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# Asset Valuation and the Fascination with Efficiency

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Readers of *Network* would be well aware of the central role that asset valuation typically plays in determination of regulated revenues and tariffs. In Australia much of the regulatory thinking on asset valuation was perhaps born of the Council of Australian Governments (COAG) agreements on industry reform and competition policy of the early 1990s'. By 1994 deprival value had been established as the preferred method for asset valuation of electricity networks, and broadly similar outcomes followed in COAG agreements on Water Resource Policy communicated in 1994, and in the National Third Party Access Code for Natural Gas Pipeline Systems in 1997.

With the preferred methodology and initial regulatory asset values established across many of Australia's regulated industry sectors some time ago, the debate on regulatory approach has moved to related issues of asset optimisation, capex efficiency mechanisms, and treatment of stranded assets. While these issues are of considerable importance, there may still be something to be learned in tracing the development of regulatory thinking on asset valuation, and the criteria in which various methods have been assessed. As such, this narrative may speak to broader issues of regulation and the objective standards in which regulatory decisions are made.

## **I. Industry Reform Initiatives of the 1990s'**

The Special Premiers Conference of October 1990 provides a notional starting point to trace the development of regulatory thinking on asset valuation and administered pricing in Australia. In that meeting, heads of Governments agreed to assess options for organisational changes to the interstate electricity network, which was to act as a precursor to the industry reform measures to come.

By July 1991 participating jurisdictions agreed to the establishment of the National Grid Management Council (NGMC) with the aim to develop a framework for open access to the eastern and southern Australian grid, and free trade in bulk electricity. In doing so the NGMC was directed to develop a National Grid Protocol, and as an adjunct to that work, advise on regulatory frameworks for network charges and asset valuation methodologies.<sup>3</sup> In developing these regulatory frameworks the NGMC was to have regard for two policy initiatives that were moving ahead at roughly the same time – one well known and the other perhaps less so.

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<sup>2</sup> I certify that I have the right to deposit the contribution with MPRA

<sup>3</sup> These records can be found in the Compendium published by the National Competition Council (1997).

The former of the two initiatives referred to is associated with the report of the Committee for Inquiry (1993) – perhaps better known with reference to its Chairman, Professor F. Hilmer. The scope of that report is well known so there is little need to cover that ground, except to remind one of its basic principles which subsequent policy initiatives would borrow from.

In speaking to monopoly pricing (one of fifteen sections of that report) the Committee recommended that pricing policy focus on efficiency concerns, rather than broader social and political goals which had been a mainstay of administered pricing of Government Trading Enterprises (GTEs) to that time. To illustrate the type of principles it had in mind in assessing price behavior the Committee offered an example in which a review body might have regard to:

the promotion of long term economic efficiency, taking into account the desirability of fostering investment, innovation and productivity improvement, and the desirability of discouraging a person who has a substantial degree of power in a market from using that power to set prices above efficient levels. (Committee of Inquiry, 1993 p. 269)

*“I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail.”*  
(Abraham Maslow)

In looking at the Committee’s recommendations on broader matters of market reform spoke to in that report, one can see the central role that economic efficiency played in the Committee’s topology of competition policy and industry reform. While not meaning to speak for the Committee in this regard, references to economic efficiency could be seen as articulating a shared vision of industry reform, as opposed to prescribed principles on which practical administrative actions would be decided. In any case, if articulating a vision for the reform initiatives to follow, the principles would seem to have been effective in application. Alternatively, one might question the success achieved to date in applying those principles as an objective standard for regulatory decision making.

The second, and perhaps less well known, initiative referred to is represented in the work of the Steering Committee on National Performance Monitoring of Government Trading Enterprise. The Steering Committee was established in 1991 with the purpose of developing a consistent performance monitoring regime across the Commonwealth, States and Territories. Within this context, the Steering Committee published guidelines on accounting policy for valuation of fixed assets, recommending ‘Current Value’ methods when valuing assets for performance monitoring purposes (Steering Committee, 1994 p. 35).

The release of the Guidelines roughly coincided with COAG’s timeline for finalising the approach to valuation of network assets, and as announced in the COAG Communique of August 1994 would be applied in developing network access charges. While it is difficult to find supporting documentation explaining the reasons for this decision, the practical advantage of having an asset valuation approach in hand, and the aim for uniformity central to performance monitoring may have played a role. That said, the purposes of performance monitoring and administrative pricing vary in important ways, and one approach might not fit both.

To briefly illustrate the cause for concern, first consider the purposes of performance monitoring in obtaining asset values and related financial metrics, such as return on assets, and return on capital employed, that could be applied in cross-sectional analysis of GTE performance. One of the key matters that one

would need to address is in normalising the data for the ‘vintage’ of assets and inflation, and in doing so this factor might tend to favor current cost approaches. However, in assessing competing valuation methods within the context of the building blocks approach to pricing, inflation is easily accounted for by providing a nominal return on assets. In this case vintage and inflation implications would not clearly favor either current cost or historic cost methods.

More generally speaking, within the context of setting administered prices the absolute value of the asset is of primary concern and the choice of valuation methodology has direct income transfer implications. Alternatively, for performance monitoring variations relative to the norm would be of primary interest, with income transfer less relevant to choice of valuation method. In any case, the point to be made here is that ideally the choice of valuation methodology would have been assessed within its rightful context and explicitly addressing criteria appropriate to the situation. David Johnstone (2002) and others have done just that, and have found many of the arguments in support of current cost (deprival value) methods irrelevant when explicitly set within the context of revenue and tariff setting.

A related matter to briefly highlight here is the role that distributional outcomes played in setting initial asset values for electricity network assets. The *Victorian Electricity Supply Industry Tariff Order (1995)* is an often cited example in which asset values were set to be supportive of uniform tariffs arrangements, called for by policy objectives of the day. Valuation exercises undertaken in other jurisdictions during this stage of industry reform broadly followed suit in setting asset values based on policy objectives. In line with COAG agreements, assets in place prior to 1 July, 1999 were to remain as determined by participating jurisdictions, provided that they did not exceed deprival value.

With asset values in the electricity sector largely locked-in this discussion might well end with Eric Groom’s comment recorded at an ACCC forum on asset valuation (ACCC 1996, p 17) in that ‘we may not like that but we as economists have got to recognise that when we talk about pricing for sunk assets we really are talking more about equity than efficiency.’ Apparently, this view was not universally embraced. As would become evident in implementation of gas sector reform initiatives in the later part of the decade, the debate on asset valuation and the search for efficiency was far from settled.

## **II. National Third Party Access Code for Natural Gas Pipelines**

The National Gas Pipelines Access Agreement 1997 set out a framework for a uniform national framework for third Party access to natural gas pipelines that would;

- (a) facilitate the development and operation of a national market for natural gas;
- (b) prevent abuse of monopoly power;
- (c) promote a competitive market for natural gas in which customers may choose suppliers, including producers, retailers and traders;
- (d) provide rights of access to natural gas pipelines on conditions that are fair and reasonable for both Service Providers and Users; and
- (e) provide for resolution of disputes.

The full list of objectives is provided here to highlight both the minimalistic approach found in the Agreement, and the focus on access conditions that are ‘fair and reasonable’ (implying a focus on property rights and distributional outcomes). Moreover, where competitive markets are referenced, the characteristic of competition to be promoted was explicitly stated in terms of *consumer choice* – no more and no less.

The Gas Code that was to follow took a more expansive view than that of the Agreement, providing numerous principles, objectives and conditions of the access arrangement that were in need of interpretation, and sometimes in conflict with other conditions. Indeed, the challenges of reconciling the many “incommensurable standards” of the Gas Code led Justin Gleeson SC (2005 p. 32) to comment that ‘(h)ow an administrative body deals with this challenge in a manner free from reviewable error is a difficult question. It provides fertile grounds for the challenge of administrative decision-making.’

As it turned out, matters of asset valuation played a strong supporting role in review of administrative decisions that were subsequently found to have been based on a wrong interpretation of the Gas Code. While the outcomes of those cases apparently did little to assist regulators in correct interpretation, the reasoning of the courts on matters of economic theory highlights the challenges of drafting efficiency standards that have a common meaning to economists and the courts.

## **Efficient Costs**

Section 8.1(a) of the Gas Code illustrates the potentially problematic nature of efficiency standards in providing that Reference Tariffs should be designed having the objective of:

providing the Service Provider with the opportunity to earn a stream of revenue that recovers the efficient costs of delivering the Reference Service ...

In consideration of s. 8.1(a) one is immediately challenged to interpret the meaning of ‘efficient costs’ which might be understood within the context of industrial operations and least-cost algorithms; or alternatively, as an economic concept focusing on the theory of the firm and competitive equilibria. The Full Court (WA) spoke to this matter in review of the *Draft Decision on the Dampier to Bunbury Natural Gas Pipeline Access Arrangement* taking the view that ‘efficient costs’ refers to economic concepts of efficiency, and that:

the word ‘efficient’ in a code dealing with the regulation of infrastructure in the context of competition policy reform, and in which the concept of ‘economic efficiency’ has been expressly incorporated, strongly suggests a usage which comprehends and reflects that notion in its accepted senses of technical or productive, allocative and dynamic efficiency.<sup>4</sup>

It takes little imagination to see a correspondence with the Court’s view of efficient costs and a textbook explanation of efficient production (the ‘first leg’ of the court’s topology of economic efficiency) of which Perloff (sixth edition, p 184) provides a fine example.

A firm uses a two-step procedure in determining how to produce a certain amount of output efficiently. It first determines which production processes are technologically efficient so that it can produce the desired level of output with the least amount of inputs. ... The firm’s second step

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<sup>4</sup> Re Dr Ken Michael AM; Ex Parte Epic Energy (WA) Nominees Pty Ltd & Anor [2002] WASCA. Para 139

is to pick from these technologically efficient production processes the one that is also economically efficient, minimizing the cost of producing a specified amount of output.

Technical efficiency is a simple optimisation solution of a profit-maximising firm given input costs. If addressing the Court's last two 'legs' of allocative and dynamic efficiency – one would look to equilibrium concepts – combining the profit maximising behavior of the firm with consumer preferences and willingness to pay for the firm's output. Efficient production would then be defined under the optimality conditions in which production occurs at the point in which long run average unit costs are minimised.

However, when considering a natural gas pipeline exhibiting increasing returns to scale; where demand varies in real time; and where there is no long run steady state in which short-run and long-run average costs can equate the standard optimality outcomes no longer hold, and efficiency can only be assessed relative to a notional second best outcome.

With the textbook understanding of competitive markets unable to support a connection between the efficiency criteria of s. 8.1(a) and choice of asset valuation method, interest seems to have turned to contestable markets. As formalised by Baumol, Panzar and Willig (1982), contestability theory was portrayed as providing the sought after efficiency characteristics of perfect competition while allowing for fixed costs of production. Unfortunately, the promise associated with contestability theory relies on the costless reversibility of fixed costs, which of course is not a characteristic generally found in natural gas pipelines. Nevertheless, parts of that theory, whether relevant or not, would be used in arguing the case for various asset valuation methodologies.

An example of one of the more contentious attributions of efficiency to a given valuation method is found in the 'hypothetical new entrant test'. Briefly put, the test can be seen as borrowing from contestability theory in arguing that in valuing an asset at its Depreciated Optimised Replacement Cost (DORC) the implicit price obtained would reflect the ceiling price found in a 'workably competitive market' – with any price above that limited by threat of entry. The application of the test to natural gas pipelines is highly questionable in that sunk costs act as a deterrent to entry.. Where sunk costs are significant, the price associated with use of the DORC is better represented (subject to some caveats) as a *minimum* that an incumbent would charge in an unregulated market – with the natural monopoly outcome serving as the upper bound of pricing.

Nevertheless, the test apparently has its proponents. For example, in a report to the New Zealand Competition Commission, Houston and Green (2009) describe the barrier to entry found in sunk-cost technologies as a short-run deviation from the workably competitive outcome, ultimately tending to equilibrium as assets are replaced. If allowed to paraphrase the essence of their reasoning, the market they had in mind was in 'dis-equilibrium' for the life of the asset, only returning to equilibrium for a very brief period of time between decommissioning of the old asset and the commissioning of its replacement (roughly speaking). The workably competitive market is then thrown back into dis-equilibrium for the life of the replacement asset, perhaps to continue *ad infinitum*. This might be viewed an example of the 'use and abuse' of economic concepts described by Rob Albon (2007) whereby economic theory becomes a matter of advocacy over explanation.

## **Replicating the Outcome of a Competitive Market**

Moving on to section 8.1(b) of the Gas Code - Reference Tariffs were to be designed with the objective of replicating the outcome of a competitive market. In commenting on this aspect of the Gas Code the Court understood that ‘the prevailing view and usage among economists is that a reference to a competitive market is to a workably competitive market’, and that ‘in the promotion of a competitive market for natural gas it would be surprising if what was contemplated was a theoretical concept of perfect competition, as the subject matter involves very real-life commercial situations.’<sup>5</sup>

In bringing together concepts of efficient costs and workably competitive markets, the Court suggested that, over time, the revenue earned by a service provider from a reference service, if that service was provided in a workably competitive market, would approximate the efficient costs of delivering the service.<sup>6</sup>

This has a familiar ring to it in that the Court might have had in mind a type of ‘workable contestability’ in which irreversible costs, as a barrier to entry, are reduced ‘over time’. It is not clear what forces are thought to act over time, but if based on the long-term cycles of asset replacement one would not expect the approximation to efficient costs to be a very good one.

Alternatively, perhaps the thinking was that workably competitive markets are those having only a ‘small’ degree of market power, limited by substitution in supply or demand factors. While one might see such factors as reasonable and relevant to the industry, this begs the question of how small is small? To answer this question one might look to the Theory of the Second Best’ as formalised by Lipsey and Lancaster (1956); the sensitivity of nonlinear systems to initial conditions and the butterfly effect of Lorenz (1963); or through complexity theory as described by Paul van Geert (2008). In each case one finds that for complex systems, small deviations in starting conditions cannot be assumed to lead to a proportionally small deviation in outcome.

With the work of Lipsey and Lancaster well known to economists, van Geert offers a brief diversion in illustrating the point with reference to *Alice Through the Looking Glass*. If reminded of the start of Alice’s adventure, on meeting the Red Queen she is confronted with the problem that for all her running she finds herself standing still. Having in mind complex nonlinear relationships, this makes perfect sense to the Queen. If allowed further liberty with van Geert’s illustration, Alice’s confusion can be explained in relating it to taking a single step in a world represented in two dimensions (after all, this is a storybook) in which she would not have travelled very far. Now take the same step in a more complex three dimensional (that is, nonlinear) terrain of mountains and cliff faces. It is not difficult to guess where this might end.

The point to be made here is not that small steps always lead to large falls – just that it is wise to understand the terrain. This holds for application of the fundamental theorems of welfare economics; contestability theory; or perhaps even the concept of workable competition should it ever be adequately defined.

### **What is Workable Competition?**

In attempting to reconcile the theory of perfect competition to the realities of the market place, J. M. Clarke (1940) envisioned a set of structural factors (or conditions) favorable to achieving a working approximation of the competitive ideal, which he called ‘workable competition’. However, identifying the conditions of

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<sup>5</sup> Ibid, para 124

<sup>6</sup> Ibid para 143

a generalized ‘second best’ outcome would prove to be problematic, particularly when having in mind the findings of Lipsey and Lancaster alluded to above.

In an address to the ACCC Regulatory Conference (2004) Rod Shogren offered an alternative view in describing the concept on its own terms (i.e. as opposed to approximating the ideal) as ‘the level of competition is as good as one could reasonably expect or hope for and provides satisfactory or acceptable market outcomes in terms of product/price/quality packages’. George Yarrow and colleagues (2010) appear to have had a similar view in stating that, (w)orkable competition, or as is often called in competition law, effective competition, signifies that the relevant competitive process, whatever its precise structure, is, or is capable of, producing outcomes in terms of economic efficiency and consumer welfare that, at a minimum, are considered satisfactory or acceptable.

Perhaps this is to say, that it is what it is.

### *‘I know it when I see it’*

In trying to make sense of this puzzling concept, one might draw the analogy to the problem faced by US Supreme Court Justice Potter Sherman in an often-cited case of constitutional law and obscenity:<sup>7</sup>

I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description; and perhaps I could never succeed in intelligibly doing so. But I know it when I see it.

Perhaps there is a divide between the two worlds of natural monopoly and perfect competition where the real world of workable competition can be found – and one that is known even though it cannot be articulated or measured – but perhaps not? To state that workably competitive markets lead to broadly efficient outcomes is simply to say that one believes that efficient outcomes are found in workably competitive markets. While literally true - the concept lacks the definition and structure needed to provide meaningful insight to market behavior and how market outcomes change given alternative sets of actions. Accordingly, it is difficult to see how to extract prescriptive meaning from the concept of workable competition no matter how it is described.

Admittedly, aspects of this critique apply to accepted theories of perfect competition as well. For example, Gerard Debreu’s seminal work in this field, found in his *Theory of Value* (1959) is based on an axiomatic proof of existence of a competitive equilibrium. In a literal sense the axiomatic method is built from a series of tautologies. An implication flowing from this structure is highlighted by Debreu in that ‘the allegiance to rigor dictates that ... the theory, in the strict sense, is logically entirely disconnected from its interpretation.’ That said, in his Nobel Memorial lecture of 1983 Debreu continued with this line of thought but offered the simple insight to those interested in worldly outcomes, that ‘(m)aking the assumptions of a theory entirely explicit permits a sounder judgment about the extent to which it applies to a particular situation.’ This would appear to be well considered whether referring to the outcomes of workable competition or the existence of a competitive equilibrium.

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<sup>7</sup> As taken from a law review article describing the context of Justice Sherman’s opinion by Gerwitz (1996)



### III. The New Reform Agenda and the Fascination with Efficiency

The 2001 COAG agreement to establish the Ministerial Council on Energy (MCE) provides a notional starting point for the ‘new reform agenda’<sup>8</sup>. Skipping through at least five extensive reviews and inquiries one finds the consolidation of access objectives codified in the National Gas Law, and National Electricity Law. Moving to the natural end-point of this discussion one finds the National Gas Objective (NGO):

The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

The promise of a ‘new reform agenda’ was perhaps exaggerated in that the objective has a certain familiarity about it if reminded of the pricing principles offered by Professor Hilmer and colleagues in 1993, although perhaps requiring a level of linguistic expertise to understand its common meaning, and no doubt a sound knowledge of law if interpreting its legislative intent. In speaking to latter of the two fields of endeavor, Peter Nicholas (2008) offered that ‘(t)he objectives are designed to recognise that promoting all aspects of economic efficiency is the best way of delivering benefits for the long term interests of consumers in the gas and electricity energy markets.’ If looking at policy guidance on the matter it would appear that the Hon. Minister Conlon settled any question of meaning in the second reading speech to the National Gas Law (South Australian Hansard, 2008) in stating that:

The national gas objective is an economic concept and should be interpreted as such. The long term interest of consumers of gas requires the economic welfare of consumers, over the long term, to be maximised. If gas markets and access to pipeline services are efficient in an economic sense, the long term economic interests of consumers in respect of price, quality, reliability, safety and security of natural gas services will be maximised. By the promotion of an economic efficiency objective in access to pipeline services, competition will be promoted in upstream and downstream markets.

The passage covers a significant range of economic thought, and to the economist there would be little doubt to its meaning. If separating its major points in the abstract:

- (i) Consumer welfare has had an established meaning in economics at least since Alfred Marshall formalised concepts of ‘consumer surplus’ well over one hundred years ago in his *Principles of Economics*, and which is recognised as a useful tool in which to measure the welfare impact of changes in prices and income on consumers (Willig 1976 ).<sup>9</sup>
- (ii) To define the economic welfare of consumers over price, quality, reliability, safety and security of supply as implied in this passage admits a more sophisticated view to regulation than that of a homogeneous product, and also has a body of economic thought attached to it in models of imperfect competition.

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<sup>8</sup> The characterisation of the MCE agenda was that of the National Competition Council 2011 p. 10)

<sup>9</sup> Marshall initially used the term ‘consumer rent’ in the early editions of *Principles* (e.g. 3<sup>rd</sup> Edition 1895, p 200) which in subsequent editions was changed to ‘consumer surplus’.

(iii) Welfare implications of policy choice across an economy, perhaps suggested by reference to upstream and downstream markets are commonly assessed by economists in use of computable general equilibrium models based on principles of competitive equilibria, and which there is considerable experience in practical application to policy choices. Restated in these terms, one might expect that regulatory actions would be informed by empirical analysis of economic welfare generally, and consumer surplus more specifically. In looking at practice to date this expectation would be proved wrong

### **From Objectives to Administrative Actions**

By interpreting the NGO as promoting all aspects of economic efficiency, the objective seems to have been made so broad as to be immune to measurement. A similar point was argued by Albert Foer (2015) in examining the ‘single-minded drive for efficiency’ within the context of US antitrust law. In that paper he highlights the difficulty one faces in identification and measurement of cognizable efficiencies (and inefficiencies) across the range of feasible actions to be considered, and questions ‘whether it was worth opening the Pandora’s Box of efficiency in the first place’.

If not amenable to empirical analysis perhaps the efficiencies referred to in the NGO are to be aspired to – not measured or benchmarked. But as an aspirational ideal, what does economic efficiency tell one in choosing among various regulatory actions? Is there a guidepost that will appear indicating the optimal throughput of a natural gas pipeline, or the location and capacity of a high voltage interconnector? In this case, one will have to have faith that regulators are able to emulate Justice Sherman in ‘knowing it when they see it’ and that they will more often than not see the same thing as the courts.

In any case, the Law is there. It will be interesting to see how it is interpreted and applied over time. For the faithful, it may come down to a matter of describing that which cannot be described. For the agnostic, reliance might be placed on an empiricism in which assumptions are stated and inferences drawn from observation – but that would require an objective standard clear in meaning and observable in its outcomes.

The fascination with efficiency served an admirable role in framing a vision of the ‘how and why’ of industry reform in Australia – but does not seem so well suited to the common place work of administrative decision making. Ultimately, a less ethereal objective standard might prove to be more effective than that of efficiency.

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