QUEENSLAND COMPETITION AUTHORITY

Discussion Paper

Regulatory Objectives and the Design and Implementation of Pricing Principles

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SUBMISSIONS

Public involvement is an important element of the decision-making processes of the Queensland Competition Authority (the Authority). Therefore submissions are invited from interested parties concerning the matters covered in this Discussion paper. The Authority will take account of all submissions received.

Written submissions should be sent to the address below. While the Authority does not necessarily require submissions in any particular format, it would be appreciated if two printed copies are provided together with an electronic version on disk (Microsoft Word format) or by e-mail. Submissions, comments or inquiries regarding this paper should be directed to:

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The **closing date** for submissions is **30 June 2013**.

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Information about the role and current activities of the Authority, including copies of reports, papers and submissions can also be found on the Authority's website.

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1. INTRODUCTION: REGULATORY OBJECTIVES AND TOOLS

The Queensland Competition Authority (the Authority) regulates monopoly providers of water, rail, and ports as well as retail electricity prices. The Queensland Competition Authority Act 1997 (the Act) sets out the objectives that this regulation is intended to achieve. These objectives relate to both efficiency and fairness. The QCA uses controls over prices, profits, investments, operating costs and terms and conditions of service provision to pursue these sometimes conflicting objectives.

It is important that regulated firms understand the broad principles used by the Authority to apply the regulatory tools at its disposal. It is also important that regulatory processes are designed to facilitate achievement of the objectives and are well understood by stakeholders. Certainty in this regard will assist the regulated firms and their customers in making planning and operational decisions.

The objective of this report is to propose a set of high level pricing principles for application to the monopoly activities regulated by the Authority. These principles could then be used to guide specific decisions regarding the level and structure of prices, or more detailed principles for particular sectors.

The report specifically incorporates risk, fairness and regulatory governance issues into the development of pricing principles. Previous pricing principles guidelines have focused primarily on the economic efficiency aspects of regulation.

1.1 Economic Regulation

Monopolies often exhibit poor economic performance. Poor economic performance means some combination of prices that exceed costs, costs that exceed efficient levels, quality of service levels that deviate from the optimum, inappropriate levels of investment, or slow rates of technological change.

Governments may choose to apply economic regulation to monopoly firms that provide essential services and are not subject to competitive threats from new entrants. Economic regulation involves government controls over the prices, operating costs, investments, profits and the terms and conditions of sale of the regulated firm with the goal of improving economic performance. Governments may also ask the regulator to consider non-economic objectives such as social welfare, equity or fairness.

An implicit assumption underlying the application of economic regulation is that government intervention in the market is capable of improving performance (Joskow 2005, p. 40). In other words, the social benefits of regulation, which encompass benefits to society as a whole, must exceed the social costs.

Regulators generally have a number of tools at their disposal to achieve their objectives. For example, regulators may:

(a) set the level and structure of prices;

(b) monitor and approve operating expenses;

(c) monitor and approve capital expenditures;

(d) set profit levels or rates of return on allowed assets values; and/or

(e) approve the terms and conditions of sale.

These tools are not necessarily all applied at the same time. Regulation can take many forms. A regulator might choose to set profit levels through a prescribed rate of return, but allow the regulated firm to choose the pricing structure and set individual prices subject to the profit constraint. Under a widely discussed (but less widely applied) approach the regulator may choose to set maximum prices ('price caps') but allow the regulated firm to maximize profits subject to the price constraints.

As discussed further below, economic efficiency objectives and the tools used to achieve them are fairly well understood, or at least have been extensively studied. The allocation of risk between the regulated firm and its customers is an important aspect of efficiency. Recent research demonstrates that the form of regulation that is applied can affect the distribution of risk between regulated firms and their customers and thereby affect economic efficiency.

Recent research also provides useful insights into the economic relationship between economic efficiency and fairness. This research has implications for how regulators could address certain fairness issues and resolve conflicts among competing goals.

The laws, rules and procedures the regulator follows in performing its duties, and indirectly also its capacity to do so, all form part of regulatory governance. For example, the governance system establishes the procedures the regulator must follow before requiring price adjustments. This can involve notice to the regulated firm, adequate opportunity to respond, and evidentiary standards for making determinations. Recent research investigates the principles for good regulatory governance and establishes a link between governance mechanisms and the achievement of regulatory objectives.

This discussion paper addresses these recent advances in understanding the relationships among economic efficiency, risk, fairness, and governance and develops a set of high level principles to guide the development of more detailed pricing principles for regulated firms in the sectors regulated by the Authority.

2. REGULATORY OBJECTIVES AND PRICING PRINCIPLES IN QUEENSLAND

The Act establishes both broad and detailed objectives for the Authority to follow in regulating monopoly firms. The Authority has developed pricing principles aimed at achieving these objectives.

2.1 Regulatory Objectives Under the Act

The Act specifies a variety of economic and non-economic goals for the Authority to follow (S26). The Authority is required to have regard to:

(a) efficient resource allocation;

(b) competition;

(c) protection of consumers from abuses of monopoly power;

(d) efficient costs;

(e) quality, reliability and safety;

(f) appropriate rate of return on assets;

(g) impacts on the environment, and

(h) demand management.

Each of these objectives has an economic efficiency driver.

The Act also requires the Authority to consider a host of broader social issues (S26). These include:

(a) social welfare and equity considerations;

(b) availability of goods and services to consumers and the social impact of pricing practices;

(c) socially desirable investment or innovation;

(d) ecologically sustainable development;

(e) occupational health and safety and industrial relations;

(f) economic and regional development issues, and

(g) directions given by the government to government-run monopoly business activities.

In addition to the general objectives discussed in the previous section, the Act provides a more detailed list of matters to be considered in making water pricing determinations (S170ZI). These include water quality and environmental issues.

The Act also includes specific provisions for the regulation of access to monopoly infrastructure services. S120 requires that regulated firms make access to facilities available to competitors. In approving access undertakings or making access determinations, the Authority must consider the 'public interest' (S120), which from a public policy perspective

is a broad concept encompassing both economic efficiency and fairness. In addition the Act specifies that prices should (S168A):

> *(a) generate expected revenue for the service that is at least enough to meet the efficient costs of providing access to the service and include a return on investment commensurate with the regulatory and commercial risks involved; and*
>
> *(b) allow for multi-part pricing and price discrimination when it aids efficiency; and*
>
> *(c) not allow a related access provider to set terms and conditions that discriminate in favour of the downstream operations of the access provider or a related body corporate of the access provider, except to the extent the cost of providing access to other operators is higher; and*
>
> *(d) provide incentives to reduce costs or otherwise improve productivity.*

2.2 Prior Consideration of Pricing Principles

Economic and regulatory principles and concepts relevant to regulating utility prices have been addressed previously by the Authority and also by other authorities and organisations.

The Authority's 2000 'Statement of Regulatory Pricing Principles for the Water Sector' discusses methods used in determining prices and, as such, has a focus on a number of issues that are not considered in the present paper (QCA 2000). These detailed topics include: the asset base valuation, the estimation of the cost of capital, and estimation of the depreciation expense.

In addition, the main part of the pricing principles section in the 2000 report is largely concerned with setting the fixed and variable components of a two-part tariff. However, it is noted (p.3) that prices should:

- *be cost reflective - that is, reflect the costs of providing the service and, usually where the demand for water exceeds its supply, potentially incorporate a value for the resource;*
- *be forward looking - in that they represent the least cost which would now be incurred in providing the requisite level of service over the relevant period;*
- *ensure revenue adequacy - the revenue needs of the business must be addressed where possible;*
- *promote sustainable investment – where the services are to be maintained into the future, the investor must be given the opportunity to enjoy an appropriate return on investment;*
- *ensure regulatory efficiency – the pricing method which minimises regulatory intrusion and compliance costs relevant to a particular circumstance should be adopted; and*
- *take into account matters relevant to the public interest.*

In the context of access pricing, principles and approaches are briefly outlined in the 2000 report. However, more specifically, in 2001 the Authority approved the following pricing principles for QR Network's first access undertaking:[1]

> *Price objectives - the Undertaking should allow QR to generate sufficient revenue to maintain its incentive to invest in its infrastructure. If there is a conflict between QR pursuing revenue adequacy and non-discriminatory pricing in a particular market, then the latter will prevail unless QR can justify the price difference to the QCA.*
>
> *Price differentiation - should be subject to a test in which all railway operators for a traffic in a geographic area would be subject to price differentiation on only cost or risk grounds, or a change in market circumstances (whether or not they are competing head-to-head). QR should bear the onus of justifying price differences.*
>
> *Efficient costs - the pricing limits, based on stand alone and incremental costs, should only reflect those costs efficiently incurred.*

[1] http://www.qca.org.au/rail/2001-agreement-development/qr-access-undertaking.php

> *Rate review - access agreements should contain rate review provisions, including for instances when third-party operators can demonstrate that QR has sold a 'like' train path to another operator for a lower price than its own.*
>
> *Costing Manual - should provide confidence in the integrity of the separation of costs between above and below-rail activities and be a reliable source for the evaluation of access charges. A strong audit procedure is required to improve confidence in the cost allocation process.*
>
> *Reporting - for the Undertaking to be effective, it is necessary there be a regime of transparent financial and performance reporting in relation to the provision of below-rail services.*

These pricing principles are broadly consistent with those developed by other regulatory authorities in Australia. The Essential Services Commission (2013, p. 9) discusses pricing principles in terms of a sustainable revenue stream ". . . which does not reflect monopoly rents or inefficient expenditure". The Australian Energy Market Commission (2012) refers to revenue adequacy and prices that promote investment.

A discussion paper released by the Utility Regulators Forum identifies common elements in the high-level pricing principles used by Australian regulators (2005, p. 2):

> *(a) prices should lie on or between the upper and lower bounds of avoidable cost and stand alone cost for economically efficient prices; and*
>
> *(b) prices should signal efficient economic costs of service provision by:*
>
> *(i) having regard to the level of available network capacity; and*
>
> *(ii) signalling the impact of additional usage on future investment costs'.*

The Productivity Commission (2001, p.323) identifies two key pricing principles in its review of the national access regime:

> *(a) promote economically efficient use of, and investment in, essential infrastructure services; and*
>
> *(b) provide a framework and guiding principles to discourage unwarranted divergence in industry-specific access regimes.*

It should be noted that divergence in access or other regulatory regimes may often be "warranted". Ergas (2012) shows that harmonisation of regulatory regimes may retard jurisdictional innovation and impose "one size fits all" requirements to diverse situations.

The pricing principles used by the Authority and other Australian regulators are mainly concerned with the relationship between prices and costs. There has been relatively little attention paid to the broader social issues that the Act requires the Authority to consider. These issues can be subsumed under the broad category of "fairness".

It would not be possible or wise to ignore fairness issues even if the social welfare issues raised were not included among the objectives of the Act. Divorcing social considerations from economic regulation could result in regulation with little public support. Recognising, assessing and addressing any trade-offs between efficiency and fairness goals adds credibility to regulatory decisions. Moreover, as will be discussed, achieving fairness may in some cases be a prerequisite for, or at least support, the achievement of the efficiency goals of regulation.

There is significant economic research into the role fairness plays in achieving effective regulatory results. In the Australian context Biggar (2011a), (2011b) and (2010) has written at length on fairness. Biggar notes that the behavioural economics literature has identified a number of social norms relating to fairness in commercial settings. If these norms are not recognised, efficient transactions may not take place.

A report for the World Bank by Brown et al (2006) explores the relationship between regulatory governance, fairness principles and the importance of legal and parliamentary systems that protect investors.[2] Brown et al have identified 'meta principles' for regulatory governance where a common element is that both investors and consumers need to believe that the regulatory system operates fairly.

Issues of regulatory governance were not addressed in the Authority's 2000 paper but are discussed here, particularly because regulatory commitment has an important role in ensuring that the regulatory system is both credible and sustainable.

[2] The primary earlier work on these issues is by Bonbright (1961) and Bonbright et al (1988). A seminal paper by Levy and Spiller (1994) highlights the importance of governance and regulatory fairness to economic efficiency.

3. ECONOMIC EFFICIENCY

The Act requires the Authority to pursue a number of goals related to economic efficiency. Economic efficiency is attained when no feasible changes in prices, production or consumption can benefit society as a whole. This is the result achieved in the economist's competitive market model. Therefore, as a starting point in designing pricing principles that promote economic efficiency, it is helpful to consider competitive market pricing. This sets the stage for considering a variety of issues including: efficient pricing when the conditions for competitive market pricing are not met; the allocation of risk between monopoly suppliers and their customers, and the application of pricing principles to infrastructure access.

3.1 The Economic Efficiency Objective

As noted in section 2.1, the Act requires the Authority to consider a number of economic and non-economic objectives. The economic objectives are related to economic efficiency. There are three types of economic efficiency: allocative, productive and dynamic.

Allocative efficiency means that, given an initial allocation of scarce resources, production and consumption are optimal in the sense that no changes can be made that would increase the total welfare of the community as a whole. In other words, all possible welfare-enhancing market exchanges have been made – no money has been left on the table. Consumers and producers as a group are doing as well as they can, given their resources.

A corollary of this result is that improvements in allocative efficiency increase national income. National income is the sum of the values for all transactions. Efficiency-enhancing changes free resources for other productive uses. This means that the value of transactions in the economy will be greater after the efficiency-enhancing change.

Note that improvements in allocative efficiency may result in winners and losers. Nevertheless, the efficiency requirement is satisfied in practice as long as the benefits of the change to the winners exceed the costs to the losers.[3] It is left to government policy to determine whether and if so, how, the losers would be compensated. The point, however, is that a portion of the efficiency improvement could be used by the government to compensate the losers. The fairness issues raised by monopoly regulation are discussed in Chapter 4.

Productive efficiency means that goods and services are produced at the lowest possible cost. Least-cost inputs are used in the correct proportions given appropriate technology and taking account of input prices to produce goods and services. Failure to achieve productive efficiency means that resources are wasted.

Dynamic efficiency refers to the timely introduction of new products, services and cost-reducing innovations. Allocative and productive efficiency are typically assessed with a given set of products and services and current technology. Dynamic efficiency essentially refers to the achievement of allocative and productive efficiency over time.

Efforts to achieve the three types of efficiency may have to be prioritised due to scarce regulatory resources. Improvements in dynamic efficiency can often generate higher gains than improvements in productive efficiency. Technology can create new services or markets that create a great deal of value. However, small improvements in productive efficiency can have a large impact on consumer welfare because the prices everyone pays can be reduced.

[3] This is sometimes referred to as the potential Pareto improvement or the Kaldor-Hicks criterion. An actual Pareto improvement refers to a situation where at least one person could be made better off without making anyone worse off. See Feldman (1980, p. 140-147).

Therefore, small improvements in productive efficiency may be more important than improvements in static allocative efficiency, which may only affect producers and consumers at the margin. These issues and potential trade-offs are best assessed on a case-by-case basis.

There may also be trade-offs between allocative and dynamic efficiency. It can be argued that monopoly provides a better environment for funding research and development that leads to technological progress. This hypothesis is controversial[4]. Less controversial is the notion that entrepreneurs should be allowed to reap the benefits of risk-taking by allowing high profits when risky investments succeed. These arguments do not necessarily apply to investment in well-established monopoly infrastructure. Returns on investments in new services or introduction of new technology may merit different treatment[5].

As the survey of regulatory objectives in the previous Chapter shows, maximising economic efficiency is not the only objective that the Authority must consider. There may be trade-offs between efficiency and other goals. For example, if the losers from an allocative efficiency improvement are low income households and the winners are high income households, fairness and equity considerations come into play. However, achieving economic efficiency maximises total welfare. Therefore, a choice to forego efficiency goals in favour of equity goals should be informed by assessing the cost of the lost efficiencies. In this way the opportunity cost of pursuing other objectives can be considered.

3.2 Economic Efficiency, the Competitive Market Model and the Short-run Marginal Cost Pricing Principle

As shown in section 3.1, allocative, productive and dynamic efficiency promote economic welfare. It turns out that competitive markets are the best mechanism for achieving efficiency, provided they can be effectively established. As explained below, competitive markets lead to efficient outcomes because prices tend towards marginal cost. However, there are many circumstances where competitive markets do not exist and relevant competitive market conditions cannot be economically established.

Prices represent the resources that consumers must forego to purchase or consume an additional unit of output. Marginal cost is defined as the additional resources required to produce one more unit of output or the resources saved by producing one unit less.[6] In competitive markets, if the price paid is above cost, a competitor will enter the market to exploit the profit opportunity. As competitors enter, supply increases and prices fall, reducing excess profits. If price is below cost, less efficient firms will exit the market, supplies will fall, and prices will rise. If a competitor is not producing at the least cost (is not productively efficient) other competitors will force that competitor to cut costs or exit the market. At the end of the day, all resources will be put to their most efficient use.

[4] See Scherer and Ross (1990, pp. 630-660).
[5] See Helm (2009).
[6] The concept of short-run marginal cost is often interpreted in policy and regulatory settings as the costs causally related to the specific level of output or incremental activity or decision. This is a helpful interpretation for determining what should be included in short-run marginal cost. See Kahn (1995, p.71). If there is a supply constraint , the marginal cost is also defined to include the marginal opportunity cost of not being able to service marginal demand. In effect, the price needs to be at a level sufficiently high to ensure that no excluded user has a higher willingness-to-pay than any other user. In this case, the full marginal cost to society is the marginal resource cost of producing the additional output plus the value the marginal user is willing to pay not to be excluded from the service. If there are any externalities (unpriced effects on other parties) the marginal cost of the externalities would also need to be accounted for. Thus the relevant marginal cost concept from an economic efficiency perspective is known as social marginal cost and includes marginal production cost plus marginal congestion plus the net marginal cost of any externality.

The market dynamics described above take place over time. In the short run, defined as a time period over which some of the inputs used to produce the good or service are fixed, an increase in market demand will cause prices to rise. This price rise serves as a signal to the firm or other firms to increase capacity. In the long run all inputs are variable. Capacity can be expanded to take advantage of the higher prices caused by increased demand. Once the adjustment process is complete prices will have fallen to just recover average total costs.

Market forces determine how much of each product or service is produced and ensure that they are produced efficiently. The products and services are distributed to consumers in an optimal fashion. The lesson is that prices that reflect marginal costs are a key to achieving economic efficiency. This learning can be applied to regulated monopoly markets.

Key characteristics of competitive markets include large numbers of buyers and sellers, costless entry and exit for firms, perfect information, homogeneous goods, no transactions costs, and the ability to manage risk efficiently. These assumptions are rigorous and unlikely to be achieved in practice. Nevertheless, the competitive market model can serve as a useful reference point for benchmarking actual, real world market conditions against ideal performance. Note that costless entry and exit is probably the most significant assumption. It can be demonstrated that if entry and exit barriers do not exist, even a monopoly firm will be forced to price at efficient levels.

The overall objective is to maximise economic efficiency. Competitive markets are a means for achieving that objective and not necessarily an objective in their own right. There are many circumstances where competition is not feasible. This is particularly true where industries are characterised by large sunk costs that effectively prohibit costless entry and exit[7]. Unconstrained pricing in these markets will lead to prices well above marginal costs.

3.3 Application to Regulated Monopoly Markets

The water systems, ports and rail networks regulated by the Authority obviously differ substantially from textbook competitive firms. There are no competitors or potential entrants to force prices to marginal cost or to induce the most efficient operation because barriers to entry are high. The source of the entry barriers is significant levels of sunk costs.

Rail roadbed is a classic example of a sunk cost infrastructure. Once the investment is made the assets have little or no value in any other use. Potential competitors will not be willing to sink their own funds in roadbed to compete. Failure of the business will result in significant losses because the sunk costs cannot be recovered.[8]

The infrastructure businesses regulated by the Authority have substantial and lumpy sunk costs. In many cases, the high fixed costs associated with the sunk investments imply that average cost falls until full capacity is reached.[9] In this case, the firm is a natural monopoly[10].

Most businesses incur at least some sunk costs. But in many cases the level of sunk costs may be small in comparison to total costs. In these cases additional entry can take place and more than one company can occupy the market. Although these markets do not satisfy the

[7] Sunk costs are those costs associated with investment in long-lived physical or human assets whose value in alternative uses (that is for different products or at different locations) is lower than its intended use.
[8] This can be contrasted with the above-rail business. Rolling stock can be used on other railroads.
[9] There are exceptions to this when capacity constraints exist and the costs of infrastructure expansion are rising.
[10] This condition is sufficient but not necessary for a natural monopoly. Average costs could be increasing and it is still cheaper for one firm to produce and supply the industry output. Therefore, any firm that can produce output at a cost that is less than that cost incurred by two or more firms whose total output is the same is a natural monopoly. This latter condition is known as sub-additivity (Berg and Tschirhart 1988: 22-23).

competitive market model assumptions, they perform well enough and costly regulation would not be justified. The concept of a "workably competitive" market is often used to refer to such situations.

The role of a regulator whose objective is to promote economic efficiency in natural monopoly markets is to set prices, or provide the regulated firm with incentives to set prices, that achieve efficiency objectives. Various means to accomplish these objectives in the face of the constraints caused by sunk costs and natural monopoly conditions are discussed below.

3.4 Revenue Sufficiency

As discussed above, where there are sunk costs, and capacity investment is lumpy, marginal cost generally lies below average cost. Prices set to recover only marginal cost would prevent the regulated firm from recovering all of its costs, which the Act requires. If the firm is not allowed to recover total costs, it will not have incentives to operate and invest.

The potential losses from a firm not participating in a market or failing to invest adequately in maintenance and expansion because regulated revenues are inadequate are likely to be significant and exceed the potential allocative efficiency losses associated with prices in excess of short-run marginal cost. Therefore, the principle of revenue sufficiency is a dominating principle in economic regulation, and is reflected in the objectives of the Act. Note that the revenue sufficiency principle is often applied to government owned enterprises even though they do not require private investors to provide funding.

The efficiency principle of equating marginal cost and price must be modified if total costs are to be recovered. Various mechanisms have been developed for ensuring that revenue is sufficient to finance total costs.

3.4.1 Efficient Pricing with Natural Monopoly

In the case of natural monopoly pricing each unit of service at marginal cost is not possible if the revenue sufficiency goal is to be achieved. However, it is still possible to pursue the allocative efficiency goal. The key condition of allocative efficiency is to ensure that a level of output is produced and consumed where the marginal benefit equals the marginal cost. Charging price sensitive customers (customers with elastic demand) lower prices than customers that are less sensitive to price (customers with inelastic demand) encourages them to buy more. The result is that a greater quantity is purchased and allocative efficiency increases.

In a competitive market there can only be one price, which all consumers pay. This does not necessarily apply for a monopoly. So long as a monopolist can prevent buyers from reselling the service, it can charge different prices to different customers or customer groups. Price discrimination can in fact allow the regulated entity to cover its fixed costs in a way that is welfare-enhancing. This is because price discrimination allows the level of output to increase towards levels that would be achieved with marginal cost pricing.

A common form of price discrimination is the two-part or multi-part tariff. The fixed part of the tariff, which applies to all customers, can be used to recover fixed costs while the variable part can be set at marginal cost. High volume users end up paying less per unit than low volume users, which is a form of price discrimination. Greater efficiency is achieved because consumers make marginal purchasing decisions based on the variable price and a

greater quantity is purchased relative to the uniform price case.[11] A downside risk is that consumers that would purchase only limited quantities of the service may choose not to participate in the market (and avoid the fixed charge) even though they are willing to pay marginal cost.

More sophisticated price discrimination schemes are possible. The Ramsey pricing or inverse elasticity rule charges each consumer based on its elasticity of demand. The consumers with the highest elasticity pay the lowest price. This approach obviously requires detailed information about consumer demand.[12][13]

Economic efficiency is not necessarily compromised if non-marginal users pay a different price to marginal users, or infra-marginal units are priced higher than marginal cost. In this case some purchases are priced above marginal cost but total supply is the same as under uniform pricing (at a price equal to marginal cost with a subsidy to ensure fixed costs can be financed) and the price of the marginal unit still equates to the marginal cost.

These pricing tools must be applied with care. Price discrimination can also enable a monopolist to over-recover its costs. Furthermore, even if a firm does not earn excess profits, price discrimination might conflict with certain policy and regulatory objectives – depending on how it is applied. In particular, where the service being sold is a monopolised intermediate input ("access") price discrimination is often not allowed due to concerns with downstream market competition. Finally, use of these tools may raise equity concerns if the price discrimination results in lower income individuals paying higher prices.

3.4.2 Short-run versus Long-run Marginal Cost

In practice, short-run marginal cost is difficult and sometimes virtually impossible to measure. Also, in some cases it may be more important to send pricing signals that lead to efficient long term investment than it is to reflect short term movements in supply and demand.

Moreover, depending on the technology and characteristics of market demand, prices based on short-run marginal cost prices would probably have to be recomputed fairly frequently. They might also be quite volatile. In particular, prices could rise sharply as capacity constraints are approached. End users may also have a preference for stability (discussed next). Finally, as discussed above, prices based on short-run marginal cost are not necessarily linked to revenue adequacy and may lead to under or over-recovery of cost.

For these reasons, regulators often use some measure of long-run cost in setting regulated firm prices. However, the economic efficiency properties of long run marginal cost can be questioned. First if there is a capacity constraint, the correct cost-based price measure to ensure allocative efficiency is short marginal cost defined to include the marginal cost of congestion. If long run marginal cost exceeds short run congestion-augmented marginal cost, price will be set too high from an allocative efficiency perspective. If long run marginal cost is less than short run, congestion-augmented marginal cost, price will not be high enough to ensure efficient capacity allocation. And when there is excess capacity, long

[11] In a monopoly setting Schmalensee (1981) and Varian (1985) show that price discrimination using multi-part tariffs increases social welfare if the total quantity of services sold increases compared with uniform prices. See also Phlips (1983). The same conclusion applies generally in an oligopoly setting (see Holmes 1989 and Corts 1998). Multi-part tariffs are a form of "second degree price discrimination".
[12] See Tirole (1988). Ramsey pricing is "third degree price discrimination."
[13] Peak load pricing is sometimes thought of as a form of price discrimination. However, in this case efficiency is improved both by reflecting differential demand for a service over time and differential costs over time (where the differential cost may reflect congestion).

run marginal cost is likely to exceed short run marginal cost. In this case prices based on long run marginal cost would lead to under use of capacity.

There is no clear rule as to whether short-run marginal cost or long-run marginal cost is always best in setting prices. There is also the issue of whether long run cost of supplying the last unit or some other increment should be used to measure long run costs. The answer will depend on circumstances and trade-offs in terms of practicality, efficiency and fairness considerations.

3.4.3 Price Stability

Short-run marginal cost pricing may lead to frequent price changes as demand and supply conditions change over time. Customers may have a preference for price stability and be willing to pay for it. Moreover, investors value stable returns in their own right but also because instability can create an uncertain political economy environment and cause investors to rethink, and possibly delay or even cancel previously planned projects. Price stability in this context is primarily an efficiency issue (see the discussion in section 3.5.). However, as the parties are generally unable to communicate the values they place on stability, the issue may be dealt with under the principles of fairness or governance.

A further point about price stability is that it is often used as a justification for using long run marginal cost rather than short run marginal cost. But if price stability is desirable, then it might be more appropriate to establish the degree of price stability independently of a cost measure, rather than using the stability properties of a certain cost measure to justify that cost measure.

3.5 Economic Efficiency and the Allocation of Risk

As noted in section 3.2, the competitive market model assumes that market participants have the ability to manage risk efficiently. Risk can be defined as a possible event that cannot be controlled by producers and consumers but for which it is possible to specify a probability distribution relating to the risky event. Examples of these external or 'exogenous' risks include operating risks (e.g. accident, component or equipment failure), environmental risks (e.g. droughts, storms, and earthquakes) and political risks (e.g. political change, civil unrest, and war)[14]. In other words, these involve risks 'inherent in nature'. This concept of risk involves a known probability distribution over the possible states of nature or outcomes[15]. This section, therefore, discusses the implications for pricing principles when these types of risk are present.

Before discussing risk in the context of regulation it is relevant to consider how the presence of risk alters the basic economic paradigm. Specifically, the paradigm must be extended to define goods not only according to their physical properties but also according to the possible states of nature in which they can be delivered or consumed[16]. For example, there might be two states of nature associated with farming a crop – 'good' or 'bad' weather. If the former occurs then crop yield is high, but if the latter occurs, then crop yield is low. As a result, the output (and the farmer's income) depend on the realised state of nature.

Under the complete markets theory, there is a market for every state-specific, or contingent, claim. A contingent claim corresponds to a good that is delivered in a particular state and only in that state. In the current example, a contingent claim would be a contract in which

[14]These are all *types* of risk, and they are distinct from the regulated firm's and its customers' *preferences* for risk (discussed later).
[15] This is in contrast to 'Knightian' uncertainty, which refers to unquantifiable risk (i.e. a probability distribution over possible outcomes cannot be specified). See Black (2010: 310).
[16] This extension of the basic general equilibrium model is in the spirit of Arrow and Debreu (1954).

another party commits to paying a specific amount of money to the farmer if the 'bad' state eventuates (perhaps in exchange for an up-front premium)[17]. If markets exist for trading such claims then prices in those markets reflect the risks involved. As a result, such markets allocate risk optimally among participants, and an efficient outcome is still attainable (Arrow 1964).

In summary, achieving economic efficiency remains the over-arching objective in a world with risk, but that risk must be allocated optimally.

3.5.1 The Regulatory Setting

Risks such as those discussed previously are also present in a regulatory setting. The monopoly firm and its customers face a number of risks. On the supply side, the firm's marginal cost can fluctuate as a result of volatility in input prices (e.g. fuel costs) and from volatility in weather that affects its operations. Such external shocks have implications not only for investors in the first instance but also for customers, if some of the volatility in costs is passed through in final prices. Cost pass-through mechanisms, such as fuel adjustment clauses, allow for such price adjustments.

On the demand side, demand can fluctuate with the state of the world and also from changes in consumers' preferences and incomes. For example, residential demand for electricity depends on the external temperature. While the immediate impact of the demand-side effect is on the customer, there are flow-through effects to the regulated firm. Sudden changes in demand create volatility (e.g. a sudden spike in electricity demand due to a heat wave), and this volatility potentially exposes the firm's investors to revenue risk.

It is a reasonable question to ask whether a regulator should care about the allocation of such risks. After all, with markets for risk-bearing, risky claims on assets can be traded that achieve efficient allocations of those claims. For example, a firm might be able to manage a certain risk by paying a premium to transfer the risk to an outside insurer that can manage it at a lower cost. This outcome reflects the operation of comparative advantage in risk management, and it is consistent with the first welfare theorem of economics (as extended to apply to economies with risk) (Eeckhoudt and Gollier, 2004: 250-258).

In addition, the Capital Asset Pricing Model (CAPM) used to estimate the regulated firm's cost of equity capital holds that investors can diversify away certain firm, or industry, specific risks by holding a diverse portfolio of assets.

Given these considerations, why shouldn't the regulator leave the regulated firm and customers to manage such risks through market mechanisms? While this option is a possibility, there are at least three important reasons why such an approach might not be optimal.

First, problems associated with natural monopoly can also result in sub-optimal risk allocation. The regulated firm is likely to have greater bargaining power than a group of customers, especially if the customers are small, many, and relatively dispersed. This asymmetric bargaining position might enable the firm to pass more risk to its customers than is efficient because investors are concerned only with how the risk in question affects their returns and not about how it affects customers' welfare, which depends on their incomes and the prices they pay[18].

[17] Of course, in this example, the economy would have to be extended to include such markets (e.g. an insurance market).

[18] The investors might care if, in the limit, the firm's management of risk somehow resulted in customers not being able to pay. Such an outcome would clearly have implications for the firm's profits and investors' returns.

Second, investors cannot diversify away 'aggregate' or macroeconomic risks, as they affect the entire economy. As a result, some risks unavoidably remain with the firm's investors, customers, and/or tax payers in general, depending on the structure of the regulatory framework. Given this possibility, investors might have an incentive to allocate risk sub-optimally for the reasons discussed previously.

Third, regulatory pricing mechanisms, such as two-part tariffs, linear prices, and revenue caps, affect the allocation of risk among stakeholders. For example, suppose a regulator sets a strictly fixed price. With a fixed price, investors bear any volatility in revenues and costs, while customers are protected from such volatility. If investors in the firm, however, do not prefer some risk then, in general, a strictly fixed price will not be efficient. Rather, the efficient outcome will involve some pass-through of cost volatility to customers. Choosing a pricing mechanism, therefore, implies an allocation of risk. As a result, the regulator should take risk allocation into account.

3.5.2 Risk Preferences

Taking risk allocation into account in achieving efficiency in a regulatory setting is potentially complex. While research in this area is still in progress, the economics literature provides some guidance to formulating relevant pricing principles. The key to assessing these issues, however, is understanding the regulated firm's and customers' *preferences* toward risk, which will depend on both their degree of willingness to accept a fair bet and their ability to avoid or manage risk.

How do investors in the regulated firm and its customers react to the various exogenous risks discussed in the previous section? The answer depends in part on their attitudes toward risk (i.e., their 'risk preferences'). Investors care about their returns on investment, and they tend to prefer stable to volatile returns[19]. Similarly, customers care about both their incomes and prices, and they tend to prefer stable income over volatile income. However, customers might dislike or like volatile prices, depending on their preferences toward price risk.

Specifically, if customers dislike price risk this is equivalent to a preference for price stability. Therefore, if both investors and customers prefer stable prices, under general conditions, efficiency requires some sharing of this volatility as both parties are averse to it. This can be achieved in practice, for example, by a partial cost pass-through instead of full pass-through, the latter of which puts all of the risk on the customer. *In this case, efficiency requires price stability.*

On the other hand, if customers like price risk, then this is equivalent to a preference for price volatility. Customers might like price risk because the volatility gives them an opportunity to consume more when the price is low (and *vice versa*). If investors are again averse to price risk but customers like (some) risk, then efficiency requires more pass-through of volatility in comparison to previously. Importantly, *in this case, efficiency requires price volatility.* The implication for regulatory policy is that it would be inconsistent with stakeholders' preferences for the regulator to stabilise prices given these preferences.

A good example is a pensioner who is averse to income risk but, at the same time, prefers price risk. Assume the pensioner pays a fixed charge per month for telephone service regardless of use and a variable price per long distance call. Given these preferences, if the pensioner is averse to income changes, then he/she would be averse to a change in the

[19] This preference is consistent with risk aversion assumptions of the CAPM, which regulators in Australia, New Zealand, and the United Kingdom apply to determine the firm's allowed cost of equity.

monthly charge. However, if the pensioner likes some price risk, he/she will make more calls when the variable price is low (and *vice versa*).

An important result from the economics literature on risk preferences is that the risk should be allocated in inverse proportion to each party's respective degree of risk aversion. In other words, efficiency involves risk-sharing in proportion to the degree of risk tolerance (Gollier 2004). An important implication is that, unless one or more parties is completely averse to a risk, then parties should share the risk in some proportion. This is equivalent to a law of comparative advantage in risk-bearing.

3.5.3 Pricing Principles in the Context of Risk

An important question is how the regulator can achieve efficient risk-sharing in practice. While an explicit and practical framework has not yet been developed, the choice of a pricing structure or form of regulation can help.

For example, suppose that an external shock increases the firm's marginal cost, which in turn increases volatility in returns. Also, suppose investors and customers are averse to volatility in returns and income respectively. If the regulator sets a strictly fixed price (i.e., an inflexible price cap), then this mechanism exposes the firm's equity holders to fluctuations in the firm's returns while fully protecting its customers. At the opposite extreme, if the regulator sets the regulated price on the basis of the firm's actual costs, such that the price changes (albeit with a lag) to reimburse the firm for realised costs, then the customers are exposed to cost volatility while equity holders are fully protected from it.

These examples are extreme as they place all of the risk completely with one party or the other. Unless the party allocated all of the risk has a preference for risk consistent with that allocation, then such an approach will, in general, not be efficient. In practice, parties will only tolerate a certain level of risk such that an efficient outcome involves some degree of risk-sharing between the parties. For example, an 'intermediate' regulatory pricing structure could involve a fixed price in conjunction with a partial cost pass-through. With such a mechanism, each party bears some of the cost volatility. How much volatility borne by each party depends on comparative tolerances for risk, which do not necessarily have to be equal.

A good example and related pricing structure is a two-part tariff. With a two-part tariff, the regulator sets the fixed component to recover the fixed costs of the regulated firm and the variable component to reflect marginal cost. For example, some water suppliers in Queensland have two-part tariffs. The fixed charge is based on irrigator entitlements and designed to recover the majority of fixed (i.e., network costs), while a volumetric charge is set based on variable operating costs, which primarily relate to electricity consumption.

Another relevant form of regulation used to allocate risk is a revenue cap. Revenue caps are a relatively common form of regulation in Australia, and they are applied to regulate electricity network transmission service providers and some electricity distributors[20]. Revenue caps are closely related to average cost pricing and provide a maximum allowed revenue to the regulated firm that is independent of demand. An important property is that revenue caps protect the regulated firm from demand volatility. This is because, if quantity demanded decreases, the regulated price increases to keep the regulated firm's revenue constant[21].

[20] They are also applied to some non-energy businesses, such as Aurizon Network Pty Ltd, which manages the central Queensland below-rail coal network.

[21] In the model, the revenue cap is specified based on the allowed revenues. The regulated price is then derived from the revenue cap and a forecast of demand. As a result, the demand function is specified *ex ante* in the model.

Another important, but less recognised, property is that revenue caps can stabilise customers' expenditure on *other* goods. Specifically, if quantity demanded for the regulated good is unresponsive to price changes, then the revenue cap fixes the customer's expenditure on the regulated good. Again, this effect occurs because, as the quantity demanded increases, the price decreases under the revenue cap to keep the firm's revenue constant. This, in turn, implies that customers' residual income (i.e., the income spent on all other goods) is fixed as well (Cowan 2004, 2006).

This effect is important if the consumer is sensitive to unexpected changes in his/her income (i.e. income risk). It is also not as unlikely as it might seem at first. Regulated natural monopolies for essential services (e.g., electricity and water) tend to have relatively unresponsive demands[22]. The policy case for a revenue cap, therefore, becomes stronger when demand is volatile and also unresponsive to price changes.

3.5.4 Risk Allocation and the Cost of Capital

A key conclusion of the preceding discussion is that the choice of pricing structure and the form of regulation can impact the allocation of risk. An important implication relates to estimating the cost of capital. As the choice of a pricing structure or form of regulation impacts the allocation of risk, to the extent that risk is non-diversifiable, the regulator's choice of price control affects the value of the beta parameter in the CAPM and, therefore, the firm's cost of capital. As a result, the regulator should not choose the form of regulation separately from the cost of capital. Rather, the regulator should determine them jointly.

For example, the firm's cost of capital would likely be higher under a fixed price cap than an average cost price or revenue cap, as the former exposes investors to greater non-diversifiable risk than the latter. The issue of risk, in the context of the form of regulation, is discussed in a separate Authority Discussion Paper (QCA, 2012).

3.5.5 Summary

In summary:

(a) achieving economic efficiency in a regulatory context involves an optimal allocation of risk;

(b) the allocation of risk should reflect stakeholders' comparative advantage in risk-bearing based on their preferences for risk;

(c) economic efficiency can require either stable or volatile prices, depending on stakeholders' preferences for price risk;

(d) the regulator can allocate risk through the choice of a pricing structure and/or a form of regulation; and

[22] For example, suppose that demand for electricity does not depend on the price of electricity but on the external temperature because it is used for heating. A larger quantity consumed does not give the customer higher utility – it simply allows the customer to maintain his/her comfort level that prevailed prior to the temperature decrease. More consumption means that more income is being spent on electricity than before the temperature decrease. As a result, residual income for expenditure on other goods is lower than before. The customer's utility, therefore, depends on residual income after paying for electricity. With the introduction of a revenue cap, expenditure on electricity is constant (e.g. price decreases when demand increases). Cowan (2004) shows that the revenue cap implies that the customer's residual income is also constant, and his/her utility is stabilised (Cowan, 2006: 257).

(e) the allocation of risk has implications for estimating the allowed cost of equity in the CAPM.

3.6 Externalities

Externalities are a major form of market failure. Externalities relate to situations where there are costs or benefits that are caused by an economic transaction that are not reflected in market prices. Externalities sometimes arise in regulated utility markets and regulations may be designed to correct for them. One way to correct for externalities is through externality taxes for negative externalities and subsidies for positive externalities. The taxes or subsidies should be set at levels that cause individuals or firms or government entities to behave *as if* they were taking the externalities into account in their economic decisions. Without such taxes or subsidies, the market price will not reflect the costs and benefits of the externalities to society.

The classic example of a positive externality occurs with bee keepers, who provide benefits to surrounding farmers. Since the beekeepers are not compensated for all of the benefits they provide to society, the supply of beekeepers may be too low – the market fails to produce an optimal supply of beekeepers.

Emissions from power plants provide an example of a negative externality. The emissions may reduce air quality in surrounding areas, imposing health costs and reducing amenity for nearby residents. However, the operator of the power plant does not bear these costs. Taxing emissions will provide an incentive for the power plant operator to reduce pollution, either by cutting back production or by investing in technology that will reduce the harmful emissions.

3.7 Access Pricing Principles

The Authority regulates both end-user pricing and access pricing for intermediate suppliers. Access prices have been regulated in Australia in the past 20 years or so in order that a wider range of services, some of which were formerly typically exclusively served by a monopolist, could be provided by competitors. The natural monopoly aspect of utilities is often limited to a physical network used to provide otherwise potentially competitive utility services. The policy rationale for regulated access is primarily to introduce competitive pressures to improve the efficiency with which access-related services are provided, while helping to restrain excessive monopoly profits.

The same economic pricing principles apply whether addressing end-user or intermediate essential inputs. However, in practice the range of access pricing options is relatively restricted compared to end-user pricing. For example, price discrimination among access buyers could potentially have anti-competitive consequences in one or more downstream markets in which access buyers compete. If so, such price discrimination would be ruled out by the competition provisions of the Competition and Consumer Act, 2010 and would not be consistent with various provisions of the Queensland Competition Authority Act 1997 (2010), which aim to promote the competitive process.

Uniform prices will in some circumstances be the only acceptable access prices if the focus is on competition downstream.[23] Access pricing principles in the context of capacity expansion are considered in detail in a separate research paper (QCA 2013).

[23] Discriminatory access prices do occur in Queensland. For example, in rail, significantly different access prices are charged for non-mineral freight compared to mineral freight trains, and also compared to passenger trains. Differences in the strength of demand and the availability of substitute services, such as trucking for non-mineral rail freight, and passenger buses instead of passenger trains, help explain the different rail access prices charged.

4. FAIRNESS OBJECTIVES

As discussed in Chapter 2, the Act requires the Authority to consider a variety of economic and non-economic goals. The non-economic goals include social welfare, equity considerations, the availability of goods and services to consumers, and the social impact of pricing practices. Regulatory pricing principles previously developed by the Authority acknowledge these non-economic goals, but have not provided concrete guidance on how the Authority should approach these issues when making pricing decisions.

Social welfare, equity and related issues are typically discussed under the broad heading of 'fairness'. The fairness concept is difficult to describe, but encompasses traditional social welfare and equity concerns. In some cases fairness and efficiency goals may conflict. However, there are many cases where fairness and efficiency goals are compatible.

Recent research in behavioural economics identifies situations where fairness may be a prerequisite for efficiency. In these cases, regulators attempting to achieve efficiency goals must explicitly consider fairness issues.

Finally, there is a relationship between fairness and regulatory governance mechanisms.

4.1 The Fairness Concept

'There is no objective standard of "fairness"' (Friedman 1977). Handler (1936) points out that:

> *What was fair yesterday may be unfair today. What is deemed unfair by one group of business men may be regarded as eminently proper by another. What is offensive to a commission may be palatable to the courts. There are other variables. Practices that are economically justifiable in one industry may be reprehensible in others. What is harmless to competitors may be harmful to consumers and vice versa.*

The lack of an objective definition of fairness has not prevented use of the term in legislation and does not absolve the Authority from making decisions that may require a determination about what is "fair".

In some situations social norms can be used to determine what is considered fair. Social norms are 'the customary rules that govern behaviour in groups and societies' (Stanford Encyclopedia of Fairness, 2011). For example, there is a social norm that athletes should play by the established rules of the game. In the realm of business and regulation, norms may be difficult to pin down, are likely to evolve over time, and may not necessarily exist for every real-world situation. As a consequence there are unlikely to be 'hard and fast' rules for the application of fairness issues to decision-making by regulators. However, as discussed further below there are cases where social norms can provide guidance to regulators.

Section 4.2 discusses cases where fairness and efficiency goals may be congruent. Section 4.3 discusses fairness considerations that might be applied in cases where there is no readily apparent efficiency basis for a pricing decision – for example, allocating common costs to individual services.

Section 4.4 addresses the implications of the application of social welfare goals such as fairness in income distribution to regulatory decision-making. As will be seen, there are many cases where application of these fairness principles come at the expense of efficiency objectives. The efficiency-equity trade-offs may require regulators to make choices among competing social objectives.

Section 4.5 explains how fairness considerations can impact transactions in ways that affect economic efficiency. The lesson is that there are cases in which application of fairness principles is *required* to achieve economic efficiency. This conclusion is informed by recent developments in the emerging fields of behavioural and experimental economics, which provide insights into the importance of fairness considerations in facilitating efficient transactions when markets have characteristics that lead to the imposition of economic regulation.

Section 4.6 introduces the important issue of procedural fairness and the design of regulatory governance mechanisms. This topic is developed further in Chapter 5. Many of these issues are also discussed by the Productivity Commission (2012) (see pp. 123-130).

4.2 Economic Efficiency as a Fairness Criterion

There are many cases when efficient prices can also be described as 'fair'. Setting prices that reflect the cost to society of producing a good or service is fair in the sense that lower prices would imply that the beneficiary is not paying a fair share. Prices above cost imply that the producer is receiving a benefit at the expense of the consumer.

The 'user pays' or 'impactor pays' principle is consistent with the proposition that it is fair for any given user of a service, or individual/ entity that causes costs to be incurred, to pay for the costs directly associated with their use or action. The user pays principle is also referred to as cost-reflective pricing (see QCA, 2000, p.29). The concept of beneficiary pays can also be invoked as satisfying a concept of fairness in relation to who should pay for a particular service.[24]

Kaserman and Mayo (1995, p. 505) use the converse to illustrate the point:

> *Suppose that one particular group is not required to pay the costs it imposes on the firm to supply the services. Because the firm is legally entitled to recover all the costs it legitimately incurs, this means that some other group of customers will be required to pay more than the costs they cause to be imposed on society to support the underpayment by the former group. Although there may be legitimate equity reasons for deviat[ing] from cost based prices for particular individuals or products, it seems to be a reasonable first step toward promoting equity to begin with prices that reflect the costs caused by the consumption decisions of customers who pay those prices.*

They conclude that 'because prices that equal marginal costs are also efficient, such pricing simultaneously promotes both efficiency and equity goals'.

The costs that are caused should include the cost of imposing any adverse externalities or reduced to reflect the value of positive externalities. Cost-causative pricing also needs to be modified to take account of dynamic efficiency effects, in particular where pricing based on marginal costs does not generate sufficient revenue to finance efficient investment (see section 3.3). However, the cost-causative principle also has application where the incremental cost that is caused relates to more than a single unit of output.

Friedman (1977) arrives at the same result from a different direction: 'to a producer or seller, a "fair" price is a high price. To the buyer or consumer, a "fair" price is a low price. How is the conflict to be adjudicated?' Friedman's answer is that the market should decide. A competitive market – one with many buyers and sellers – will result in prices that equal marginal cost. The result is 'fair' to both buyers and sellers because it reflects the impartial workings of market forces and is the result of willing transactions. Buyers are not forced to buy at the market price and sellers are not forced to sell.

[24] It is not always the case that users and beneficiaries are the same, which complicates application of these concepts. For example, benefits that accrue to third parties as a by-product of someone's use of a service are positive externalities. See the discussion in section 3.6.

Friedman, given his deep distrust in the ability of any government body to determine a reasonable price, would likely have argued that any market free from government interference produces the best result. The continuing decision of governments to regulate the prices of some monopoly providers can be taken as reflecting a social norm that monopoly profits for essential facilities are considered to be 'unfair'.

At the time Friedman was writing, government in the United States was regulating many markets considered to be competitive – or potentially competitive – but for artificial, government-imposed entry barriers. Deregulation of competing rail providers, trucking, airlines and emerging competitive telecommunications markets all reflect a societal consensus based on experience, that if competitive markets can be established they usually provide better results for society than do monopolies.[25]

4.3 Cost Allocation and Fairness

Common costs are those costs for which there is no cost causation basis for allocation to the services benefiting from them. In other words, common costs cannot be assigned to any one output based on cost causation. A classic example is railroad track. Specifically, how much of the cost of railway track should be assigned to each of the goods shipped over the track? Many regulated, natural monopolies are network industries (e.g., water, electricity, and rail), and network industries tend to have significant common costs. As a result, common cost allocation is an important issue in the context of pricing regulated goods and services.

The problem of the allocation of common costs situations is often addressed by methods that are linked to some concept of 'fairness'. This is because the allocation of common costs may have no well-defined or practicable efficiency basis (discussed below). The common cost allocation problem can arise in a single product or multi-product natural monopoly context. In the multi-product case, the division of these common costs can correspond to a division of the benefits of economies of scope from joint production[26]. In the absence of an efficiency basis for common cost allocation, the discussion over this issue is often couched in terms of fairness.

4.3.1 Fully Distributed Costs

A common method for allocating common costs is known as fully distributed cost pricing. With this method, all costs are distributed (i.e., allocated) to the relevant goods or services based on some measure, including for example relative output, attributable cost (i.e., variable cost), or gross revenue. In each case, the method assigns common cost to each good or service using the relevant allocator. For example, the first method assigns common cost to each output in proportion to that output's proportion of total output.

However, there are several important problems with fully distributed cost pricing (Braeutigam, 1989, p. 1314). First, the choice of activity or output measure used as the basis for the allocators is arbitrary. Specifically, no one cost allocation method is consistently superior to another on an efficiency basis (as defined in section 3.1), and different choices will lead to potentially widely diverging results. As the approach is not based on economic efficiency, it is often interpreted as leading to prices that reflect a 'fair' share of costs. However, the method is still arbitrary from an economic perspective. Fully distributed cost

[25] Winston (1998) summarises research attempting to measure benefits from regulatory reform designed to eliminate regulatory barriers to competition in a number of U.S. markets. He concludes that 'accounting for changes in prices and service quality, a conservative estimate of the annual net benefits that consumers have received just from deregulation of intercity transportation – airlines, railroads, and motor carriers – amounts to roughly $50 billion in 1996 dollars'.

[26] Economies of scope are present when the joint output of a single firm is greater than the output that could be produced by two separate firms, each producing a single product.

methods have no meaning independent of the prices they are supposed to determine. Second, some allocators may be based on prices or revenues. This obviously entails a degree of circularity – prices are in some way used as the basis for cost allocations used to determine prices. However, fully distributed cost methods are easy to implement and may be the only feasible approach for allocating common costs.

4.3.2 Axiomatic Principles

Economists have sought to address the common cost allocation problem by employing "axiomatic cost-sharing principles". Desirable principles that an allocation of common costs should satisfy are specified as axioms. Fairness considerations are often invoked as a basis for one or more of the cost allocation axioms. Allocation rules that satisfy the axiomatic principles are then derived in a game theory framework. For example, Shapley (1953) used four axioms to derive a unique solution to the cost allocation problem. One of the key axioms is Aristotle's principle of distributive justice that "equals should be treated equally" (discussed further below).[27]

Game theory has been used to explore allocation decisions in other contexts. In the two person "game of fair division" one person decides how to allocate costs and the other chooses which allocation to take. Presumably the player making the allocation choice will do so fairly because to do so unfairly risks the chance of receiving the unfair allocation. However, generalising the analysis to multi-person games is problematic as the information requirements are demanding. As a result, the axiomatic approaches have not proven useful in real world applications to date.

The most satisfying approach from an economic efficiency point of view is to use demand information to allocate costs so that the highest prices are paid by the users that receive the highest value, as indicated by their willingness to pay. The result is to increase consumption and production toward efficient levels. However, this approach, which is discussed further below, is also demanding in terms of the information required for implementation.

The two-part tariff approach discussed in section 3.3 may also be used to finance common costs. Each consumer pays a portion of common costs as an entry fee and then pays for usage at marginal costs.

Kaserman and Mayo (1995, p. 505) explain how application of the Pareto improvement test can be used to bring equity considerations into two-part tariff pricing. The Pareto improvement test is that if one or more parties are made better off by a change and no one is harmed, the change can be deemed equitable. Retaining the original flat-rate tariff but allowing consumers to optionally select a two-part tariff satisfies this test. Those who benefit from two-part pricing are provided the opportunity to do so while the ability of everyone else to keep the original terms is preserved. In effect, with the optional two-part tariff, consumers are able to reveal their preferences.

4.3.3 Cost Allocation Tests for Subsidy-free Prices

An approach that has been developed, in relation to cost allocation, that has both a fairness and partial efficiency rationale is to identify a set of prices that are 'subsidy free'. Cost allocations chosen by the regulator may generate concerns about fairness if one party believes that it is cross-subsidizing another.

[27] This is the symmetry axiom. The other axioms are that if a player does not contribute value, its payoff is zero ('nullity'),the value of the game to a coalition of two players is equal to the value for each player separately ('additivity'), and the sum of the allocations is equal to the total to be allocated ('efficiency') (Winter 2000).

Following the seminal work of Faulhaber (1975) on applying cost tests for determining 'subsidy-free' prices, a set of prices is said to be subsidy-free if for each product and all combinations of products or services offered by the firm, the price generates more revenue than its incremental cost but less revenue than its stand-alone costs. Where several products are produced, the incremental cost is the change in total cost related to producing the particular product at a given level compared to producing only the other products at given levels. The stand-alone costs of producing a specific product are the total costs of producing only that product at a given level in isolation from other products.

The intuition is that if the pricing of a particular product does not cover its incremental cost but total revenue equals total cost, then some customers would be better off if the product was not provided, and they would have incentives to be supplied by alternative arrangements. But if prices exceed incremental costs for a particular product, then consumers of other products are better off because of the contribution its revenues provide towards covering total fixed costs. Clearly, if the total costs allocated to customers are greater than the hypothetical stand-alone costs of serving them they would be better off if a stand-alone option was available. Thus subsidy-free prices for any subset of prices cannot be higher than would be the case if only those products were provided and there was competitive entry.

The Faulhaber result derives from a game-theoretic set-up where, if prices contain subsidies, there will be market incentives (assuming competitive entry) that would erode the subsidies. This may result in inefficient entry (bypass) and be reflected in a loss of economies from joint production. The Faulhaber result thus has a partial efficiency rationale, but is often presented in discussions of fairness or equity aspects for prices. In addition, the Faulhaber test only specifies lower and upper bounds for the recovery of common costs, and the regulated firm is allowed to choose the set of prices within these bounds.

Pittman (2010) objects to the application of the stand-alone cost test in the context of U.S. railroad regulation. He points out that Faulhaber's test was designed primarily to prevent inefficient bypass and specifically disavows a fairness basis. Pittman also notes the practical difficulty of measuring stand-alone costs.

The most well known approach to specifying prices that will ensure the least inefficient recovery of common costs is known as Ramsey pricing. With Ramsey prices, the prices are derived from the relative sensitivities of different categories of demand to price changes, with levels set to meet a specified revenue constraint.

There are several important implications of using Ramsey prices in the context of common cost recovery. First, in the absence of marginal cost pricing, Ramsey prices are welfare-maximising but not necessarily subsidy-free. This is because Ramsey prices may not cover incremental costs for a particular service where those costs contain a fixed component related to that service. Second, as a general proposition, if the regulator ensures that the firm breaks even, then all of the fully distributed cost pricing methods are inferior to the Ramsey solution[28].

4.4 Efficiency-Equity Tradeoffs

The previous section discussed cases where market transactions resulting in cost-based prices might be considered fair given prevailing social norms. This section discusses cases where there are trade-offs between efficiency and equity. These are cases where achieving social norms may preclude the achievement of economic efficiency. As will be discussed, in

[28] Cole (1981) shows that in certain special circumstances that a combination of the attributable cost and relative output methods can result in Ramsey prices.

many of these cases where there is an apparent conflict between equity and efficiency, there may be mechanisms that can allow equity to be achieved without sacrificing, or at least minimising the sacrifice of, efficiency goals.

As noted in section 2.1, S26 of the Act requires the Authority to consider social welfare, equity and related matters. The concepts of horizontal and vertical equity, borrowed from tax policy provide a useful description of social norms that may be relevant to some pricing decisions. The horizontal and vertical equity principles are respectively that individuals in similar circumstances should be treated equally and individuals in different circumstances should be treated differently, taking due account of their different circumstances. This principle goes all the way back to Aristotle's proportionality principle (the oldest formal principle of distributive justice)[29]: *"Equals should be treated equally, and unequals, unequally in proportion to relevant similarities and differences"*.

There is also a broad consensus, if not a social norm, that the least well off members of the community should be provided with assistance from the broader community. The significant number of social service programs in Australia aimed at low income and disadvantaged populations illustrate this consensus. The work of philosopher John Rawls is often cited in support of this social welfare principle. As described by Zajac (1978, p. 63), Rawls proposes that " . . . all other things being equal, society is to act so as to make the least favoured member of society as well off as possible."

There are numerous historical examples of using the regulated firm's pricing structure to advance social welfare and equity issues. Specific rate relief for low income households is an example of addressing social welfare issues through the regulatory process. Charging the same price for rural ratepayers as urban ratepayers even though the cost of supplying the former may be larger than the cost of supplying the latter has been justified on equity grounds. The notion is that essential services such as energy, electricity, water and communications services should be available to all citizens at the same or similar prices no matter where they live.

Economists have often pointed out that these social welfare objectives may be more efficiently achieved through other means. For example, a fundamental theorem of economics is that direct subsidies to individuals the government wishes to target for support are more efficient than indirect subsidies. Given the choice of a subsidised service or an equivalent cash payment, a rational individual should always take the cash and spend it in line with his or her own needs.

In general, governments that attempt to achieve social goals through the regulatory process need to be aware of the limitations of regulatory tools to achieve multiple objectives. Unless two goals are strictly compatible it is generally true that policy makers require two policy instruments to achieve the goal (Tinbergen 1952). For example, efficiency may be achieved with the marginal cost pricing rule, but at the expense of what the policymaker may deem equitable. Another tool is required to achieve equity – for example direct income transfers. If the goals are efficiency, revenue adequacy and equity, three tools would be required: marginal cost pricing would be required for efficiency, direct income transfers for equity and fixed charges to recover non-marginal costs for revenue sufficiency.

Policymakers must recognize the limitations of the tools at the disposal of the regulator. In the example above, direct income transfers are required for the government's efficiency goal, but the best tool to accomplish the goal may be tax policy, which in the Australian case is under the control of the Commonwealth and not the state government. In addition the rule of

[29] See Moulin (2002).

one instrument for each objective may not be sufficient to achieve objectives in a world of uncertainty about impacts (see Ng 1984).

Cross-subsidies between ratepayers can similarly be shown to be inefficient. The high (above marginal cost) prices for urban services deter efficient consumption of the urban service and the low (below marginal cost) prices in rural areas stimulate inefficient use of the rural service. Again, direct payments are more efficient.

Another problem with social welfare approaches to pricing regulated services is that the subsidies are often poorly targeted. For example, wealthy farmers (or wealthy urbanites with weekend homes in the bush) are subsidised while less financially well off city dwellers pay more. This would seem to violate the requirements for horizontal and vertical equity.

Despite the admonitions of economists, policymakers often choose to use the subsidy vehicle to assist individuals considered to be in need or those in rural areas. For whatever reason, government chooses to use the regulated firm's pricing structure to achieve social goals.

However, Australia has developed a means to address these programs directly. Community Service Obligations (CSOs), imposed through legislation or regulation are used to make subsidies explicit and transparent.

The Queensland Treasury (1999) defines CSOs as:

> *activities . . . that would otherwise not be undertaken, or would be priced differently, by commercial entities (based on the entity earning normal commercial profit levels and the products or services being delivered on a cost-effective basis). (p. 4)*

The Queensland Treasury goes on to note that:

> *While, in many instances, CSOs will be provided by Government-owned entities . . . , there is also scope for such products or services to be provided by entities owned by other governments or private service suppliers. However, this is ultimately a matter for the Government and it should be considered on a case by-case basis . . . . (p. 5)*

The availability of this policy tool to government and the principles on which its adoption are based suggest that where the government has not chosen to establish a CSO, and has otherwise not provided formal directions to consider fairness, efficiency goals should take precedence over fairness goals.

Where the Authority is called upon in its role of providing policy advice or recommendations involving equity issues, an important step is to identify the cost of lost economic efficiency resulting from a decision to pursue fairness goals at the expense of economic efficiency. Only by doing this can the cost of lost efficiency be compared to any benefits from pursuing fairness goals that are economically inefficient. This suggests the pricing principle that decision-makers should develop the best available information about the economic costs of pursuing non-economic fairness goals and consider alternatives before arriving at a decision.

Productivity Commission (2012) discusses the importance of targeting, the importance of making subsidies explicit and the need for transparency in addressing equity or social goals if regulation is to be used to achieve distributional goals (see p. 128).

4.5 Fairness as a Prerequisite for Economic Efficiency

More recently the fields of experimental economics and behavioural game theory have contributed to the analysis of fairness in economics. It is now well established that many individuals modify their economic behaviour if they consider an outcome to be unfair. There

is also ample experimental evidence that suggests what is considered to be fair is highly dependent on context. Differences in "framing", such as the ordering of information relating to scenarios, the sequencing of events, and even minor changes in details, can significantly affect the parties' economic behaviour in relation to what is considered fair and what is not. Other important contextual parameters include perceived need and prior investment of effort.

If there is one aspect of fairness that seems to transcend many contextual differences, it is that fairness is a relative rather than absolute concept – in particular, if the terms and conditions of supply of a utility service decline significantly, e.g. some customers now have to pay significantly more for the same thing, there is a good chance that this will be seen as unfair. In other words, the *status quo* becomes the *benchmark* by which fairness is assessed. The empirical and experimental economics literature suggests there is a range of circumstances in which some outcomes are clearly interpreted as unfair in terms of a community standard but others that are not, including some where there are changes to the *status quo*.

Biggar (2010) has recently reviewed various aspects of fairness in public utility regulation, highlighting key norms confirmed by Kahneman et al (1986) and linking fairness norms to incentives to protect the sunk investments of both the investors in the regulated firm and the firm's customers[30]. Kahneman et al (1986) propose that a central concept in analysing fairness of actions is the reference transaction. The reference transaction is described as follows (Kahneman et al 1986, pp. 729-730):

> *The main findings of this research can be summarized by a principle of dual entitlement, which governs community standards of fairness: Transactors have an entitlement to the terms of the reference transaction and firms are entitled to their reference profit. A firm is not allowed to increase its profits by arbitrarily violating the entitlement of its transactors to the reference price, rent, or wage. When the reference profit of a firm is threatened, however, it may set new terms that protect its profit at transactors' expense.*

Although the reference transaction is informed by relevant market prices and the history of transactions, it does not necessarily have to be explicitly defined. In addition, it is not necessarily interpreted as 'just' but best interpreted as '*normal*'. Thus changes to the *reference transaction* are the focus of the fairness norms.

From randomly selected Canadian households, Kahneman et al (1986) elicited responses in terms of fairness in questionnaires in relation to various commercial scenarios. Their findings are:

(a) there is considerable acceptance of various actions taken to protect the terms of the reference transaction including protection of reference profits;

(b) it is considered unfair to exploit shifts in demand by raising prices and there is a strong aversion to price rationing;

(c) even rather mild exploitation of monopoly power is considered unfair; and

(d) an action that deliberately exploits the special dependence of a particular individual is seen as exceptionally offensive.

Biggar (2010) draws a link between the above fairness notions and the concerns of users of regulated infrastructure to protect the value of their sunk investments. An outcome that is considered unfair can adversely affect the incentives of both users of and owners of

[30] Kahneman's work on perceptions of fairness and reference points serves as an important basis for the rapidly evolving field of behavioural economics. This work is closely related to prospect theory, for which he was awarded a Nobel Prize in economics. See also Kahneman (2011, Chapters 24-28).

regulated infrastructure to invest and thereby have an adverse impact on economic efficiency.

The relevant literature on fairness highlights a need to establish a reasonable reference transaction to determine what all parties to the transaction would regard as fair from an ex ante perspective. The ex ante perspective effectively requires addressing the question of what *principles* all parties to a transaction would have agreed to *before they made any sunk investments*.

In the context of considering pricing by regulated firms, fairness norms suggest that an ex ante reference transaction would probably not support rationing of demand by price increases if capacity constraints are reached and certainly not if this was unexpected and substantial. This is true for both intermediate and end-user pricing.

As an example of a current issue in Queensland, users of infrastructure are likely to perceive that significant, unexpected increases in price as a result of increased costs to service unexpected increases in demand by new users could well be perceived as unfair. This would be particularly the case where price increases were substantial and there were perceptions that expanding or new users were in effect being subsidised while non-expanding or existing users were being exploited. However, evidence from behavioural economics suggests that users may accept unexpected price increases to cover unexpected costs of serving them *not* related to demand increases (Kahneman et al 1986).

Clearly price increases will be more acceptable if they are allowed for in an original contractual arrangement. The fairness literature also suggests that price increases will be more acceptable if there is sufficient notice or the scheme does not discriminate based on the sunk nature of investments.

Zajac (1978) explores the related case where significant changes from current levels of prices are necessary to recognise shifts in the supply curve or to rationalise prices that, for whatever reason, had been set artificially low. Zajac's conjecture is that '. . .small unregulated rises in prices over long periods of time are not usually considered unjust, but that sudden, large price increases bring public outcries of "unfair"' (p. 60). In these cases regulators often choose to 'phase-in' the significant changes over a significant period of time. This in some way ameliorates the impacts on consumers that may have made decisions to sink funds in reliance on a regulated price. This is consistent with Biggar's (2010, p. 14) observation that:

> *. . . empirical studies of fairness seem to show that the concept of fairness is not so much related to a particular tariff structure or cost allocation as it is to changes in that tariff structure or cost allocation. It seems that virtually any cost allocation could be considered to be fair if consumers have had a long enough period of adjustment.*

The economic efficiency arguments in favour of allowing markets to clear through the pricing mechanism is just as strong in situations where demand and supply conditions are subject to short term disruptions – for example a natural disaster (Gieberson 2011). However, the social norm appears to disfavour use of the market mechanism in these cases. A possible basis for this apparent social norm is that in emergency situations the sacrifice should be shared by all and that it would be unfair for the wealthy to bid away bread, milk and water from the less advantaged. Those cases where a vendor of the scarce good has the legal option but chooses not to raise the price during an emergency can perhaps be explained by either his or her own sense of fairness or the realisation that raising the price by offending the fairness norms of customers can have negative consequences for future business.

The fairness norms cited above are considered to be relevant in complementing efficiency-based criteria when formulating key pricing principles for both access and end-user prices.

They can also provide some practical guidance for taking account of community and commercially-based standards of fairness when developing pricing principles.

In conclusion, the reference transaction is often determined by the *status quo ante*. In some sense the reference transaction reflects an implicit contract between the supplier and the customer. In the absence of a known reference – say establishing prices for a new service – the regulator might determine what the parties would have agreed to in the hypothetical case that none of the parties have yet incurred any sunk cost and neither party has market power.

4.6 Fairness and Regulatory Governance

Friedman (1977) reaches the conclusion that the only fairness issue of concern should be 'procedural fairness':

> *There is a real role for fairness, but that role is in constructing general rules and adjudicating disputes about the rules, not in determining the outcome of our separate activities. That is the sense in which we speak of a "fair" game and a "fair" umpire.*

As discussed above, governments have typically taken broader actions with regard to fairness. Nevertheless, procedural fairness is an important consideration. If regulated monopoly suppliers and their customers do not have confidence that they will be treated 'fairly' by the regulator, investments necessary to achieve economic efficiency may not be made.

Brown et al (2006) in a World Bank Handbook for Evaluating Infrastructure Regulatory Systems set out three high level meta-principles for regulatory governance that are important for developing and sustaining confidence in the regulatory arrangements. These principles are: credibility for investors; legitimacy for consumers and transparency. The first two principles both require the third principle of transparency so that investors and consumers 'know the terms of the deal'. The common element of the first two principles is that both investors and consumers believe the regulatory system operates fairly. This means that the terms and conditions that are specified in a regulatory decision need to be seen to be fair and reasonable from the perspective of both parties. This requires appropriate recognition of the interests of both parties. This in turn means that concepts of 'fairness' as discussed above need to be incorporated into pricing principles as well as economic efficiency.

5. REGULATORY GOVERNANCE AND PRACTICE

Good regulatory practice principles are important for ensuring that the overall objectives of economic regulation can be effectively achieved by using pricing and costing tools. There is a mix of higher order governance principles that relate to overall credibility and sustainability of the regulatory arrangements as well as various implementation principles and standards that are relevant.

Brown et al (2006), in the World Bank Handbook for Evaluating Infrastructure Regulatory Systems, provide a comprehensive presentation of best practice regulatory principles. As noted above, higher order governance principles are: credibility for investors; legitimacy for consumers in terms of being protected from monopoly power; and transparency so that investors and consumers "know the terms of the deal". Economic efficiency is an additional principle that relates to outcomes. The Handbook also defines 10 implementation principles and 15 critical standards for operational purposes. Note that credibility for investors and legitimacy for consumers also entail some aspects of economic efficiency.

It is relevant to note that the Australian Energy Market Commission (AEMC 2006, p.2) recognises that good regulatory practice requires enhancing stability and predictability in prices and transparency of the process for setting prices in developing rules for transmission pricing.

Bonbright et al (1988 pp. 384-87) provide a comprehensive discussion of attributes and criteria for sound rate structures in public utility pricing. They suggest that stability and predictability are secondary criteria with the primary criteria being: capital attraction (revenue adequacy); consumer rationing (allocative efficiency) and fairness. However, they argue that stability and predictability still deserve consideration and that predictability is more important than stability. Predictability is important for planning purposes while a commitment to price stability may be too restrictive – imposing costs and risks in an inefficient manner. Predictability and stability are relevant for planning and providing confidence that sunk investments will be protected as well as for minimising transactions costs, but may conflict with other important regulatory principles.

Baldwin (2013, p.8) points out that a stable regulatory regime ". . . is not so much one in which there are no changes as one in which the changes that occur are knowable or foreseeable and governable. A process of change is liable to be seen as the less unstable in so far as it can be easily planned for and managed."

Baldwin also notes that regulatory changes can occur at three levels. First, the elements of the existing regulatory tools can be modified. For example, the methodology for computing the weighted average cost of capital using the building block approach can be modified. Second, new tools or control mechanism can be adopted. For example, price caps could replace building blocks. Finally, there could be regulatory paradigm shifts or 'fundamental transformations in structures or techniques'. For example, command and control regulation could be replaced with principles-based regulation. In each case regulated firms should have time to plan and adjust within an appropriate time frame, with the appropriate time-frame being progressively longer for each of the three levels of change.

Good regulatory practice also encompasses the concept of regulatory efficiency as outlined in QCA (2000). Essentially, regulated prices should involve as little intrusion as needed to accomplish the required outcome.

6. SUMMARY: CRITERIA FOR EVALUATING PRICE LEVELS AND STRUCTURES

Criteria for evaluating pricing levels and structures need to be specified based on regulatory policy objectives and effective regulatory practice. Some criteria are typically more important than others but application of the criteria necessarily involves trade-offs that vary depending on specific circumstances. Each criterion will normally have some relevance for evaluating pricing structures and will need to be applied with judgement based on specific circumstances. It is not possible to specify the criteria in a way that provides a clear rules-based solution to the determination of optimal price levels and structures in all circumstances. Effective application of the criteria will be case-specific.

The criteria are relevant for evaluating general pricing structures and cost allocation proposals as well as for particular issues such as paying for capacity expansion. Each criterion also has a number of sub-criteria or aspects to be considered.

6.1 Criterion 1 – Economic Efficiency

Are the pricing arrangements consistent with achieving economic efficiency – broadly defined to encompass all aspects of economic efficiency including efficient allocation and management of risk?

The primary consideration in evaluating whether a specific pricing proposal or structure is justified from a public policy perspective is whether it is clearly consistent with increasing overall economic efficiency (comprehensively defined) on a net present value basis. If this is not the case there would have to be well justified non-efficiency based reasons as to why it should be supported.

Efficiency in this respect includes:

(a) Allocative efficiency: this essentially requires allocating scarce resources to their most highly valued uses. Allocative efficiency is dependent on output being produced at a level consistent with price being equal to short-run marginal cost.

(b) Productive efficiency: which requires that output is produced at minimum cost.

(c) Dynamic efficiency: this is primarily about investment and encompasses the inter-temporal aspects of efficiency as well as the timely introduction of new processes, systems and services.

Economic efficiency also requires the optimal allocation of risk. This allocation should reflect the parties' comparative (not absolute) advantage in risk-bearing, based on their preferences toward risk and their costs of managing risk. In general, when these factors are recognised, some form of risk-sharing between the firm and its customers is almost always more optimal than an extreme allocation. Further, economic efficiency can require either stable or volatile prices, depending on the parties' preferences for price risk.

While there is currently not a well developed framework for allocating risks optimally in a regulatory context (although the capital asset pricing model (CAPM) is widely applied to price investors' non-diversifiable risks), a key conclusion is that the choice of pricing structure or form of regulation can impact risk allocation. As a result, to the extent that the risk is non-diversifiable, the regulator's choice of control affects the beta parameter in the CAPM. The implication is that the firm's form of regulation and cost of capital cannot be determined independently from each other. The issue of risk and its impact on the cost of capital are discussed in the separate Discussion Paper, Risk and the Form of Regulation (QCA 2012).

Any relevant externalities must also be accounted for when assessing economic efficiency.

6.2 Criterion 2 – Fairness

Are the pricing arrangements fair and reasonable from the perspective of both service providers and users?

A primary fairness consideration is the extent to which the proposed pricing arrangements are consistent with a reasonable understanding of how prices would be set before sunk investments were made by either party. This is a relevant characterisation of the 'reference transaction' proposed by Kahneman et al 1986, particularly in a context where buyers might have to pay for some costs that were not directly associated with their use.

In addition to consideration of the reference transaction, the proportionality principle – that individuals in similar circumstances should be treated equally and individuals in different circumstances should be treated in proportion to their differences – is relevant. These perspectives are often referred to as horizontal and vertical equity respectively.

Determining whether or not there is a subsidy and the rationale for the subsidy is important in assessing the fairness criterion. For example, in the context of paying for higher average cost as a result of capacity expansion, a key issue is the extent to which both non-expanding and expanding customers use the same infrastructure in the same physical manner. If the capacity is not contracted to users on a long-term basis (or if there is no 'reference transaction'), then there is no meaningful economic sense in which existing customers would be subsidising expanding customers. Simply put, the demand for a certain service has increased and this requires a higher cost of supply that all users should pay in order to continue to have access to the service.

Now assume there is an overall efficiency gain but infrastructure expansion entails new infrastructure that can be clearly segmented for usage purposes from existing infrastructure. Assume also that, in this situation, users of the existing infrastructure but not the infrastructure expansion are in effect paying a price above the stand alone costs of serving them, then clearly there is a subsidy. Although the price for such users might be above stand alone costs of using the infrastructure, alternative supply arrangements may well not be available so that the pricing arrangements are sustainable (because entry by an alternative service provider is unlikely). This situation could in effect represent an efficient implicit tax on the basis that it supported the realisation of an increase in overall economic efficiency. But this then leads to considering whether this is fair for non-expanding customers.

In summary, the fairness criterion entails consideration of:

(a) Consistency with an appropriate 'reference transaction'.

(b) Consistency with the proportionality principle implying horizontal and vertical equity.

(c) The existence and rationale for a subsidy.

6.3 Criterion 3 – Regulatory Governance and Practice

Do the regulatory laws, rules, procedures, and regulatory capacity, and associated pricing arrangements result in the regulator performing its functions in a professional and appropriately transparent manner such that stakeholders can judge whether the regulatory decisions that affect them are sound and they have not been unfairly treated?

As explained above there are a number of regulatory governance and practice principles that are important for ensuring that the objectives of economic efficiency and fairness can be

achieved in the design and application of pricing principles. At a high level economic efficiency and fairness are important regulatory governance principles. In addition there are a number of operational or lower order principles that are relevant:

(a) Transparency. The methodology for determining prices needs to be as transparent as practicable to ensure participants have confidence that outcomes are consistent with relevant public policy and regulatory objectives.

(b) Stability and predictability. The regulatory arrangements and outcomes in relation to pricing need to be as stable and predictable as possible given other objectives. Stability and predictability are likely to promote confidence in the regulatory arrangements and also economic efficiency by reducing uncertainty associated with long term decisions. However, there may be circumstances where stability of prices is not consistent with economic efficiency. In addition, predictability can be more important than stability per se if it is the key to facilitating efficient future decisions.

(c) Practicability. The regulatory arrangements in relation to pricing need to be practicable and minimise administrative and compliance costs as much as possible given other objectives.

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