

COMMUNITY SERVICE OBLIGATIONS

SOME DEFINITIONAL, COSTING AND FUNDING ISSUES

**STEERING COMMITTEE ON NATIONAL PERFORMANCE
MONITORING OF GOVERNMENT TRADING ENTERPRISES**

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PREFACE

There has been a long tradition in Australia of governments imposing special requirements on Government Trading Enterprises (GTEs) which extend beyond the commercial operations of these businesses. Governments have often required GTEs to produce specific goods or services, to maintain a specific pricing structure to provide concessions to particular users, or to utilise specific inputs or level of inputs. These requirements are usually termed 'community service obligations' (CSOs).

Many of the CSOs of GTEs have been in place for decades. They often have not been clearly specified and their scope has been uncertain while the cost of implementing the obligations has been hidden or inappropriately measured.

CSOs provide a range of social benefits to meet government policies. Nevertheless, their presence may also impact on other users of the services of these enterprises, through the use of cross-subsidies and barriers to competition, and on the financial performance of the GTEs.

Consequently, the definition, costing and funding of CSOs have become important issues in developing reforms to improve the performance of GTEs throughout Australia without detracting from the social goals most governments have set themselves.

The Steering Committee on National Performance Monitoring of GTEs was established to develop and publish measures of the financial and non-financial performance of major GTEs in a range of core industries. One of the many methodological issues in developing these indicators concerns the treatment of CSOs. Different ways of funding CSOs will impact differentially on the performance of GTEs and different definitions and methods of costing CSOs make it difficult to measure performance and make comparisons of performance between GTEs.

The refinement of our indicators of GTE performance to achieve more accurate measures, and to provide a more consistent basis for comparisons, of performance depends in part on a more consistent approach by governments to the definition, costing and funding of CSOs.

The paper is published by the Steering Committee as a contribution to the public discussion of ways to develop a more consistent approach to the definition, costing and funding of CSOs. It recognises that governments have chosen to take different approaches to these issues. The paper is aimed at developing the basis for a more broadly agreed approach between jurisdictions. It canvasses a

range of issues and makes recommendations for governments on the preferred definition of a CSO, on the preferred methods of costing CSOs in different market circumstances and on further steps which might be considered in measuring the costs of the CSOs of particular GTEs. Nevertheless, it is likely that legitimate differences of detail between jurisdictions will remain for some time until definitions are further tested in practice and more experience is accumulated on the practical problems of measuring the costs of CSOs in different circumstances.

The paper was drafted for the Steering Committee by Trevor Cobbold of the Industry Commission.

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EXECUTIVE SUMMARY

At the behest of Governments, most Government Trading Enterprises (GTEs) provide some goods and services to certain categories of users at a price which does not cover all costs. These Community Service Obligations (CSOs) can have a significant impact on the performance of GTEs depending on the manner in which they are financed and the proportion of their activities which are subject to CSOs. In turn this makes it difficult to measure the performance of GTEs and to compare their performance with that of other GTEs.

It is therefore desirable to take into account the impact of CSOs on the financial performance of GTEs. This requires agreement on a standard definition of CSOs as well as a consistent approach to their costing.

In addition better information on the extent and cost of CSOs will provide governments with a clearer idea of their budgetary implications and distributional consequences. This should lead to improved decision making.

Defining CSOs

Numerous definitions of CSOs are available, which makes it important to reach some agreement as to what constitutes a CSO in order to make progress on national performance monitoring of GTEs, among other reasons. Several characteristics are commonly associated with CSOs:

- a government directive to a GTE relating to the conditions of supply of a specific service;
- the service would not otherwise be supplied under the same conditions as a commercial decision of the enterprise; and/or
- the service provides an identifiable community or social benefit.

There is considerable ambiguity associated with each of these characteristics and considerable scope for different interpretations of their practical meaning.

The recommended approach is to define CSOs as arising from any specific government directive to a GTE which induces departures from otherwise commercial decisions regarding the conditions of supply of services. However, they would not include directives to GTEs designed to meet allocative efficiency objectives which would not otherwise be achieved through the commercial decisions of enterprises.

Within the framework of the proposed definition, three broad categories of CSOs can be considered, including those where:

- government requires GTEs to provide access to certain services for final consumers at uniform or 'affordable' prices;
- GTEs are required to grant price concessions to special groups of consumers as a way of implementing the income redistribution policies of government; or
- particular public enterprises are required to purchase inputs to meet specific government objectives regarding source and conditions of supply which do not apply to competing public or private firms.

It is recognised that the proposed definition does not resolve all problems. For example, judgements will be required on what a commercial enterprise would do in the absence of a government directive. Furthermore, the definition permits a wide range of government directives to be included as CSOs. However, the definition does serve to highlight the necessity for government review of its ongoing relationship with GTEs. It also explicitly recognises the capacity for governments to influence the types and costs of inputs used by particular enterprises.

Benchmarks for measuring the cost of CSOs

The development of an agreed approach to measuring the cost of CSOs is necessary to reduce potential inconsistencies in performance measures. The purpose of measuring the cost of CSOs is to determine the economic cost (opportunity cost) of the resources used in the production of such services. The central issues are those relating to the establishment of appropriate benchmarks for pricing (which determines revenue) and the identification of relevant costs. The shortfall between revenue and costs is a measure of the cost of the CSO.

Conceptually, marginal cost provides the basis for measuring the economic cost of CSOs because it reflects the opportunity cost of extra units of resources devoted to providing the service. However, in practice it is difficult to estimate. Avoidable cost is an approximation of marginal cost which reduces problems of calculation. A distinction is to be made between short-run and long-run avoidable cost, the latter including the capital cost of additions to capacity to serve CSOs.

There may be large differences between avoidable cost and average accounting costs or fully distributed cost. Fully distributed costs do not reflect the relationship between the extent of cost increases and the supply of additional

quantities of a service. Stand-alone costs measure the cost of supplying a service by itself and therefore tend to ignore economies of scale and scope.

Given the difficulties and expense associated with measuring marginal costs and the tendency for fully distributed costs to over-estimate CSOs, avoidable cost will usually be the preferred method. However, further potential complexities in precisely costing CSOs are likely to necessitate trade-offs between precision and the time and resources devoted to the exercise.

Complications

In practice, there are a number of potential complications associated with measuring the costs of CSOs. Examples considered include:

- cost-padding — actual costs may diverge from ‘best practice’, but actual costs remain as the appropriate measure of resources which otherwise could be used for other purposes;
- peak-load capacity — costing should strictly take into account time of use so that the avoidable cost of CSO services in peak periods will include capital costs;
- decreasing costs — entirely new services provided to meet a CSO should be valued at avoidable cost because joint costs would still have to be met even if there were no CSO, but where a CSO concession is made available to pre-existing users some proportion of joint costs should be included in the valuation of the CSO, whether by avoidable cost plus a mark-up or by average cost;
- capacity utilisation — the degree of capacity utilisation will affect what is included as avoidable cost, in particular, where capacity is fully utilised the avoidable cost would include a variable component to ration capacity as demand continues to increase.

These more complicated circumstances often typify the market conditions in which GTEs operate and, for the most part, avoidable cost remains the preferable benchmark for measuring the costs of CSOs. The major exception to this concerns some particular, but not uncommon, circumstances pertaining to decreasing cost industries. The avoidable costs of a CSO will vary according to the level of operation within an enterprise at which the analysis is to be conducted. Moreover, the significance of the complications noted above is likely to vary between enterprises. This suggests that the relevant avoidable cost will vary according to different market circumstances.

Consequently, it may be necessary to adopt a case-by-case approach to measuring the cost of CSOs. The development of a series of case studies would provide further information on the practical problems incurred in measuring CSOs, as well as a guide to GTEs on how costings should be undertaken.

Examples of methodologies

The most widely employed method for costing CSOs seems to be fully distributed cost.

The most detailed work on the estimation of the costs of CSOs has been undertaken by the Bureau of Transport and Communications Economics (BTCE), Telecom and Australia Post. The BTCE study estimated the cost of Telecom's CSOs by using the avoidable cost approach. Because the BTCE study did not include joint or common costs that would have been incurred even in the absence of the CSOs, it produced a smaller estimated cost of CSOs than did Telecom, which used the fully distributed cost method.

Australia Post is required to use an approach similar to that used by the BTCE, that is, based on avoidable costs.

Funding CSOs

There are a number of ways to finance the CSOs of public enterprises. These include:

1. cross-subsidies between different users;
2. explicit levies on users
3. direct cash transfers to consumers;
4. direct funding of enterprises; and,
5. acceptance of lower rates of return on capital.

None of these mechanisms provide a complete solution to the problems encountered with CSOs. They all involve trade-offs between efficiency and other objectives.

An advantage of direct funding of CSOs over some other methods is that it provides for greater transparency in the provision of these services. It provides an avenue for ensuring that the objectives of government policy are made more explicit and for providing public scrutiny of the costs of implementing them.

Recommendations

1. The preferred definition of a CSO is:

A Community Service Obligation arises when a government specifically requires a public enterprise to carry out activities relating to outputs or inputs which it would not elect to do on a commercial basis, and which the government does not require other businesses in the public or private sectors to generally undertake, or which it would only do commercially at higher prices.
2. The avoidable cost approach is the preferred method of measuring the cost of CSOs, recognising that in some circumstances short-run avoidable costs will be the most appropriate benchmark, while in other cases it will be long-run avoidable cost incorporating the additional capital costs directly attributable to the provision of CSOs. In some particular circumstances pertaining to enterprises operating in decreasing cost conditions it will be more appropriate to value CSOs at above avoidable cost with the precise details being determined on a case-by-case basis.
3. It is preferable that the costs of CSOs be determined on the basis of the actual costs of provision.
4. Governments aim to specify their CSOs for each GTE and to request enterprises to prepare estimates, usually based on the avoidable cost method but adjusted where necessary on a case-by-case basis, of the cost of providing CSOs and to document the sources of funding of their CSOs.
5. Case studies be encouraged in consultation with the Steering Committee in each core group of enterprises with the objective of providing a guide to GTEs of possible ways to measure the cost of their CSOs.

1. INTRODUCTION

Most public enterprises are required by governments to pursue some community service obligations (CSOs). These CSOs are not always explicitly defined and the costs of meeting them are often hidden and can be high. Pursuit of these objectives will impact adversely on the financial performance of a government trading enterprise (GTE) if it is not recompensed by government or other users for providing those services. There is the danger, therefore, that meeting a CSO will cloud any assessment of the performance of a GTE for that part of its operations concerned with providing goods and services on a commercial basis. This suggests that some allowance should be made for the costs of providing CSOs in assessing the performance of GTEs.

The Report of the Special Premiers' Conference Task Force on Monitoring Performance of GTEs (1991) noted some possible options for handling CSOs. One option is to exclude CSOs from the data used to construct performance indicators by excluding their costs. Another is to adjust performance indicators such as the rate of return to allow for the CSOs. A difficulty with these options is determining what part of the enterprises' capital stock is excluded from assessment or to what extent the rate of return of the GTE should be adjusted for a CSO. Almost any unwise or inappropriate investment decision could be blamed on CSOs. In recognition of such difficulties, the Task Force suggested that a more appropriate approach would be to include CSO activities in the construction of performance indicators and invite owning agencies to attach notes to the published measures describing relevant CSOs and detailing the costs incurred in providing them.

This latter approach, however, does not obviate the need to develop an agreed definition of CSOs and a methodology for estimating their costs. This was recognised by the Task Force Report in its suggestion that the Steering Committee would need to develop an appropriate approach to identifying and costing CSOs on a consistent basis.

Alternative definitions of CSOs are likely to result in different types of services being allowed for, thus impairing the comparability of national indicators of performance. A standard definition of CSOs would clarify which services supplied by GTEs are to be considered as functions whose conditions of supply are determined by independent commercial decisions and which can be assessed on normal commercial principles. A clear definition is necessary to enable more accurate estimation of the cost of the services and evaluation of the commercial performance of enterprises. Similarly, different methodologies for estimating the costs of CSOs will reduce the comparability of indicators. A

consistent methodology also is required to measure the impact of CSOs on the financial performance of enterprises.

2. DEFINING CSOs

Many definitions of CSOs have been put forward. Several examples are provided in the Attachment to this paper. There is some ambiguity as to what features or characteristics of a service qualify it to be considered as a CSO. Some of the characteristics more commonly associated with a CSO are:

- a government requirement or directive to a GTE relating to a specific service or function including specification of the conditions under which it is to be supplied;
- the service or function would not otherwise be supplied under the same conditions as a commercial decision of the enterprise; and
- the specified service provides an identifiable community or social benefit.

2.1 A government directive to a GTE

The first characteristic is a relatively straightforward and essential part of the definition of a CSO. The directive is to a particular GTE. A GTE is defined by the Australian Bureau of Statistics as a publicly owned or controlled enterprise which is mainly engaged in the production of goods and services for sale in the market with the intention of substantially recovering costs (ABS 1990, p.15).

In practice, the directives to provide community services have not always been made explicit or public. In some cases, community services supplied by GTEs may be based on tradition or established practice rather than explicit direction. Others may have been established and continue to operate as a result of directives not made public.

The directive to a GTE may also be not to supply certain services or not to implement certain management decisions in relation to the supply of services. For example, the requirements may include government refusals to grant fare increases as proposed by the managers of a GTE. Other directions to enterprises may be not to supply or use goods or services hazardous to the environment. These latter directives may be specific to public enterprises because there are no other firms in a given industry.

It seems essential that a CSO be defined as an explicit and specific public requirement or directive to GTEs in order to identify which services are CSOs, to be able to estimate the cost of the service accurately and to assess the impact of government directives to GTEs on their performance. Many governments

have moved to clearly specify CSOs. In some cases, governments have entered into explicit contractual arrangements for the provision of CSOs by a given enterprise, for example, the NSW Department of Transport has negotiated CSO contracts with NSW transport authorities (see Brew 1991, Stephens 1991).

The definition of a CSO as a specific directive means that a range of government directives to GTEs would not necessarily be regarded as CSOs. For example, general industry objectives set by governments for public enterprises would not be included as CSOs, for example, the objective set for water authorities to supply potable water. Neither would government directives to GTEs to report their financial results be regarded as a CSO. Similarly, other activities undertaken because of the public sector character of enterprises such as Freedom of Information requests (if applicable) would not be included as CSOs. Nor would general regulatory directives such as environmental standards be regarded as CSOs.

GTEs may also bear a different cost structure to private enterprises as a result of different award coverage and superannuation. To the extent such employment conditions are determined through a process which is the same or similar to that which governs the determination of employment conditions in the private sector there seems little reason to include them as CSOs. CSOs are restricted to directives to supply or not supply services and/or the conditions under which they are supplied.

A further issue is whether the definition of CSOs should be restricted to the characteristics of the output of an enterprise – the quantity supplied, the quality of the service and the price at which it is made available. CSOs have been widely viewed as requirements determining the conditions under which a service is supplied rather than requirements impinging directly on the inputs to these services such as labour and capital. Yet, government directives also determine how inputs are used by GTEs. For example, some governments require GTEs to source some of their inputs intrastate rather than interstate or domestically rather than from overseas, or to provide purchase preference margins to local suppliers. Similarly, some enterprises have been required to meet government regional employment objectives and/or to act as employers of last resort.

Such directives on the use of inputs can have the same effect on the performance of GTEs as those directly impinging on the output of a service. They may increase costs and lead to losses or increased charges for the users of other services supplied by a GTE. It is somewhat arbitrary to exclude such input requirements from the definition of a CSO and there seems to be little reason not to include them in the measurement of the costs of CSOs. However, government procurement and regional policies generally apply to all public

sector authorities. A directive for preferential treatment to local inputs should only be considered as a CSO if the requirement applies discriminatorily to particular GTEs and not to other public authorities or private sector firms.

In principle, the Steering Committee believes that the impact of input directives on enterprise performance should be recognised and where possible measured. In practice however, there may be substantial difficulties in establishing whether or not a particular input directive should be treated as a CSO and if so what impact it might have on input costs if the GTE does not face competition from the private sector which is not subjected to such directives. One option is to regard such obligations which are not directed at assisting the community as 'Non-commercial Operating Restrictions'. CSOs could then refer exclusively to output related directives of a community service nature.

In the first instance, it would be preferable to focus on output related CSOs, unless a GTE is able to identify a particular input directive which is having a significant adverse impact on its performance.

2.2 A non-commercial activity

The second frequently mentioned characteristic of a CSO is that the service would not be supplied, or would not be supplied under the same terms, as a commercial decision. A non-commercial service is usually interpreted as one which cannot generate sufficient revenue to cover the costs of supplying the service. Consequently, CSOs are commonly regarded as loss-making services supplied by a GTE at the direction of government.

Some caution is required in the interpretation of this characteristic. Loss-making services cannot always be identified as CSOs.

Both public and private firms may choose for good commercial reasons to accept losses on particular activities or use particular inputs despite them costing more than alternative sources of supply. Firms often choose not to set prices for goods and services which accurately reflect the cost of their provision. For example, private firms in Australia often employ national uniform pricing policies.

One reason is that costs of generating and processing the information necessary to price accurately the cost of supplying a large range of products to different customers can, itself, be a very resource intensive exercise. Where the cost of fine tuning prices to reflect actual costs would be large relative to the price differences that would emerge, some degree of cross-subsidisation may be efficient. In some cases, a national uniform price may be easy to administer and permit the advantage of a nationally advertised price.

Another reason is that sales of one product line may generate additional sales for another product line. This rationale underlies the use of loss leaders, where particular product lines are heavily discounted, possibly below cost, in order to attract customers to other product lines.

Firms may also be willing to bear losses on some lines in order to protect their corporate image and thereby attract or retain customers on other lines. For example, after its privatisation, British Telecom actually expanded the phone box network, a system in which a large number of facilities make losses (Early 1991). The firm did not have an obligation to do so.

A further example relates to the existence of excess capacity, a circumstance perhaps typical of public utilities and many other firms, particularly after new plant has been installed. In these circumstances, enterprises could often be operating at the point where short-run marginal cost is less than average total cost and making losses if they based their prices on marginal cost. As capacity utilisation varies so too could the extent of losses, often being eliminated as the enterprise achieves optimum capacity utilisation.

Decisions to supply products under any of the above conditions will be made by firms as part of their assessment of their commercial prospects. Consequently, identification of the loss-making services of a GTE will not always indicate the presence of CSOs. Moreover, the extent of the losses made on services may not provide an accurate costing of the provision of CSOs.

The critical aspect of the identification of a CSO is that enterprises are directed by governments to supply a service that they would not otherwise supply as a commercial decision, or not supply under the same conditions as required by government. For example, Smiles (1991) states that the over-riding principle to be followed in identifying and quantifying a CSO is to answer the question: 'What would you do differently if the obligation was removed' (p.6).

The difficulty here is knowing what the enterprise would do in the absence of a government directive. There exists a potential principal-agent problem in that governments will not have full access to the information determining the commercial decision making of enterprises.

It may not be in the firm's commercial interest to discontinue all loss-making services for the reasons outlined above, least of all those for which it expects in time to fully utilise capacity. Yet, if governments provide direct funding or accept a lower rate of return to compensate for CSOs, the enterprise is provided with a financial incentive to induce the government (or even compel it by appeal to the electorate) to fund any loss-making activities the enterprise would otherwise be prepared to undertake itself. There is an incentive for the enterprises to load the funding of their 'commercial' loss-making operations on

to government. Of course, governments are in a position to specify those services which they require GTEs to retain. Nevertheless, there is a distinct possibility that governments could end up funding services that an enterprise would be willing to supply in the absence of the government directive.

There seems to be little that can be done formally to resolve this difficulty as there can be no objective test of what an enterprise would do in the absence of government directives. Explicit contracts in themselves will not necessarily resolve the difficulty as the incentive remains to include as many loss-making activities in the contract as governments will agree to. However, the negotiations associated with the preparation of contractual arrangements for the delivery of CSOs provide a means to restrict the transfer of funding responsibilities to the government for services GTEs may provide in any case. Consequently, the contractual basis of CSOs assumes additional significance.

Apart from these considerations, the interpretation of a CSO as a non-commercial service provides for a wide variety of circumstances which are not commonly associated with being CSOs. Governments could legislate to require GTEs to carry out functions or deliver services in a certain way which enterprises would not undertake as a commercial decision, but which may improve efficiency in resource use. For example, in the absence of government regulation, a natural monopoly will have some incentive to price its services such as to maximise monopoly profits. In such a case, the commercial decision of the enterprise is not necessarily the most efficient outcome and there is a case for the government to require the monopolist to price competitively, a decision that the monopolist would not necessarily make on commercial grounds. Moreover, the outcome for the enterprise of a government directive of this nature could be absolute losses on the services it is required to supply. Such losses would have to be made good by direct government subsidies, by the enterprise pricing other services above cost or by some other pricing arrangement.

To include such government requirements as CSOs would of course extend the range of government directives considered to be CSOs quite considerably and, perhaps, unnecessarily.

One response to this problem is to exclude from the definition those government directives or requirements associated with the regulatory framework of the industry. The regulation of monopoly, environmental regulation and the like can be considered as regulatory requirements of industry which are distinct from CSOs. The Steering Committee considers that directives to GTEs to meet allocative efficiency objectives which would not otherwise be achieved through the commercial decisions of enterprises should not be treated as CSOs.

2.3 Social policy objective

The third characteristic commonly associated with CSOs is that the service or function is required by government to provide identifiable social or community benefits that would not otherwise be met. This characteristic provides some basis for restricting the range of government directives to GTEs to be considered as CSOs but only if a particular interpretation is adopted of what are social benefits or objectives.

Consideration of social benefits and costs provides a basis for governments to intervene in the operations of public enterprises, and other industries, to improve efficiency in resource use. However, the social benefits or objectives more commonly associated with the concept of community service obligation are those related to income distribution objectives. These may be to provide welfare assistance to some disadvantaged groups in society according to the objective of making a service affordable to the greatest number of households (vertical equity objective). Alternatively, the objective may be to provide a service uniformly throughout a State or the nation (horizontal equity objective). Another income redistributive objective may be to provide a service to some interest group as a result of political considerations.

In some cases, it may be difficult to separate economic efficiency and income distribution objectives in the provision of CSOs. Certainly, the universal provision of the telephone service is most commonly cited as the classic example of a CSO but its rationale includes both economic efficiency and income distribution considerations. Nevertheless, it is social policy considerations which are commonly associated with the CSO requirements of GTEs.

2.4 Proposed definition

In summary, many of the commonly used definitions of a CSO can be seen to be somewhat vague, arbitrary and inconsistent. Nevertheless, it seems possible to bring together some of the characteristics commonly associated with CSOs to form a workable and meaningful definition. A definition incorporating these characteristics is:

“A Community Service Obligation arises when a government specifically requires a public enterprise to carry out activities relating to outputs or inputs which it would not elect to do on a commercial basis, and which the government does not require other businesses in the public or private sector to undertake, or which it would only do commercially at higher prices.”

Such a definition will not resolve all problems. Some difficulties remain. For example, there will be difficulties in determining what loss making activities enterprises would undertake for commercial reasons in the absence of government directives, especially when the enterprises themselves are the only source of this information.

The advantage of a definition which excludes the income distribution criterion is that practical difficulties in distinguishing between the efficiency and income distribution objectives of governments would be avoided. The disadvantage of the above definition, however, is that a wider range of government directives may be included as CSOs. This serves to point to the necessity for governments to review the nature of their relationship with GTEs and to rationalise the extent of government interference in the commercial operations of these enterprises.

Within the framework of the above definition, three broad categories of CSOs can be considered.

First, there are cases where governments consider it desirable that final consumers or industry should have access to certain services supplied by a GTE at a uniform or an 'affordable' price irrespective of the cost of provision. Examples are the provision of electricity, transport, telephone and postal services to isolated regions. In some cases, the services may be required to be provided free of charge to the public (as in the case of maritime search and rescue services) or to government.

Second, public enterprises may be required by governments to grant price concessions to special groups of consumers in order to implement welfare and redistribution policies.

Third, particular public enterprises may be required to adjust their purchase of inputs to meet specific government objectives regarding source and conditions of supply which do not apply to competing private firms.

3. MEASUREMENT BENCHMARKS

In measuring the costs of CSOs the objective is to determine the economic cost of the resources that the GTE is devoting to the required service. The costs should measure the real resource or opportunity costs of the output in question. Expenditure is not necessarily synonymous with costs in a given period. Expenditure is a measure of what is actually spent, but economic costs measure the consumption of resources, and opportunities foregone as a result of not adopting alternative uses of resources.

The practical measurement issue is by how much total costs change when output is varied as a result of the CSO, compared to the revenue derived from the good or service. The financial cost of a CSO can be measured as the difference between the price (revenue) received for a service and the cost of supplying that service. The extent of the shortfall will be influenced by the level of prices (revenue) and costs which would have been obtained in the absence of the CSO. Revenues are determined by the pricing policy of the enterprise, given demand expectations, which specifies how the relevant costs of operation are to be recovered. Consequently, central issues in the measurement of the costs of CSOs include the establishment of appropriate benchmarks for pricing and the identification of the relevant costs of operation.

Another method of measuring the cost of CSOs is to compare the benefits of a service with avoidable cost. For example, one of the methods used by the BTCE in its study of CSOs for roads is to compare the net benefits of a road system at existing standards with those obtainable had the road link been initially constructed at a lower standard. A road would be classed as a CSO if it was built or maintained to a standard above that at which net economic benefits are at a maximum. (see BTCE 1992)

If the purpose of measuring the costs of CSOs is to determine the economic cost of the resources being devoted to these services, the most appropriate basis on which to make the assessment would seem to be the revenue and costs which would be otherwise associated with the most efficient pricing and production practices. But, as many inquiries have demonstrated, GTEs do not often employ the most efficient pricing and production practices. Consequently, it may be extremely difficult to obtain precise estimates of the real cost of CSOs.

The potential complexities in precisely costing CSOs are likely to necessitate trade-offs between precision and the time and resources to be devoted to such an exercise. There is a danger in pursuing more precision in costing than is feasible and which does not materially influence the outcome to an extent

sufficient to warrant such precision. This is an important criterion to be considered in adopting the most appropriate method of estimating the cost of CSOs.

There are a variety of methods to estimate the shortfall in revenue in relation to cost. They differ in the treatment of revenues and costs. The main methods are discussed in the following section. It is followed by an outline of the empirical approaches which have been recommended or adopted in Australia.

Measurement of the costs of CSOs is influenced also by the nature of the government directives. In some cases, these directives are quite explicit in the nature of the service and conditions under which it is to be supplied, for example, rebates for pensioners on the supply of electricity and water. In other cases, the directive is more general, such as the provision of a standard telephone service which is reasonably accessible to all Australians on an equitable basis, and would require some interpretation by the relevant GTE. Some directives may be met by an increase in output from existing capacity, others may require investment in new capacity such as extension of networks associated with telecommunications, electricity and water supply. Other directives relate to the use of inputs such as labour by the GTE.

3.1 Marginal cost

In principle, the concept of marginal cost provides the basic benchmark for measuring the costs of CSOs and determining any shortfall in revenue. Pricing according to marginal cost determines the revenue available to the enterprise given demand and, in general, promotes the efficient use of resources. Marginal cost is the cost of producing one more unit of a good or service although it can equally be envisaged as the cost that would be saved by producing one less unit. Considered the first way, it is sometimes termed incremental cost; considered the second way, it can be termed avoidable cost. These terms, however, are often reserved to indicate the average additional cost of a given increase in output. Avoidable cost is further discussed below.

The essential criterion of what belongs in marginal cost and what should be reflected in the price of a service is causal responsibility. Only those costs that will increase as a result of use of a service should be considered. In general, all purchasers of any commodity should be made to bear all additional costs which derive from the provision of the extra unit of output. Price should only reflect those costs which vary with output because production of an additional unit is causally responsible for only those costs.

In principle, short-run marginal cost is the relevant cost of additional units supplied with existing capacity of an enterprise. It is the change in total variable

cost. It reflects the opportunity cost of supplying the additional unit to buyers. Consequently, costs which are not a function of use such as the cost of capital and various other overhead expenses should not be included in the costs to be recovered by price.

In contrast, long-run marginal costs include capital costs, comprising the change in market value of the assets being utilised and the cost of capital invested in the plant. Plant capacity is variable in the long run. Long-run marginal costs are relevant only to planning for the future. The planned revenue to cover these costs will turn out to be appropriate only if demand is correctly forecast.

Essentially, long-run decisions are about providing capacity and short-run decisions are about using it. Short-run costs would be equal to long-run costs only when capacity happens to be in long-run equilibrium. Consequently, it could be expected that the provision of goods and services, such as those which governments require to be supplied by GTEs, should be costed by reference to short-run marginal costs.

The exclusion of fixed costs from the marginal cost to be recovered from current output does not imply that prices set for this purpose will not cover fixed costs. Short-run marginal cost can be higher than, equal to, or lower than average cost, depending on the relationship between demand and plant capacity. With any plant there is usually some point beyond which the rate of output can be expanded only by incurring increasing variable costs. As long as demand is sufficient, prices to recover short-run marginal cost will have the effect of recovering fixed costs.

However, there are practical difficulties in defining and estimating short-run marginal cost which often necessitate other methods of pricing and estimating costs. Defining marginal cost, let alone estimating marginal cost and applying it, is no easy matter. Even the most elementary, in-principle approach must consider several problems: the classification of costs between short or long-run marginal cost; the appropriate unit of sale for costing purposes; and treatment of common and joint costs.

Several practical difficulties are incurred in the classification of costs as between long-run and short-run. For example, to the extent that wear and tear of equipment varies with use, depreciation is a variable cost although it is typically used for accounting purposes to combine wear and tear costs with provision for obsolescence and charged per unit of time instead of output. The practical difficulty is to distinguish between the component which varies with production and that which is a function of time, that is, a fixed cost which should not be included in the estimation of the marginal cost to be recovered by price.

The ideal approach is to consider the shortest-run marginal cost for the smallest possible increment of output but this too is not often practicable. Judgements have to be made about the appropriate increment or unit of output in order to estimate marginal cost. For example, is the incremental unit the filling of an empty seat on a scheduled bus or plane trip, is it that particular bus or plane trip with a full complement of passengers or is it the full schedule of services between different locations? The choice of the proper unit for sale for purposes of pricing and costing involves a balancing of the practicable with the economic ideal.

The problem of specifying the size of the unit of increased output is itself a reflection of a more general problem in estimating marginal cost, that of common costs. The costs of carrying 200 passengers on a single plane flight constitute a set of common costs: they are incurred not on a passenger-by-passenger basis but all together or not at all. In these circumstances, the unit of production (the flight) is larger than the unit of sale (a ticket to a passenger). As a result, the marginal cost of each sale is practically zero; whereas the cost of the unit of production will be much larger.

Multiple goods or services supplied by the same plant are characteristic of most GTEs so that most costs of these enterprises are common. As long as the proportions of the common services and the capacity planned or used for each can be varied, the marginal cost of each can be determined. For example, a system of dams can be operated to yield varying proportions of electricity and water supply. If the proportions are economically variable it is possible to identify as the marginal cost of any one product the addition to the total cost of the joint production process occasioned by increasing the output of that one product, while leaving the output of the others unchanged. However, in the presence of pervasive common costs for a variety of services, it is not feasible to make exhaustive calculations of constantly changing and differing marginal costs of each unit of service.

When instead the products are truly joint, in that they can be economically produced only in fixed proportions, neither of them has a genuine, separate incremental cost as far as the joint part of their production process is concerned. Consequently, it is not possible to determine the marginal cost of increasing the output of one unit of one of the joint services.

There are other practical difficulties associated with the estimation of marginal cost. It will be a very costly exercise to determine marginal costs of the complete range of different services provided by GTEs even as CSOs. Also, marginal costs can vary a great deal between quite short periods of time as demand constantly changes. For industries such as the electricity supply industry, which face demands which vary substantially over the day and the

year, and which have marginal production costs which vary with the size of demand to be met, there are in effect as many products as there are time periods in the year which it is meaningful to distinguish. For each of these products there will be one, or even more (see Webb 1973, p.104), associated marginal costs. Enterprises operate at perpetually changing points on their short-run marginal cost function and between extremes much wider than either average variable or average total costs. Congestion in some services will add to the difficulty of calculating marginal cost. The cost functions themselves will also be constantly shifting.

The problems in using marginal cost to determine the cost of CSOs and the shortfall in revenue, therefore, are twofold. There are problems in defining what is in marginal cost and there are practical difficulties in estimation and application as well. These considerations indicate it is extremely difficult, and a costly process itself, to measure precisely the costs of CSOs based on the marginal costs of different sales. It seems that compromise in both pricing and measuring costs is necessary.

For these kinds of reasons, other more practical pricing and costing approaches are often seen as necessary. Other approaches may provide a more simplified approximation of the costs of CSOs. They are likely to incorporate longer run aspects of costs with short-run pricing being confined to special or more restricted circumstances.

3.2 Fully distributed costs

A practically achievable version of short-run costing and pricing is to estimate average variable costs, themselves averaged over a given time period. The difficulty is that short-term average variable cost is never as large as average total costs and if prices are set accordingly, revenue does not cover costs for any services, let alone CSO services.

As a result, there is a tendency for firms to resort to full cost pricing in practice comprising average variable cost plus a mark-up to cover fixed costs. In this tradition, fully distributed costs provide a practical criterion for many GTEs in determining prices (revenues) and costs.

Fully distributed costs are the total costs of an enterprise allocated to all the different activities it undertakes, including those not directly attributable to particular activities.

Various methods can be used to distribute or allocate costs among the range of different services provided by a GTE. Some costs can be directly assigned exclusively to one service or other but, in general, most costs must be allocated

at least in part because they are incurred in serving more than one class of customer. These common or joint costs may be distributed according to a variety of allocation schemes (Braeutigam 1980). Some of the more usual methods are on the basis of some common physical measure of utilisation, in proportion to the costs that can be directly assigned to the various services or in proportion to the gross revenue generated by each service. There is no uniquely acceptable allocation rule.

The attraction of the fully distributed cost method of estimating the costs of CSOs is that it is perceived to be fair. Each consumer pays the attributable costs of supplying the service to them and a share of the unattributable costs. A requirement to supply additional services or additional consumers means that the unattributable costs can be shared more widely, even with the government requiring the service if it funds the costs.

The basic defect of fully distributed costs as a method of costing CSOs is that it does not necessarily measure marginal cost responsibility in a causal sense. It does not measure by what amount costs increase with additional quantities of any particular service or by what amount costs would be reduced if the service were correspondingly curtailed. They are average costs: the allocations among the various services are often made in part on the basis of the relative number of physical units of consumption or utilisation by each, and the total allocated revenue is then divided by those physical units to obtain the unit cost.

As a result, measuring costs by reference to fully distributed costs and setting prices (revenue) to meet these costs will lead to overestimation of relevant costs and excess charges compared to marginal cost pricing up to optimum capacity. To cost marginal or infra-marginal services provided as CSOs according to the fully distributed cost approach would lead to an overestimation of the costs of providing those services. Conversely, beyond the point of lowest cost utilisation of capacity, adoption of the fully distributed cost method will result in an underestimate of the costs of the mandated services.

Fully distributed costing ignores the pervasive discrepancies that arise between marginal and average cost in the provision of many services by GTEs (see Kahn 1989, pp.152–8).

Only in cases where the cost functions approach constant returns to scale would the fully distributed cost method provide a reasonable approximation of the true cost of CSOs. Consequently, this method does not provide a reliable guide to the costs of CSOs. Depending at what point on its cost function an enterprise is operating relative to the most efficient use of capacity, fully distributed costing results in either over or under-estimation of costs.

Also, being apportionments of historical costs, even when they do accurately reflect historical responsibility for incurring these costs among the respective users, they do not provide a reliable measure of what will happen to costs in the future if particular services are dropped or expanded. Therefore, they do not indicate whether a particular service is profitable or unprofitable in the sense that its continued provision makes a net contribution to revenue over the costs for which it is responsible, or whether, instead, it is a burden on other services (Kahn 1989, p.152).

3.3 Avoidable costs

A practically achievable benchmark for costing CSOs which approximates short-run marginal cost is more likely to be a type of longer-run incremental cost, estimated for a given block of incremental output. The concept of 'avoidable' cost is often used. It is essentially a practical measure of marginal cost (BTCE 1989, p.18). The important feature of the concept of avoidable cost is that it provides a measurable approximation of marginal cost while retaining that causality between increases in output and its costs which is fundamental to efficient pricing of goods and services.

In contrast to marginal cost as the cost of an additional unit of output, avoidable cost is used practically as an average cost of a given range of output. It includes all costs associated with the provision of the given additional block of output. These include the average incremental variable costs of the extra output and the estimated additional capital costs per unit where additional capacity is associated with implementation of a CSO. Thus, there is a distinction to be made between short-run and long-run avoidable cost.

Nevertheless, as in the case of marginal cost, the incremental level of output, or what is avoidable, has to be specified. According to Luck and Martin (1988, p.16), avoidable cost "... is an imprecise concept that requires specification of the subject or item that will be 'avoided'". The avoidable cost will vary depending on the dimension and scale of the subject under consideration. Different levels of output will have different cost components. The smaller the unit of output specified, the smaller will be the avoidable costs. As the perspective is broadened, more and more costs become avoidable so that the issue becomes one of specifying the level of output to be considered. Avoidable cost will also vary according to the time period being considered. More inputs are avoidable the greater the time period. In particular cases being examined, the relationship between avoidable cost as a measure of resource use and actual expenditure by the enterprise has to be established.

An example of the variability of avoidable cost according to the unit of output being considered is provided by the BTCE (1989) in its approach to the calculation of the cost of Telecom's CSOs. The BTCE considered avoidable cost at different levels of output. At the lowest level, few of the costs of providing a single unit of output such as a telephone call will be avoidable. At this level, if one call was not provided, the avoidable cost may include some electricity cost and an identifiable proportion of the costs of maintaining equipment. As the perspective broadens through single customers, groups of customers, exchanges, districts, market segments and ultimately to the whole telephone network or the whole Telecom organisation, the proportion of costs which are avoidable increases up to the total cost of the network.

In summary, the avoidability approach used to assess costs of CSOs takes into account the facts that avoidable costs are different at different levels of analysis and that a long run perspective is more appropriate than short run. (p.30)

The provision of CSOs in some cases may not necessarily create a need for additional capacity. In other cases, however, implementing CSOs requires additions to existing capacity such as the extension of networks. In these latter circumstances, the capital costs of the additional capacity are relevant to estimation of the cost of the CSO. This was the approach adopted by the BTCE in its estimation of the cost of Telecom's CSOs. It took the view that if CSOs were not imposed, Telecom could avoid the cost of investment in some infrastructure and that the long-term provision of CSOs would necessitate replacement of existing capital used in providing the CSOs when it is worn out or becomes obsolescent.

One difficulty often raised in valuing CSOs is the appropriate treatment of common costs incurred in providing the CSO services and other services. In principle, there are many ways of allocating these costs between different services. However, the avoidable cost approach of valuing CSOs includes only those costs directly attributable to the provision of the service. Those fixed costs which would be incurred in the absence of the CSO are not avoidable despite the fact that they may jointly contribute to the provision of the CSO. Therefore, they are not included in the valuation of the CSO. But, what are considered to be common costs which are non-avoidable at one level of analysis may be considered to be avoidable at a broader level of analysis. For example, in telephone networks the cost of an exchange could be considered as a common and non-avoidable when estimating the costs of CSOs to customer groups but avoidable when conducting the analysis at the exchange level. Thus, what is to be considered as avoidable capital cost depends on the level at which the analysis is to be conducted. This is an empirical issue and one that cannot be decided in the abstract.

In some circumstances, it may be necessary for CSOs to be costed at avoidable cost plus a mark-up to reflect a contribution to common costs. Such complications and qualifications are discussed in Section 4 of this paper.

The inclusion of capital costs raises further issues such as the appropriate gross cost of capital (rate of return and depreciation) which is included in the cost of a CSO. There is an issue as to what is the most appropriate rate of return for measuring the opportunity cost of funds devoted to the provision of services required by government as CSOs. There are various possibilities. For example, in its costing of the CSOs of Telecom, the BTCE considered the rate of return on the marginal project within the public or private sector, the rate of return on the marginal non-CSO project within Telecom and the rate of interest paid by Telecom on its borrowed funds. It derived a CSO figure for each rate of return.

Except for the portion of depreciation that varies with the extent to which the facilities are used, depreciation costs are a function of time. As such they may be recovered from customers in various ways; for example, equal amounts for equal periods of time, or equal amounts per unit of sales. For the purposes of costing capital for CSOs, it will be necessary to determine the appropriate method of allowing for depreciation.

These issues raise the further question of the appropriate valuation of the capital of an enterprise, whether it should be based on historic or current costs.

Practical difficulties can arise in assessing avoidable costs if accounting systems are not sufficiently disaggregated. Without this it is not possible to accurately match economic costs associated with CSOs against the revenue produced by separate and identifiable operating units.

3.4 Stand-alone cost

Stand-alone costs are those of providing a product or service in isolation from other products, that is, the existing costs of the enterprise less those costs which would be avoided by deleting all other products or services. The stand-alone cost of a group of services is the cost of supplying those services without the supply of any other.

Public enterprises typically supply a large number of different services with complementarities in their production (economies of scope) which arise, in part, from the utilisation of common facilities. Consequently, the cost to an enterprise of supplying many services simultaneously is less than the sum of the costs of supplying them each in isolation from one another.

Stand-alone cost is more relevant to setting ceilings on the prices charged by natural monopolies by requiring that the revenues from any service or group of

services fall below the total cost which would be incurred by supplying that service or group of services in isolation. The concept of stand-alone cost is also useful in determining the existence of cross-subsidies (see Faulhaber 1975).

Using stand-alone cost as a benchmark to estimate the costs of CSOs will result in extensive over-estimation of those costs. The reduction in costs available from economies of scale and scope will not be captured in estimates based on stand-alone cost. For example, the avoidable cost of supplying a pensioner with electricity at a rebated price will be much less than the stand-alone cost of supplying the same pensioner. Even fully distributed costs would provide a better basis for measuring the costs of CSOs than stand-alone cost.

3.5 Conclusion

Conceptually, marginal cost provides the basis for estimating the additional cost of supplying extra services because it reflects the opportunity cost of the extra units to buyers. Nevertheless, in practice it is difficult to estimate. Avoidable cost or incremental cost is an approximation of marginal cost which reduces the problems of calculation. On the other hand, there may be large differences between avoidable cost and average accounting costs or fully distributed costs. Fully distributed costs do not reflect the causality between the extent of cost increases and the supply of additional quantities of a service. Consequently, avoidable cost will usually be the preferred approach to measuring the costs of CSOs. Some potential qualifications to this conclusion are discussed in the following section.

4. COMPLICATIONS AND QUALIFICATIONS

4.1 Cost-padding in GTEs

Where there is little incentive to minimise costs, for example, because of insulation from competition, cost padding will add to the costs of delivery of CSO services. An issue arises in these circumstances as to whether the cost of a CSO is measured as the shortfall of revenue on the actual economic costs faced by the enterprise or by comparison of the revenue and costs of providing the CSO service in the most efficient manner.

A distinction should be made between the approach to costing CSOs and their funding. The objective of measuring the costs of CSOs is to assess the extent of opportunities foregone in providing these services. It is the actual cost of delivering the services, rather than the 'best practice' cost, which is the measure of the resources available which could have been used for other purposes. This is not to say that 'best practice' cost could not be used as the basis for funding CSOs in order to promote more efficient delivery of the services. This possibility is further discussed below.

4.2 Peak-load capacity

In some circumstances, the costing of CSOs should take into account the time of use of the available capacity.

Much of the capacity of GTEs is utilised at varying rates according to time of use. The capacity installed is to meet peak demands which are not sustained for all periods. Off peak users may not impose any capacity costs on society and the marginal cost of serving these users might be quite small. For those hours of the day at which demand is insufficiently strong or responsive to a charge covering only operating expenses, longer-run marginal costs, or avoidable costs, include only those operating costs. For those times of day at which demand is strong or so responsive to a lower charge as to cause congestion, longer-run marginal cost necessarily includes capital costs as well. The principle is quite clear: if the same type of capacity serves all users, capacity costs should be levied only on utilisation at the peak.

Strictly speaking, the costing of CSOs by the avoidable cost method should take account of this pricing principle. Capital costs should be included only in the valuation of CSOs which are provided during peak periods. It is only peak users who impose on society the incremental cost of the capacity which they

use. There is no such causal connection between off-peak utilisation and capacity costs: the capacity would be there whether or not the off-peak user made demands on it.

But, there are some complications. For example, some off-peak users may properly be charged for some capacity costs. Some GTE services may be subject to increasing costs in the short-run, such as in the case of electricity generation where plants vary in age, technology, location and efficiency. In these circumstances, the common practice is to hold the less efficient plants in reserve and phase them in according to the level of demand and according to their marginal costs. As a result, some off-peak users will pay a contribution to joint capital costs (see Kahn 1989, p.94). The costing of CSOs to such users should also reflect these costs.

Thus, avoidable cost remains the appropriate basis for valuing CSOs but the specification of those costs varies according to the market conditions in which a CSO service is provided.

4.3 Decreasing costs

The provision of services by GTEs is often associated with decreasing costs, in the short or long-run.

Heavy fixed costs are associated with most GTE operations and they generally need to build capacity in advance of demand because of the economies of large plant size and their obligation to supply a service that in many cases cannot be stored but can only be produced on demand. As a result, excess capacity and short-run decreasing costs are pervasive. Moreover, many aspects of GTE operations exhibit economies of scale and/or scope so that there are long-run decreasing costs as well. The consequence is that adoption of an economically efficient pricing policy, that is, pricing to marginal costs, will incur a shortfall in revenue for the GTE.

Governments may require firms to fully recover costs rather than continue to fund these losses from consolidated revenue. This is becoming a more common practice. In these circumstances, various pricing policy options are open to enterprises to recover their costs including a return on capital. One price option, for example, is to discriminate in price between different products or classes of users (such as recommended by Ramsey pricing). The objective is to allocate costs in excess of marginal cost amongst various users to achieve the most efficient allocation of resources. Price discrimination is the means by which an enterprise with decreasing costs can cover average total costs while making fuller use of existing capacity and permitting as many purchases as possible as long as buyers are willing to pay the incremental costs of supplying them.

Ramsey pricing offers the opportunity for enterprises to fully recover their costs while minimising the loss of efficiency associated with pricing above marginal cost. Two-part tariffs are another option. In practice, however, many enterprises resort to fully distributed cost pricing to recover costs.

Where enterprises in decreasing cost industries are required to fully recover costs the issue arises as to whether the costing of CSOs should incorporate costs above long-run marginal costs.

It may be considered that CSOs supplied in those conditions should be costed at above avoidable costs because all users would otherwise be expected to contribute to recovery of fixed costs. In contrast, the effect of the avoidable cost approach to valuing CSOs in these circumstances is that joint or common costs between CSO services and other services are excluded.

The justification for not including joint and common costs in the valuation of CSOs is that those costs would still have to be incurred by enterprises even if there were no CSOs. The purposes of measuring the costs of CSOs include determination of the impact of CSOs on enterprise performance and assessment of funding requirements where direct funding is used to compensate enterprises for CSOs. Costs which are incurred whether or not an enterprise has CSOs are not related to the impact of CSOs on performance. For example, Martin (1991) states:

Evaluation of the commercial performance of the enterprise as if it had no CSOs, that is as if it was purely commercial, requires all costs which are joint between commercial and non-commercial activities to be included as commercial costs. They all would be incurred if the firm only undertook those commercial activities.

This argument applies more aptly to circumstances in which a CSO requires the provision of new service which utilises already existing fixed overheads. A CSO which induces new demand, whether as a result of a new service required by the government or a price concession on an existing service, should be valued at avoidable cost. The enterprise would have found it necessary to cover the same common costs in the absence of the new demand.

However, a difficulty arises in using the avoidable cost approach for the many CSOs which involve concessions to already existing users of a service. Prior to the introduction of the concession, existing users contributed to the recovery of common costs. With the CSO in place, previously existing users in receipt of the concession will no longer be making a contribution to common costs. Consequently, the enterprise will suffer a shortfall in revenue if the government does not make a contribution to meet some share of the common costs for its CSO. Without government funding the enterprise would have to shift responsibility for all common costs to users of the services supplied

'commercially' so as to maintain its financial viability. These non-CSO users would then pay prices higher than would be otherwise necessary.

An example of this effect can be seen in the water sector where several CSOs involve a lower access charge for CSO beneficiaries than for other users. In these cases, the avoidable cost approach would result in the allocation of all joint and common costs to other users. Given the requirement to meet a target rate of return, the water authority would have to set access charges for non-CSO services at a higher level than if the CSOs were being costed and funded at a level which included a contribution to joint fixed costs (see Industry Commission 1992, p.92).

Thus, there is a case for CSOs provided to previously existing users to be valued at a mark-up above avoidable cost where services produced are subject to decreasing costs. Adoption of this approach would give rise to further practical complications.

The first is the practical difficulty of distinguishing between previously existing demand for a service at commercial prices and new demand induced by the price concession. Most CSOs have been in existence for some considerable time. It will not be possible to distinguish between those who would have been using the service in the absence of the price concession and the extra demand generated as a result of the introduction of the CSO. It is not possible to calculate how many units of output should be valued at avoidable cost and how many on the basis of foregone revenue. It may be more feasible when a new CSO concession is introduced which applies to some previously existing users but even then there will be major difficulties distinguishing new demand due to the new price concession and that resulting from normal growth or from other factors. At best, it could be done under very approximate operating assumptions.

Consequently, governments may look to other more practical solutions for the costing of CSOs in declining cost GTEs. Two possibilities are to value the CSO at avoidable cost and let the GTE recover the revenue shortfall from other users or at avoidable cost plus a mark-up for all demand for the targetted service (previously existing and new).

Neither option provides an accurate estimate of the opportunities foregone in providing the CSO services and there are obvious efficiency costs arising from funding CSOs on either basis. The first option involves charging higher prices to other general users of the service in order to recover the revenue shortfall. It tends to obscure the costs of implementing CSOs and makes their measurement more difficult. The second option involves compensating the GTE at above avoidable cost for the total demand, including that induced by the CSO. This means that the government must raise more taxation revenue than is necessary

to fund the GTE to supply the CSO. The GTE will receive more revenue from the government than is necessary to compensate it for the cost of the CSO and this may induce further inefficiencies in the operation of the GTE.

The former option essentially involves confirmation of existing practice in the funding of CSOs, that is, cross-subsidisation between various products and users. In order to better promote efficient resource use and public scrutiny of the costs of CSOs most governments are now looking to other methods of funding these objectives. For this reason, it may be more desirable for governments to pursue the latter option.

This course gives rise to a second major practical difficulty which must be addressed. This is the problem of deciding how to set the mark-up above avoidable cost. The pricing model which most efficiently enables the enterprise to recover its costs then has some influence on how costs are allocated between CSO and non-CSO services. Given existing demand patterns, it determines the revenue side of the equation in calculating the net cost of CSOs to other users or the government.

In industries where access fees are appropriate, costing CSOs at above marginal or avoidable costs to include the costs covered by a standard access fee would be a relatively simple matter. In other industries, however, costing CSOs at above avoidable costs raises the complex issue of how to set the appropriate mark-up. It involves balancing considerations of administrative simplicity, the financial viability of enterprises and efficiency implications of over-funding or under-funding GTEs for their CSOs.

In some industries, it may be most efficient for the enterprise to implement Ramsey pricing and set prices so as to allocate costs, including common costs, between different users or products according to differences in their demand responsiveness to changes in prices. The prices of products whose demand is relatively inelastic are set at higher levels than those where the demand is relatively elastic. Thus, different proportions of costs are allocated between different products and users.

The cost of a CSO implemented on a service whose demand is relatively inelastic should reflect the contribution its users would have otherwise made to common costs. If the government does not cost and fund the CSO on this basis, the GTE will suffer a shortfall in revenue. It will be forced to recover its costs from other products whose demand is more elastic and a further loss of efficiency will result.

In practice, it will be an extremely difficult process. For example, it necessitates knowledge of demand elasticities for the different customer groups or different products and, where there is intermodal competition,

cross-elasticities of demand as well. Pursuit of precisely allocated costs above marginal or avoidable costs will incur substantial costs on its own behalf. In order to meet the criterion of administrative simplicity more practical solutions are required for the valuation of CSOs.

One such simplified approach which allocates costs in excess of short-run avoidable cost according to a Ramsey pricing model has been undertaken by the BTCE in relation to road cost recovery (see Luck and Martin 1988). The study reports that even if the elasticities for different user groups are not known with certainty the groups can be ranked according to price-elasticity ratios. Allocating at least slightly more costs per unit of output to the group with the most inelastic demand is likely to achieve a more efficient distribution than some other allocation, provided the same prices and elasticity values apply fairly widely within each group. The study acknowledged that more refinement of groups of users may need to be identified to ensure that charges (that is, the allocation of costs) are based as close as possible on elasticities of demand, particularly if the elasticities vary widely within each group identified.

Of course, allocating costs between different products or users according to their price elasticity of demand is not the only option available. Allocation of the costs according to the Ramsey pricing model could result in the allocation of more costs to lower income groups than to higher income groups because many of the services supplied by GTEs could be considered as necessities and relatively price inelastic. To overcome this problem, the Feldstein pricing model incorporates specific distributional considerations in determining the most efficient set of prices to recover costs (see Feldstein 1972a, 1972b; Munk 1977; Bos 1983, 1986). Under this scheme more of the costs in excess of avoidable cost are allocated to goods or services used by higher income groups. Costs allocated to CSO services above avoidable cost under this scheme will be less than under the Ramsey pricing model if the specific distributional goal of the CSO is to favour lower income groups.

Allocating costs in this way involves a number of additional welfare judgments. Judgments must be made about interpersonal comparisons of utility and there is no guidance on how much lower the prices should be for the targeted group of products. Consequently, there are difficulties in transforming this allocation method into an objective operational mechanism.

An alternative method could be to adopt a fully distributed cost approach with a simple allocation rule to distribute common costs between the CSO service and other services. This may imply over-estimating or under-estimating the cost of the CSO depending on whether it has a low or high price elasticity of demand. If government funding is decided on the same basis, the GTE may be either over-funded or under-funded.

If there is little difference between long-run average cost and long-run marginal cost the fully distributed cost method could be regarded as a reasonable approximation of the real cost of a CSO in a decreasing cost industry. But, where the difference is significant, there may be advantages in approximate price elasticities of demand to determine the mark-up above avoidable cost to value CSOs. It could avoid major inaccuracies in costing which have implications for the financial viability of GTEs, their internal efficiency and the pricing of other non-CSO services.

The above considerations suggest that valuation of CSOs for GTEs operating in industries characterised by long-run decreasing costs must have regard for different market circumstances and, therefore, can only be determined on a case-by-case basis. In some circumstances, for example, the avoidable cost method (less revenue received from beneficiaries) remains appropriate. In others, for example, where previously existing users of commercial services gain a concession, avoidable cost plus a mark-up may be more appropriate. The latter approach involves the issues of how to determine the mark-up and whether it differs markedly from a fully distributed cost approach to valuing the CSO. In all these cases criteria such as administrative simplicity, the financial viability of enterprises and the efficiency implications of funding based on the cost estimates should be brought to bear in deciding the most appropriate method.

4.4 Capacity utilisation

The operations of many GTEs are characterised by fixed plant capacity and increments in capacity can only be made in discrete amounts. Ignoring the daily or seasonal fluctuations in demand discussed above, the utilisation of plant capacity will vary over its lifetime. There may be substantial excess capacity early in the life of a plant which is reduced over time as demand grows. At some point further growth in demand will be restricted by the capacity limit of the plant. The capacity constraints will apply for as long as the gain in consumer benefit from the installation of additional capacity is less than the capital cost of that capacity. As demand continues to grow the point is reached at which an expansion of capacity is warranted.

Pricing at short-run marginal cost does not generally lead to long-term deficits in these cases and may even involve surpluses. But, it may involve price and surplus/deficit cycles as price increases with demand but is reduced with capacity expansion (see Rees 1984; Ng 1987). The appropriate price will be different at each stage in the cycle of demand expansion and capacity augmentation with prices gradually increasing to ration supply until new

capacity is brought into operation and then decreasing. Within this cycle, prices will sometimes be substantially above full cost and sometimes below.

In principle, the efficient prices at each stage in the cycle provide the benchmark for costing CSOs. The opportunity cost of the CSO in conditions of capacity underutilisation is given by the marginal cost of supplying the service. However, when consumption is limited by the capacity constraint no good elsewhere in the economy is foregone by the consumption of a marginal unit of the GTE service. With a capacity constraint extra consumption by someone causes less consumption by others.

“When consumption is limited by capacity, the opportunity cost of a marginal unit of consumption is another marginal unit of consumption.” (Ng 1987, p.25)

Consequently, the complexity of determining marginal cost as benchmark for the cost of CSOs is enhanced. A practical implication is that the avoidable cost will vary also at the different stages of capacity utilisation. In these circumstances, the question arises as to whether avoidable cost is always the most appropriate basis of measuring the cost of CSOs.

The principle to be followed in the first instance is that the cost of CSOs should be estimated on the same basis as efficient prices charged to other users. It should reflect the changing scarce capacity to provide the service.

In conditions of excess capacity, a fully distributed cost approach would overestimate the costs of providing the service. Where the capacity constraint applies, fully distributed costing will only fortuitously approximate the cost of providing the service. More generally, the opportunity cost of the service will be either below or above a price for the service based on fully distributed costs.

It would seem desirable that the opportunity cost of government mandated services should be reflected in their actual costing. Avoidable cost provides a practical approximation of this opportunity cost in both conditions of excess and scarce capacity. Where a capacity constraint exists the avoidable cost approach will include an increasing cost component to allow for the process of rationing supply as demand grows and the next augmentation of the system approaches. Nevertheless, there will be practical difficulties in determining the extent of the rationing element to be included in avoidable cost. Inevitably, this will lead to some arbitrariness in the costing of CSOs where GTEs face capacity constraints.

To the extent that the CSO services at concessional rates induce an expansion of demand, full capacity of the existing system is reached more quickly and the date of augmentation is brought forward. This creates a further cost to be considered. Capacity will be expanded prematurely so that capital costs, in present value terms, are higher than they would otherwise be.

The level of induced demand will depend partly on the method of funding the concessions. If funded by cross-subsidies, for example, there is likely to be some offsetting reduction in demand by other users.

In practice, governments may not permit GTEs to ration capacity by price because it leads to significant price fluctuations. A possible alternative is to use two-part pricing incorporating a fixed charge or access fee and a per unit consumption charge. A low unit price with a substantial fixed charge may be used when capacity is abundant relative to demand. The fixed charge can be maintained or even reduced as the unit price is raised to restrain demand when demand is high relative to capacity. In this way substantial price fluctuations can be smoothed out. In cases such as water supply where some consumption is essential for all users and substitutes are almost non-existent any efficiency losses associated with two-part tariffs may be relatively small (Ng 1987, p.30-1; see also Industry Commission 1992).

This approach provides an alternative basis for the estimation of avoidable cost. In some circumstances it may be approximated by fully distributed costs (Water Authority of Western Australia 1992). With a capacity constraint, however, it is likely to exceed fully distributed costs for some period before the next augmentation. There can be no confidence that the fully distributed cost approach will provide a consistently reliable estimate of the opportunity cost of GTE services supplied as CSOs.

Finally, the above analysis has assumed that the cost of constructing additional capacity is constant. In reality, this may not be so. Technological advances may reduce the cost of augmentation. Alternatively, increased input prices or scarcity of suitable sites (for example, water catchment areas) may increase the costs of installing new capacity.

In these circumstances, avoidable cost remains the most desirable approach to the costing of CSOs. For example, consider the case of increasing costs for the addition of new capacity to serve remote communities. The cost of installing new facilities is much higher than the average cost of facilities to service customers in the existing network. The avoidable cost approach would reflect this difference. But, under the fully distributed cost approach, the cost of servicing the additional customers would be estimated on the basis of average system-wide costs. The fully distributed cost approach would not reflect the opportunity cost of the augmentation.

5. EXAMPLES OF METHODOLOGIES

The most widespread method of costing CSOs used by GTEs seems to be on the basis of fully distributed costs. Estimates of the costs of various CSOs have been supplied to IAC and Industry Commission inquiries on government charges, energy, and rail transport by enterprises and governments. The basis for these estimates has not often been specified but where it has fully distributed cost is by far the most common approach.

The recent report of the Economic and Budget Review Committee of the Victorian Parliament (1991) indicates that major GTEs in Victoria support the fully distributed cost approach. The Committee recommended that each GTE should cost its CSOs using the long-run avoidable cost approach. However, it suggested also that, in practice, it might be more realistic to regard the avoidable cost figures as a minimum level of cost attributable to a CSO. In addition, it said, there would be a need to consider what portion of joint or common costs (if any) should enter the calculations. Of course, as discussed above, the presence of decreasing costs could justify attribution of costs above avoidable cost.

The most detailed empirical work on the estimation of the costs of CSOs has been carried out by the BTCE, Telecom and Australia Post.

5.1 BTCE

The definition of a CSO adopted by the BTCE (1989) is a government requirement to provide products or services to community groups at a price less than the cost of supplying them. It thus emphasises the loss-making criterion.

In measuring the costs of Telecom's CSOs the BTCE assessed the contributions to Telecom's total overheads and profit made by various operations at different levels of the network. The contribution of each level was calculated as the difference between revenue and avoidable costs. Operations which made a negative contribution to total overheads and profit were separately identified, valued and summed at each level of operation – customer, exchange, minor switching centre and district. The cost of the CSOs was then defined as the highest negative contribution for the four levels.

The exercise involved assessing revenue from incoming, outgoing and intra-group calls and other revenue at each level – the customer, exchange, minor switching centre and district levels. The total of relevant revenue falls as the analysis moves up to the next level.

The various items of Telecom's costs had to be estimated and correctly attributed to the units at the various levels on an avoidability basis. Information collected during discussions with Telecom engineering, technical and management accounting officers, surveys of exchanges and districts, and other analyses were used to determine the degree of avoidability and to estimate the causal relationship between cost items and decision units at the various levels. The total avoidable costs, unlike that of revenues, increases when moving up to wider decision units.

Contributions for subsets at each level were assessed. Because the subsets overlap, the contributions they made were not mutually exclusive. The largest possible sum of negative contributions was regarded as the CSO cost. The group of subsets which achieved this was regarded as the CSO group. When such a group of subsets was considered jointly, additional overhead costs that became avoidable were included in the total of the CSO cost.

This approach did not include any joint or common costs that would still have been incurred in the absence of the CSO. As a result, the measured cost of the CSOs by the BTCE was less than that obtained by the Telecom methodology using fully distributed cost.

5.2 Telecom

The fully distributed cost approach was used by Telecom in its estimate of the costs of its CSOs.

The methodology involved the allocation of all revenues, expenses and assets to each Telecom district exchange. Profitability of each was determined by subtracting allocated cost from revenue. The resulting profit figure was compared with the level of profit required to ensure the average rate of return required on the fully allocated assets of each exchange. Exchanges that earned less than the required profit level were stated to be CSOs.

A significant amount of joint or common costs, such as the capital costs of the central telephone network, were allocated as overheads to each exchange in proportion to their total contribution to sales. This was done even though many of the exchanges described as CSOs were generating positive returns on their own assets, and the central overheads which were allocated to the CSO exchanges would have continued to be incurred by Telecom even in the absence of the CSO exchanges.

5.3 Australia Post

Guidelines for the costing of Australia Post's CSOs were issued by the Department of Transport and Communications in June 1991. They require an approach based on avoidable costs which is very similar to that undertaken by the BTCE for measuring the costs of Telecom's CSOs.

The approach involves taking the existing network, standards and traffic as given and identifying the facilities and traffics that Australia Post would not provide if it acted entirely on commercial grounds.

An outline of the methodology used to measure the cost of Australia Post's CSOs is contained in the submission by Australia Post to the Industry Commission inquiry into mail, courier and parcel services (see Australia Post 1992).

For each mail path, which consists of a scheduled route linking an acceptance point such as a post office to a delivery point such as a private letter box, a long run avoidable unit cost and unit revenue was established. For each post office or postal agency the revenue contribution above long run avoidable cost was measured. Similarly, local overhead costs were established for each centre.

The first stage in the costing process involves the measurement of path costs against path revenues and the determination of the paths where revenue was insufficient to cover long run avoidable costs. In this way, CSO paths and volumes are determined by Australia Post together with their net costs.

In the second stage, and for each location, the contribution towards local overheads (including capital cost) from non-CSO mail paths is calculated. Where the contribution is negative, the difference is regarded as avoidable and added to the cost of the CSO.

The third stage measures the proportion of State and National overheads which can be regarded as avoidable in the long run following the identification of the relevant CSO mail paths and offices.

6. FUNDING CSOs

Services or goods provided under the CSOs of public enterprises may be regarded as a form of in-kind transfer or in-kind subsidy in that specific commodities are provided to the targeted groups at reduced prices. There is a variety of ways to finance the provision of such services to consumers. They include cross-subsidies, levies on users, direct cash transfers to users, direct funding of enterprises, vouchers, contracting out, explicit government reimbursement of losses incurred by the enterprise, and acceptance of lower rates of return on capital. The methods are not mutually exclusive, as enterprises may engage in cross-subsidisation, for example, and still make losses which are then either funded from the government budget or lower rates of return on capital are accepted.

All these instruments have effects on efficiency in resource use and a choice has to be made between imperfect mechanisms. The question is whether any one mechanism has fewer adverse effects on efficiency in resource use and consumption, either generally or in particular circumstances. It is likely that some instruments will be better suited to meeting particular government objectives than others.

6.1 Cross-subsidies

Many CSOs are funded internally by GTEs by means of cross-subsidies whereby other consumers are forced to pay the direct cost of providing CSOs. Individual consumers pay directly through prices which are higher than the cost of supplying the service; this excess revenue then covers the losses made by supplying the favoured group at below cost.

In terms of direct consumption, those who pay the subsidy (face a price above marginal cost) will restrict their usage of the product, even though they might value additional units more than the cost of producing them. This discourages consumption and results in a welfare loss. Conversely, those who receive a subsidy (face a price below marginal cost) will be encouraged to expand their usage of the product beyond the point where the value to them of additional units becomes less than the cost of producing them. The result is increased consumption by the favoured group.

Resource use can be influenced by the impact of the price effects of the cross-subsidies on services which are inputs into other industries. Those industries which use the subsidised service more intensively are able to improve their

competitiveness, but at the expense of others. Those which use the higher priced service more intensively are disadvantaged in their competition for resources with other industries.

An additional influence CSOs can have on efficiency in resource use and consumption arises from the regulatory environment in which enterprises operate. In order for enterprises to fund their CSOs through cross-subsidisation and not lose market share it is necessary for governments to maintain legislative barriers to entry by potential competitors. The existence of barriers to entry can create a further set of efficiency effects.

It may encourage cost-padding practices, such as relatively high remuneration for employees, restrictive work practices, and over-employment, which are passed on to users of the output by higher prices. The cost padding could be so extensive that the intended subsidised price for a service provided under a CSO may in fact be no lower than the price which would be paid in a contestable market. Restrictions on competition from potential new entrants may also inhibit adjustment to change and slow the introduction of new techniques of production and management.

Cross-subsidisation arrangements also reduce transparency in the provision of CSO services and inhibit monitoring of the performance of GTEs. The costs of CSO services often remain hidden. The favoured group(s) can be provided with benefits without those incurring the extra costs aware that they are doing so. In contrast with the accountability requirements for appropriated funds, governments can determine CSOs and direct their delivery by means of cross-subsidies without parliamentary approval or even knowledge of the relevant costs and benefits.

Transparency of CSOs funded by cross-subsidies is further inhibited by the difficulties in measuring the extent of the transfers occurring under cross-subsidies. The mixture of commercial and non-commercial services makes it difficult to identify the cost of operating any particular market segment. This makes it difficult to assess the performance of the relevant GTEs.

6.2 Levies on users

An alternative to cross-subsidisation for funding the costs of CSOs could be a levy on users. Consumption levies on all users would make the cost of internally funded CSOs explicit. Under this approach, all users could have a line item on their bill covering the cost of providing each CSO. This requires an estimate of the cost of this service so that it can be apportioned to all

subscribers, but it has the advantage of making the cost explicit and appears to have lower administrative costs.

This option is a more general form of cross-subsidy. But, it would avoid the need for entry barriers as all consumers of the product, whatever their source of supply, could be included in recovery of the costs. However, consumption of the product being taxed is likely to be reduced, and the costs of those industries which use the product more intensively as an input will be raised relative to other industries. Further, while funding of part of a government income redistribution program is extended to a broader base under this option, it may be more appropriate that the base for funding welfare programs consist of all taxpayers rather than being confined to the users of a particular service.

These considerations suggest that there is little reason, apart from their overall budgetary impact, to adopt a levy on users in preference to other mechanisms which directly fund consumers or the enterprises from the budget for CSOs.

6.3 Direct cash transfers to consumers

Cash payments to supplement the incomes of targetted groups are often suggested as the most efficient form of income support. Supplementing the incomes of targetted groups with cash transfers avoids the need for public enterprises to provide services on a non-commercial basis. Consumers are free to spend the supplement on goods or services of their choice so as to maximise the benefits and therefore should be the most economically efficient form of income support (IAC 1989, Appendix I). In principle, it is likely to be more efficient for governments to adopt a commercial pricing structure for GTE services and provide for access to these services among the targetted groups by increases in pensions or other cash transfers.

A significant problem sometimes associated with direct cash transfers is that they may create greater scope for people to claim transfers intended for others. Redistribution relies upon information which individuals have an incentive to conceal. This consideration has particular relevance to those CSOs providing services in rural areas. Cash grants provided in lieu of subsidised electricity, telephone, postal and railway services in rural areas would create significant incentives for non-rural residents to claim the grants as well. For example, if cash transfers were provided to all who live in isolated areas in lieu of current subsidised telephone services in isolated regions, there may be increased demand for postal addresses in those regions as people seek to take advantage of the offer. To obtain the in-kind transfer of a cheap telephone connection, potential imposters have to incur substantially greater set up or even relocation costs than they would if the subsidy were paid in cash.

It can be said also that governments (and taxpayers) face a 'moral hazard' problem in pursuing their social welfare objectives. If cash transfers are used to ensure that the less well off have access to, say, adequate housing and health services, the recipients of the welfare payment may choose to spend or 'waste' the money on more conspicuous consumption. In these circumstances, the welfare group could come to government with a case for more help to meet basic human needs. Providing for basic human needs by in-kind transfers such as subsidised electricity, telephone, housing, etc., is said to be a means of avoiding the moral hazard. Of course, if such considerations were taken to the extreme, government income redistribution programs would consist entirely of in-kind transfers, severely restricting the consumption choices of the recipients and resulting in a very costly delivery system.

Some studies suggest that in certain conditions the cost of cash-based transfer programs can be reduced by providing a welfare program package that includes both cash payments and payments in-kind (see Nicholls and Zeckhauser 1982, Dye and Antle 1986, Blackorby and Donaldson 1988, Ross 1991). In adopting in-kind packages, some loss of welfare is accepted by restricting recipients' choices to improve the targeting of the redistribution process and deterring potential fraud.

The policy implication of these considerations is that there is a case for redistribution programs to employ a combination of cash transfers and in-kind transfers or subsidies. Just how widely the in-kind program with its associated choice restrictions should be employed is difficult to determine since, in practice, it will depend also on administrative costs and can only be resolved on a case-by-case basis.

A particular difficulty associated with cash transfers as an alternative to the CSOs of GBEs arises from the nature of the division of powers between the Commonwealth and State governments. Under current federal fiscal arrangements the Commonwealth Government has prime responsibility for social welfare payments and it has the revenue base to support this function. State governments may have differing social objectives but they do not possess a revenue base sufficient to implement a different program. In these circumstances, in-kind transfers through the CSOs of GTEs could be seen as a response by State Governments to implement their own social policy objectives.

6.4 Direct funding of enterprises

As an alternative to redistribution via cross-subsidies or cash transfers, governments can choose to directly fund enterprises to implement CSOs. This approach has a long history in Australia, especially in respect to railways (see

Wettenhall 1987). It can also encompass voucher systems and contracting out the provision of services.

This option deserves serious consideration in the light of recent reforms to develop a more commercial orientation on the part of government enterprises, including more precise specification of non-commercial objectives. It has several advantages over cross-subsidies as a method of funding CSOs.

6.4.1 Advantages of direct funding

Direct funding of CSOs provides a means of reducing the efficiency effects associated with cross-subsidies and their concomitant barriers to entry. It ensures also that the costs of the non-commercial objectives of government enterprises are subject to closer annual budget scrutiny which also provide the opportunity for public discussion of the cost and benefits of the CSOs. Further, the cost of the redistribution of income is spread over all taxpayers rather than being limited to the users of particular goods and services. There are difficulties in monitoring the costs of operation and there are incentives for cost padding, but there seems to be little reason to expect such costs to be greater under this option compared with other means of delivering CSOs.

Direct funding of CSOs also creates the potential for competition between suppliers in the provision of CSOs. It is not necessary that the CSOs be provided by public enterprises; they may be contracted out or provided under franchise by private enterprises. For example, CSOs undertaken by public bus operators could equally be undertaken by private bus and coach operators. Under such a scheme the private sector would be required to provide not only the profitable goods and services but also the CSOs and be reimbursed by the government.

The choice between cross-subsidies and direct funding, therefore, involves judgements as to their relative impact on allocative efficiency. The advantages of direct funding are avoiding the efficiency costs of the entry barriers required to support cross-subsidies and the potential for annual Budget review and public scrutiny offered by direct funding.

6.4.2 Taxation implications

Despite its advantages as a method of funding CSOs, it should be recognised that direct funding has an impact on efficiency in resource use through the tax system. Government subsidies for CSOs would come from general tax revenue. Higher levels of taxation affect people's disposable income, the labour/leisure choices of workers and/or relative prices of goods. Increased taxation also brings increased administration, compliance and policing costs. There is some evidence from both Australian and overseas sources which suggests the costs of

raising income taxes are significant (see Findlay and Jones 1982; Fullerton 1991).

The form of tax also influences the incidence of taxation on different income or consumer groups, and consequently their contribution to the provision of CSOs. If the CSO is funded by an increase in the general level of income tax, costs will be spread more widely over all taxpayers. If the CSO is funded by a larger increase in the rate of tax on particular goods and services, its effects will be concentrated on the consumers of those products. If they are consumed by only a relatively small number of consumers, funding CSOs in this manner could create greater distortions than funding by cross-subsidies.

In Australia, the tax base available to the states is narrower than that available to the Commonwealth Government. In recognition of this, the Western Australian Treasury (1989, 1991) has noted that state governments must rely on a number of economically inefficient and distortionary taxation measures to meet their revenue requirements. It has argued that direct funding of all CSOs by means of such arrangements may be less efficient than the current system of cross-subsidies used by many governments.

It is possible that some revenue raising alternatives devised by the states could result in more adverse effects. For example, the revenue base of public enterprises in the water, electricity and transport industries could well be wider than would exist for many forms of indirect taxation available to state governments. In some cases, however, the costs of cross-subsidies may be carried by a more narrow group of the community than the base for state government revenue raising measures such as payroll tax, land tax and stamp duties. It is difficult to make general judgements about the relative size of these 'tax' bases without more detailed examination.

Nevertheless, cross-subsidies have the potential to create significant resource costs as a result of higher prices paid by particular users and the entry barriers required to support cross-subsidies. State governments do have access to measures which do not restrict competition in the production of goods and services. In particular, resort to direct budgetary funding for enterprises facilitates public scrutiny of the financial resources devoted to CSOs and the costs of raising those funds.

6.4.3 Administration of direct funding

Past experience of direct funding has revealed some problems which will require attention in any further application of this option. One particular difficulty arose from a combination of inadequate specification of non-commercial objectives and lack of clear demarcation between the respective responsibilities of governments and enterprises and accounting shortcomings.

As a result, there was some difficulty in distinguishing the costs of politically enforced activities of the enterprises from those incurred in commercial operations. Often, compensation for enterprises was inadequate to meet all political directions and interference in the operations of enterprises. Limits on the compensation were in practice restrictive. For example, enterprises were compensated for losses on particular services or in respect of concessions on particular items, but not for political refusals to grant general increases in charges. Moreover, the case for direct funding of public enterprises to implement social objectives was challenged by many because it resulted in extensive wrangling between the enterprises and Treasury departments over compensation payments. This process seemed unnecessary given that the overall losses of enterprises were funded by governments in any case (Wettenhall 1987, pp.48–53).

Measures to promote commercialisation of public enterprises, together with publication of political directives to enterprises, could help ensure that such problems do not re-emerge in the use of direct funding of CSOs.

An important contribution to this reform process could be made by the introduction of contracts between governments and their GTEs for the provision of CSOs. Such contracts would allow for the precise specification of government objectives and requirements for community services. The contracts could identify exactly which particular services are to be directly funded by the government, the quality of services to be provided and the indicators to be used in assessing performance. Such a system of contracts has been established in NSW between the Department of Transport and transport authorities (see Stephens 1991).

Where current cost structures are not at the most efficient levels, it may be desirable to fund the delivery of CSOs on the basis of 'best practice' cost structures. Otherwise, there will be incentives for GTEs to load more costs onto their CSO activities in order to improve their performance results on other operations, for example, by using older equipment or obsolete technology to perform the CSO tasks.

By funding CSOs on the basis of 'best practice', governments could put pressure on GTEs to reduce costs. For example, the NSW Government only compensates the State Transit Authority (STA) to approximately 75 per cent of actual costs for its CSOs because of remaining inefficiencies in the operations of the enterprise (Brew 1991). The 75 per cent level has been established on the basis of world best practice cost benchmarks. This approach has had the effect of forcing STA to work very hard to reduce its costs.

6.4.4 *Voucher systems*

Another way of implementing direct funding of enterprises is to employ the use of vouchers. A voucher is a gift of income to consumers which may only be spent on specified commodities. The voucher may be restricted to a specified good or service such as water supply or a more general category of services such as transport services. Consumers do not receive a direct cash transfer but a ticket which can be tendered to take delivery of a good or service at a reduced price. Enterprises are recompensed by the government on the basis of the number of vouchers tendered by consumers.

The advantage of voucher systems is that they can be used to implement in-kind transfers while incorporating some of the desirable features of cash transfers such as retaining an element of consumption choice, transparency and non-interference in the commercial activities of enterprises. It also retains the advantage of avoiding the efficiency effects of cross-subsidies and the associated regulatory barriers. As a voucher is a form of tied grant, the possibility that recipients will spend the voucher on goods other than those in question is minimised, although it is possible a secondary market for trade in the voucher or the goods concerned may occur.

Voucher systems are most appropriate in circumstances where there are a number of suppliers of a service which governments wish to subsidise. A voucher system will enable consumption choices to be made between available services and thereby encourage competition between suppliers. Where alternative suppliers do not exist, as is the case with a number of services provided under the CSOs of public enterprises, there seems little point in introducing such a mechanism. However, as natural monopoly elements in the production and distribution of these services are undermined by the introduction of new technologies, the argument for a voucher system is strengthened.

For services currently the subject of CSOs, a voucher system seems most applicable to those provided as fringe benefits in welfare programs and where competing suppliers may exist. A quasi-voucher system already exists in the form of the Pensioner Health Benefits card which entitles holders to concessional rates on electricity, gas and telephone rental charges, etc. The existence of similar concessions or rebates on electricity and gas charges in many jurisdictions provides an element of choice between energy sources for some domestic purposes. It is the practice also of most States and the Commonwealth to provide some concessions for railway and bus travel. There would seem to be a case for the use of a voucher system to provide a set amount of concession which could be used on any transport service, whether public or private.

Administration costs will be incurred in identifying the level of transfer to particular consumers. This would be particularly difficult in the case of equalisation of charges between rural and urban areas, and could involve regular and costly reviews. For these reasons, the applicability of the voucher system to major services such as electricity, water and sewerage, and telecommunications could be limited.

6.5 Accepting lower rates of return

Fulfilment of CSOs will impact adversely on an enterprise's ability to meet a particular financial target. Government's have the option of setting a lower rate of return target in lieu of directly funding the enterprises for these services. Losses would be made on CSO services but prices of the commercially provided services would not be affected.

The Commonwealth Treasury (1990) suggests that the easiest way to take into account CSO costs that are not budget funded is to add them to the income of the enterprise for purposes of calculating rates of return achieved by the GTE. This imputed achieved rate of return can then be compared directly with the target rate of return set for the enterprise. Such a process also takes into account the higher asset base required to meet the additional demand generated by lower prices associated with the CSO.

Adding the CSO cost to income in this way to determine the imputed rate of return can be viewed as a method of indirectly funding the CSOs of enterprises. The owner government is effectively accepting a lower return on its investment in the enterprise in return for the achievement of its objectives. Adding the CSO cost notionally to the earnings of the enterprise is equivalent to what would be done with the budget receipts if the CSO cost were funded directly from the budget.

Indirect funding provides many of the same advantages as direct funding. One practical difference with direct funding is that indirect funding would have financial implications for enterprises as they would not have the same amount of cash in hand. The reduced level of cash may simply mean lower levels of dividends than would otherwise be the case. Instead of paying the CSO cost directly from the budget the owner government would be notionally funding the CSOs by accepting lower dividends (that is, lesser receipts to the budget).

Notional compensation of GTEs for CSOs also provides the basis for calculating rates of return for performance monitoring purposes.

7. CONCLUSIONS

The variety of definitions of CSOs which are available makes it important to attempt to reach some broad agreement as to what constitutes a CSO in order to further progress the national performance monitoring of GTEs. The recommended approach is to define CSOs as any specific government directive to a GTE which overrules commercial decisions on the conditions of supply of services apart from those directed at meeting allocative efficiency objectives.

The costing of CSOs raises a number of complex issues. The matters canvassed in this paper are by no means exhaustive.

Perhaps the most definite conclusion that can be made is that the pursuit of precision in the costing of CSOs is likely to prove fruitless and yet be very costly. In the complex environment in which most GTEs operate it is not possible to say that the theoretical benchmarks for revenue and costs will be the same for all enterprises. Practical considerations also will necessitate compromise and trade-offs in determining the basis for costings in different enterprises. The best possible compromise of offsetting considerations will vary from one industry context to another. It will be impossible to issue a detailed set of conclusions as to how to cost CSOs in a variety of different price and cost contexts. The best that can be done at a general level is to recommend a broad approach which could then be applied and modified on an industry-by-industry basis according to the particular circumstances.

The main element of such a broad approach would be to recommend use of the avoidable cost approach for estimating the costs of CSOs. In some circumstances, only short-run avoidable cost will be the appropriate benchmark but in many others it will be necessary to incorporate the capital costs associated with the provision of CSOs.

This approach has become widely accepted following publication of the empirical work of the BTCE. It has been accepted by the Commonwealth Government in the costing of CSOs in telecommunications and postal services. Several State Government Treasuries have given their support to this approach. However, the Victorian Parliamentary inquiry (Economic and Budget Review Committee, 1991) demonstrated continuing support amongst some of the larger GTEs for the fully distributed cost approach. Significant progress in development of a consistent approach to the costing of CSOs would be made if in principle endorsement could be given to the avoidable cost approach.

Beyond this there is little that can be said in principle which would be likely to apply to the demand, price and cost circumstances of each industry for all types of CSOs.

In cases where CSOs do not add to the necessary capacity of an enterprise avoidable costs should exclude capital costs. Some significant practical problems will remain to be resolved such as the treatment of depreciation. Where additional capacity is associated with the implementation of CSOs, capital costs should be included. Similarly, some differentiation between off-peak and peak users may be necessary in determining if capital costs are to be allocated to some CSOs.

Decreasing cost conditions arising from economies of scale and/or scope are a feature of many industries in which GTEs operate. Here some particular complexities occur as a result of the need for enterprises to adopt pricing policies which avoid the need for government subsidy. It will be necessary to have regard to different market circumstances in costing the CSOs. In some circumstances, for example, the avoidable cost method (less revenue received from beneficiaries) remains appropriate. In others, for example, where previously existing users of commercial services gain a concession, avoidable cost plus a mark-up may be more appropriate. The latter approach involves the issues of how to determine the mark-up and whether it differs markedly from a fully distributed cost approach to valuing the CSO.

In some circumstances, therefore, the valuation of CSOs in decreasing cost industries may include costs in excess of avoidable cost. This possibility suggests that it will be necessary to adopt a case-by-case approach. Criteria such as administrative simplicity, the financial viability of enterprises and the efficiency implications of funding based on the cost estimates should be brought to bear in deciding the most appropriate method.

The capacity constraints of the fixed capital assets of GTEs and indivisibilities in adding new capacity provide another complication in the measurement of the costs of CSOs. The avoidable cost method remains preferable in these circumstances. There are practical difficulties, however, in defining avoidable cost because the relationship between demand and available capacity varies over the life of assets. Where demand is constrained by available capacity, it is necessary to incorporate a rationing component which will vary according to the level of demand.

A solution to such difficulties could be use a two-part tariff charged to other users as the benchmark for costing CSOs. While this may be similar to fully distributed cost over the long-term out there can be no guarantee that resort to a fully distributed cost approach would provide a reliable approximation of avoidable cost.

The development of a precise standard approach to the costing of CSOs is likely to be difficult. Yet, some broad common approach seems necessary to reduce the inconsistencies in performance indicators that will occur under widely differing approaches. Endorsement of the avoidable cost approach as the starting point is a fundamental step in this direction.

Beyond this, two further options seem possible. One is to adopt an industry-by-industry approach to measuring the costs of CSOs. This could be initiated by one or two case studies to determine the practical problems and the basis on which practical compromises can be made. The objective of such a case study approach would be similar to that being implemented with regard to estimating total factor productivity in enterprises. It would be to utilise the practical knowledge and information available to enterprises to obtain the best approximation of costs for CSOs but within the avoidable cost framework. It would serve also as a demonstration to GTEs of how costings of CSOs based on avoidable cost could be undertaken.

Another option, which does not conflict with the first, is to categorise the various CSOs of different GTEs according to the degree of difficulty in costing them. It is likely to be easier to develop a common approach to those CSOs which do not involve additions to capacity than to those which require the allocation of capital costs and costs above avoidable capital costs. Case studies could be developed for the simpler categories while further work is undertaken in refining an approach to the categories of CSOs for which costing will be more complex.

Finally, the difficulty in deriving estimates of the costs of CSOs suggests that it would be highly impractical to revise them each year. It may be preferable to prepare detailed estimates industry-by-industry on a regular cycle of, say, four or five years and allocate costs in the intervening period on the basis of some composite index of price and cost changes.

As regards the funding of CSOs, several alternative mechanisms can be considered. They include cross-subsidisation, levies on users, direct funding of enterprises with variations to include use of vouchers and contracting out, and acceptance or lower rates of return by enterprises. None of these mechanisms provides a complete solution to the problems encountered with CSOs. They all involve trade-offs between efficiency and other objectives.

Use of CSOs to implement government objectives could be replaced by direct cash transfers to the targeted recipients. It has several advantages and the large part of government welfare programs are delivered in this way. However, there is a case for welfare packages to include some in-kind transfers, although the desirable extent of these may require a case-by-case examination. The argument for cash transfers to be provided in lieu of the subsidised in-kind

transfers made available to rural areas through CSOs is weakened by the potential incentives they would provide for non-rural residents to claim them as well.

All these mechanisms could be considered as potentially part of a complementary set of measures to implement government objectives more efficiently. Direct funding of CSOs provides an avenue for ensuring that the objectives of government policy are made more explicit and providing for public scrutiny of the costs incurred in implementing them. It is also a means of overcoming some of the more serious efficiency effects of cross-subsidies. It may be necessary to phase in direct budget funding over several years in order not to exacerbate the budgetary position of governments. Indirect funding through acceptance of lower rates of return by enterprises provides many of the same benefits as direct funding. Notional funding of CSOs also provides a means of developing comparable national performance measures for GTEs. Selected use of voucher systems and contracting out services to be provided to meet government objectives could be used to improve consumption choice.

8. RECOMMENDATIONS

1. The preferred definition of a CSO is:

A Community Service Obligation arises when a government specifically requires a public enterprise to carry out activities relating to outputs or inputs which it would not elect to do on a commercial basis, and which the government does not require other businesses in the public or private sectors to generally undertake, or which it would only do commercially at higher prices.

2. The avoidable cost approach is the preferred method of measuring the cost of CSOs, recognising that in some circumstances short-run avoidable costs will be the most appropriate benchmark, while in other cases it will be long-run avoidable cost incorporating the additional capital costs directly attributable to the provision of CSOs. In some particular circumstances pertaining to enterprises operating in decreasing cost conditions it will be more appropriate to value CSOs at above avoidable cost with the precise details being determined on a case-by-case basis.
3. It is preferable that the costs of CSOs be determined on the basis of the actual costs of provision.
4. Governments aim to specify their CSOs for each GTE and to request enterprises to prepare estimates, usually based on the avoidable cost method but adjusted where necessary on a case-by-case basis, of the cost of providing CSOs and to document the sources of funding of their CSOs.
5. Case studies be encouraged in consultation with the Steering Committee in each core group of enterprises with the objective of providing a guide to GTEs of possible ways to measure the cost of their CSOs.

ATTACHMENT

Some CSO definitions

ARRDO (rail CSO)

... current requirements or constraints from government which, when satisfied in the most efficient way, still result in a financial loss to the railways. (cited in Michael 1984, p.572)

EEC (rail CSO)

Obligations which the transport undertaking in question, if it were considering its own commercial interests, would not assume or would not assume to the same extent or under the same conditions. (cited in Michael 1984, p.571)

BTCE

... a government requirement to provide products or services to community groups at a price less than the cost of supplying them. (1989, p.9)

Telecom

CSOs are activities or policies that Telecom would not choose to pursue on the same conditions if acting solely on commercial principles. (1990, p.10)

Commonwealth Treasury

... an activity undertaken by a GBE is a CSO only if it results from an explicit government direction or explicit legislation, and if the enterprise would not have undertaken it, if given the choice, because of the losses involved. (1990, p.20)

Henry Ergas (Telecommunication CSO)

CSOs can be loosely defined as the obligations imposed upon the providers of telecommunications services as a result of government social or non-commercial objectives. (1990)

Railway Industry Council

Australian rail systems are required by Governments to provide services for wider social and economic reasons which, on purely commercial or financial grounds, they would not choose to run as they are usually loss makers. Such services are termed Community Service Obligations (CSOs) and must be separately identified and costed appropriately to ensure that operators are fully compensated and that CSOs are run as efficiently as possible. (1990, p.63)

Industry Commission

A Community Service Obligation arises when a government requires a public enterprise to carry out activities which it would not elect to provide on a commercial basis, or which could only be provided commercially at higher prices. (1991, p.68)

Parliament of Victoria. Economic and Budget Review Committee

A Community Service Obligation should be defined as arising when the Parliament or the executive government expressly requires a government business enterprise to carry out an activity which it would not elect to provide on a commercial basis, or which would only be provided commercially at a higher price. (1991, p.xxiii)

Board of Works

The process of identifying an activity as a CSO involved a multi-criteria approach. It involved determining: whether the Board was under any formal (legislative) or informal (ministerial) obligation to undertake the activity; the extent to which costs were recovered for these activities from the users of beneficiaries; what benefits the Board derived from

undertaking the activity; and whether the Board would continue to undertake the activity if it was a private company operating in a competitive environment. (cited in Economic and Budget Review Committee 1991, p.16 and in Xavier 1991, p.8)

Ministry of Transport

A CSO arises where the government formally requires a government business enterprise to carry out activities which the GBE would not normally elect to provide if it were operating on a commercial basis, or which the GBE would only provide commercially at higher prices than that which it is permitted to charge. (cited in Economic and Budget Review Committee 1991, p.15)

Public Transport Commission

A service, other activity or cost which the government has recognised as essential to the community and which must be kept operating or met as part of its social justice strategy even if it is not commercially viable to do so. (cited in Economic and Budget Review Committee 1991, p.15, and in Xavier 1991, p.7)

SECV

A CSO is a business practice which the GBE would not normally adopt on business grounds, but whose implementation is expressly requested by the government. The practice must be clearly specified, with an explicit definition of the target beneficiary person or group. (cited in Economic and Budget Review Committee 1991, p.14 and in Xavier 1991, p.6)

Prospect Electricity

A CSO may be defined as a service which is obligatorily provided, but which does not earn sufficient revenue to meet direct costs of service provision and make a positive contribution to joint or overhead costs. (cited in Smiles 1991, p.6)

John Snelson

A government requirement to provide products or services of community groups at a price less than the cost of supply. (1991, p.1)

WA Treasury

CSOs are obligations imposed on Government Trading Enterprises (GTEs) by government to satisfy government policies of a non-commercial nature. They are in the nature of additional costs or requirements to provide services which the GTE would not have provided (or would not have provided to the same extent or under the same conditions), if it operated on strictly commercial criteria. (1991, p.1)

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