoly in one fell-swoop and without the complementary regulatory and organisational changes.
Suggested approaches to this difficult balance differ.

For example, in telecommunications the PSTN has strong natural monopoly characteristics, while downstream markets providing call and other services are more naturally competitive, *provided* firms operating in these markets have regulated access to the PSTN.

In the next session, Dr William Tye of the Brattle Group will share with us his broad experience across industries and countries of how to design efficient access arrangements. He will be

focussing particularly on ideas of "competitive neutrality". Accordingly I will not pursue this aspect here.

From a practical perspective, the distinction between parts of utilities that are highly naturally monopolistic ("essential facilities") and those that are more competitive, is crucial to designing appropriate organisational and regulatory structures for utility industries.

I will return later to the view that the regulatory challenge is partly transitional, but also seems to have a degree of permanency. I believe that many observers have understated the strength of some natural monopoly characteristics, and therefore, have placed insufficient weight on the strength of the case for government intervention.

Oligopolistic Interactions

Once it has been decided what utility areas can be successfully opened to competition, we face the realisation that the number of industry participants in those areas is likely to be quite small. In assessing the effectiveness of the competition, it is necessary to consider how the small number of firms will interact with each other.

Markets with few suppliers have always presented an intellectual challenge to economists, and some of the world's best have lent their brilliance to enhancing our understanding of how oligopolistic firms interact with one-another.

I am sure that most of you have noticed the attention that has been given to the work of John Nash, following the recent book and movie, *A Beautiful Mind*. In the 1990s economists have taken a renewed interest in strategic behaviour or "game theory", and this was partly stimulated by the awarding of the Nobel Prize to Nash in 1994 for work he had done more than forty years earlier.

Where there are few suppliers, the outcomes depend on how these firms interact with each other.

At one extreme, if they collude successfully, the outcome will be no better than monopoly — and may even be worse if economies of scale, scope and networking have been destroyed.

At the other end of the spectrum, if they behave competitively, the outcome could be most agreeable.

Real world markets seem to be somewhere in between these extremes.

Nash's famous equilibrium was similar to a much earlier approach to oligopolistic interaction studied by Augustin Cournot in the mid-nineteenth century. Based on the assumption that duopolists assume that their rival will not react to their moves by changing output, Cournot determined that the outcome will be little better than monopoly or successful collusion. Given marginal cost is constant, Cournot's duopolists will produce a total of two-thirds of the competitive output; triopolists would produce three-quarters of the competitive amount, quadopolists four-fifths, etc. with the output converging eventually to the competitive level.

On the other hand, making the assumption of another nineteenth-century French economist, Joseph Bertrand, results in prices being competed down to costs. Bertrand postulated that each rival would hold its price constant and just shade the price of the other in the belief that this would deliver it the whole market. This assumption would always prove to be incorrect — but the players would never realise this — and price would be propelled down to marginal cost in cut-throat competition.

Heinrich von Stackelberg, a German economist of the first half of the twentieth century took a far more sophisticated approach than either Cournot or Bertrand. He extended this type of analysis in directions allowing for leaders and followers, including the genesis of the very interesting dominant firm model. I believe this approach is applicable in the markets for a number of important telecommunications services.

Also around the time of Nash's work was the exposition of the "prisoners dilemma" where decisions are made in isolation from others, but where the outcome of the decision is crucially dependent on what others do.[5] The deceptively simple prisoners dilemma framework is vitally important in understanding collusive behaviour, and how to combat it. Those colluding must have effective communication with each other for their arrangement to succeed. Taking away or

[5] J. von Neumann and O. Morgenstern, *The Theory of Games and Economic Behavior*, Princeton University Press, Princeton NJ, 1947.

reducing the ability to communicate leads to the inherent instability of collusive arrangements. This has obvious implications for the design of regulatory institutions.

The Reviews

While these are very difficult issues, in my view some of the treatment of them in the reviews is not completely satisfactory. Sometimes this appears to be a consequence of taking an unrealistically benign view of the motivation of industry participants.

Consider, for example, the Productivity Commission's inquiry into telecommunications competition.[6] While it found that "most theoretical and simulation findings suggests that duopoly pricing will tend to be nearly as inefficient as monopoly", it nonetheless flirted in the Draft Report with the idea of recommending that a duopoly was enough to rule out potential regulatory coverage. In the event it came out with recommendations for much tougher tests in all industries, but drew away from the view that duopoly is enough for effective competition.

However, in the case of airports, the Productivity Commission recommended abandonment of existing regulation for a "monitoring" arrangement in spite of finding that Australia's four most important airports have "a high degree of market power in domestic markets".[7]

In these and other cases the Commission was of the belief that the Productivity Commission had not made a strong enough case, arguing that the existing law and procedures for declaration and coverage are appropriate. Expressions of fear about declaration or coverage are often private interest concerns clad in public interest garb.

While the Commission exercises the utmost care in declaration and coverage, it must be kept in mind that declaration does not automatically entail doing anything, areas within services (such as local call resale in CBD areas) can be exempted and, of course, declaration can be revoked.

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[6] Productivity Commission, *Telecommunications Competition Regulation*, Report No. 16, 21 September 2001, p. 271

[7] Productivity Commission, *Price Regulation of Airport Services*, Report No. 19, 23 January 2002, p. 144.

The Reform Process / Structural Issues

Finally, I want to say a little about the role of structural issues and inter-governmental relations in the reform process.

Traditionally, utility operations were vertically-integrated in government-owned entities, often embedded in government departments. The process of corporatisation initially provided a focus on structural matters, and interest was heightened when competition began to be introduced. In the early 1990s the COAG process led into a major inquiry into National Competition Policy headed by tonight's after-dinner speaker, Fred Hilmer.

The NCP reforms emphasised the benefits of structural separation of entities providing access from those seeking it. Where the owner is vertically-integrated with potentially competitive activities in upstream or downstream markets, there is the possibility of a conflict of interest in providing access. In such circumstances, the potential to charge monopoly prices may be combined with an incentive to inhibit competitors' access to the facility, with clear anti-competitive effects.

Amendments to the *Trade Practices Act 1974* were introduced in 1995 to create an explicit "regime to facilitate third party access to the services of certain essential facilities of national significance". These arrangements are administered by the Commission.

Having been subject to previous restructuring, the telecommunications industry missed the boat on NCP reforms. Telstra remained vertically integrated, and, unlike carriers in other countries, was allowed to build its own broadband cable.

Debate has recently arisen with respect to possibilities of advancing accounting separation of Telstra's wholesale and retail activities, and with respect to the conflicts that could arise from Telstra's partial ownership of Foxtel. The Commission is watching and — where appropriate — engaging in this debate.

Even more complex is the debate about the governance arrangements covering Australia's electricity markets, prompted by COAG's Energy Markets Review. The debate is a response to

concerns that reforms in the industry are stalling and that the existing governance arrangements do not provide an effective mechanism for addressing the problems.

In the 1990s COAG agreements established the National Electricity Market (NEM) and set out a vision for the industry. The agreements aimed for a national electricity market, as far as possible, relying on market-driven outcomes. To help achieve this the COAG agreements committed state governments to remove legislated barriers to entry, undertake structural reform, and create customer choice of supplier. At the same time COAG recognised that not all markets can be competitive, so it established access regimes covering electricity transmission and distribution networks.

The benefits are showing with a trend to more efficient electricity pricing, improved service standards and substantial new investment in all parts of the energy market. Prices over the last year averaged around $30 per megawatt hour, compared with $50 before the reforms were introduced, a fall of around 40 per cent. Businesses have been the main beneficiaries. Investment in transmission is at historically high levels with over $3 billion planned or spent over a five-year period. Over the last year or so there have also been substantial investments in new generation capacity in South Australia, Victoria and Queensland.

Nevertheless there is still some way to go before the goals set by COAG in the 1990s are achieved:

- Customer choice of supplier is still not available to many energy customers;
- Some state government actions are blunting price signals in the market; and
- Further structural reforms are needed to realise the full competitive potential of the NEM.

More fundamentally, the existing arrangements do not provide an effective mechanism for addressing these issues and responding to other issues as they arise. Which takes us back to governance.

The governance debate has focused on regulatory institutions, and in particular the National Electricity Code Administrator (NECA) and the Commission. I am concerned that this focus distracts from the more fundamental issue, namely ensuring that there is an ongoing commitment by state governments to complete the reform program started in the 1990's.

The areas where progress has been slow or inadequate are mostly the responsibility of the states. The implications for the National Electricity Market are significant. For example, incomplete implementation of full retail contestability limits the potential for competition in retail markets, while inadequate horizontal separation of generation businesses limits the potential for competitive outcomes in the wholesale market for electricity.

Having said this, I also consider that reform to the regulatory institutions could be useful. The arrangements have been effective in implementing reforms so far, but with eight agencies involved in economic regulation of the NEM the arrangements diffuse responsibility for oversight of the NEM and for electricity regulation. They also make code change processes potentially complex and slow.

One of the options being canvassed by industry is a national energy regulator. This could be a new agency or it could come under the umbrella of the Commission. It could take on functions undertaken by NECA and potentially the roles undertaken by state regulators.

There are a number of advantages and disadvantages with this approach. Although appearing seductively simple, a national energy regulator may actually increase the costs of dealing with regulators, may increase the number of regulators and could result in greater regulatory fragmentation in the energy sector.

The real danger is that the regulatory arrangements could see a national body doing some of the energy regulatory work, the Commission undertaking competition laws and possibly state based regulators continuing with much of what they do now.

Furthermore, synergies in regulating across sectors (telecommunications, transport etc) would be lost.

More importantly, and as pointed out by the OECD[8], an industry-specific regulator would lack a competition focus. Competition regulators are well placed to understand the longer term potential

[8] OECD Committee on Competition Law and Policy, *Relationship between Regulators and Competition Authorities*, 1999.

for developing competitive markets and the potential for deregulation. By contrast an industry-specific regulator is likely to have a narrower focus on regulation and will be less well placed to recognise the trade-off between competition and regulation and where the appropriate balance lies.

This is not to say that the current arrangements cannot be improved. They can, but any changes need to be carefully considered by policy makers.

I note that Professor Wolak — who is speaking next — has titled his presentation, "Restructuring of Network Industries for Competition" and that his main focus is on the electricity industry. I am looking forward to hearing his views on this important issue.

Conclusions

It is not difficult to find critics of the reforms affecting the utility industries, but I don't think there are too many who would seriously want to go back to the days of highly-politicised government monopoly nor — apart from the incumbents — are there many who want to head too far towards deregulation.

While time travel is not presently possible, sometimes I wish that those who complain about current arrangements with respect to utility organisation and regulation could travel back in time to experience how utility performance was before the reforms began. I can assure you that all facets of performance are much better now, and that the utility industries are part-and-parcel of a much more productive economy than we had in the eighties.

Tomorrow, Dean Parham of the Productivity Commission will be speaking about Australia's productivity performance in the 1990s and will be exploring the relationship of the enhanced performance with underlying economic reform.

I can also attempt to paint a picture of how things would look if the current regulatory regime were to be substantially weakened. I am convinced that this is unlikely to be a pretty picture, featuring insufficient output and insufficient investment, and prices far in excess of current levels.

The reasons for intervening in the utility industries is that there is natural monopoly power that would lead to highly unsatisfactory outcomes in the absence of regulation.

Increasingly the Commission is devoting more time to understanding the structure of these industries and to applying the ideas of game theory to how small numbers of firms interact with each other — and with the regulator.

One of the crucial things we have learned is that the utility needs to be looked at as a grouping of inter-related production components, some of which are naturally monopolistic and others that are more "naturally competitive".

For efficiency and competition, the different areas need to be subject to different treatment. A key idea is that of an "essential facility", but we also need to understand cost structures and market integrations in the more competitive areas.

In general, the Commission is satisfied that its approaches to declaration and coverage and to access pricing balance the interests of suppliers and consumers and provide the right incentives for efficient industry development. It has adopted a watchful approach in an effort to ensure that regulation continues to secure the objectives required by the legislation.

This is not to say that further reforms are unnecessary, and the Commission will remain an active participant in the various debates surrounding the appropriate institutional and regulatory arrangements for Australia's vital utility industries.