POSITIVE ECONOMIC ANALYSIS AND THE TASK
OF STATE ENTERPRISE EFFICIENCY
AND CONTROL

by

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"The future would look brighter if much of the energy at present spent on the ritual debate about ownership was devoted instead to careful assessment of public enterprises and to discussion of an effective control framework." (Heald and Steel [1981] p. 365)
SUMMARY

This paper reports on the first stage of a broader study aimed at assisting the task of improving state enterprise performance. The paper sets out to identify the contribution that economics - in particular 'positive' economies - can make towards the design of operational guidelines which could improve state enterprise efficiency within the context of the problem of control. A forthcoming paper will use the guidelines/framework developed here to evaluate the reforms to state enterprise policies which the Victorian Government has been conducting over recent years.

The structure of this paper is as follows: Section 1 introduces the study and refers to recent 'positive economics' contributions to the literature on state enterprises which emphasize that the mere identification of what economic guidelines should guide state enterprise policies does not ensure their effective implementation. This is because if 'Agents' have their own objectives they would be unlikely merely to passively pursue policies prescribed by 'Principals'. Thus, as discussed in Sections 2, 3 and 4, pricing policy and other guidelines need to be considered within the context of the problem of monitoring and control.

Section 5 specifies the pricing guidelines prescribed by economic theory in regard to the structure of prices, and Section 6 in regard to the level of prices. It is concluded that despite theoretical and practical problems, the logic of the marginal-cost-based pricing principle, complemented by a rate-of-return requirement, should underlie state enterprise pricing policy. However, whether state enterprises do follow such guidelines will depend on whether appropriate incentives and/or penalties to motivate them to do so can be designed. It is also concluded that marginal cost pricing in itself addresses largely the task of achieving allocative efficiency but its potential in inducing X-efficiency and/or dynamic efficiency is very limited. A rate-of-return requirement is also of limited usefulness in this regard. Section 7 attempts to identify policies which do address these latter tasks so that complementary policies to pricing policy guidelines might be suggested. It concludes that, whilst they are desirable, management audits and other performance evaluation measures would also be hampered by the problem of obtaining adequate and accurate information - unless incentives and/or penalties to promote the truthful revelation of information can be devised.

Section 7 also examines alternative views which, despairing of improvements under the present institutional structure, advocate the 'privatisation' of state enterprises or at least the encouragement of substantial competition and 'contestability'. It concludes that the case in favour of privatisation has not been proven. However increased competition and contestability might well assist in improving performance, but in view of the uncertain consequences, a gradual judicious approach seems advisable.
Section 8 presents the **broad conclusions** of the Study. Economics can make (indeed, has made) important contributions to the development of guidelines which should - where economic efficiency is of concern - underlie state enterprise policies. **However,** limitations of theory and practice remain. For instance, in regard to improving the X-efficiency and dynamic efficiency of state enterprises, the contribution economics has made is somewhat limited. In fact, it appears that thus far the contribution has been more in improving our understanding of the problems involved than in finding solutions to them.
1.1 INTRODUCTION

Much of the extensive economic literature on state (or 'public') enterprise produced in Britain, North America, and in Australia has stemmed largely from applications of the theory of welfare economics - which is essentially normative in character. That is, the discussion has focussed substantially on what the objectives of Government and/or state enterprise should be (namely, for most writers, economic efficiency). From that standpoint discussion proceeded to attempts to identify/specify the economic rules for pricing and investment which should guide state enterprise decision-making (see, for example, Turvey [1971], Webb [1976], Rees [1976], Heald [1980] for British examples; Kolsen [1982], Albon [1985] for Australian examples and Joskow [1976] for an American one).

More recently it has been recognised, indeed, emphasized, that the mere specification of economic guidelines for state enterprise does not ensure that these guidelines will be adhered to (e.g. Heald [1980], Hartley [1982]). As Heald [1980] put it:

"Most of the public enterprise literature has implicitly assumed that the managers are social welfare maximisers. They are presumed to act altruistically in the sense that their utility depends solely on, and increases with, social welfare. Under these restrictive conditions the public enterprise managers can be relied upon to implement decentralized decision rules such as investment appraisal at a prescribed discount rate and marginal cost pricing. It is important in devising a control system to consider what the objectives of the public managers actually are. The control system must give appropriate incentives to efficiency at the enterprise level. (p. 244) (Emphasis added.)"

In other words, even assuming that Government accepts and prescribes such guidelines for state enterprises, there remains the question of whether such enterprises will, in fact, endeavour to behave in accord with such guidelines. Littlechild (1979) for instance, is one commentator who has pointed to the evident contradictions observed in Britain between what the economic (marginal-cost-principle-based) guidelines prescribed by the Government (U.K. White Papers 1967 and 1978), and what was actually done by state enterprises. Part of the explanation for the contradictions, Littlechild suggested, is that state enterprise management are not "administrative eunuchs faithfully endeavouring to carry out the Government's bidding". In fact they may be expected to act also in accord with their own objectives and to respond to the prevailing incentive/penalty structures they face. This implies that for normative guidelines to be effectively translated into policies they have to be consistent with, or complemented by, appropriate incentives/penalties for state enterprise management. What is required is a better understanding of what motivates state enterprise management and how they respond to changes. That is, we require a positive theory of state enterprise behaviour.

The next section describes what would be involved in such a theory. Then Sections 2, 3 and 4 discuss the application of the Principal-Agent model to the task of state enterprise control. Sections 5 and 6 discuss the economic principles of pricing policy and the implications of a positive economics perspective. Following this, Section 7 goes beyond pricing policy to explore complementary means of improving state enterprise efficiency.
1.2 CHARACTERISTICS OF A POSITIVE ANALYSIS

Ideally this positive theory should provide a system of generalizations that would lead to (reasonably) accurate predictions about the consequences of any change in circumstances on state enterprise behaviour. Then it would combine these considerations in such a way so that a functional relation could be established between certain visible and measurable characteristics of state enterprise and the decisions they make. Ideally the relation would give unique results in the sense that there would be a one-to-one correspondence between every subset of characteristics and behaviour/decisions made.

Finally, ideally we would be able to collect enough factual data so that the basic relationships could be subjected to some form of (statistical) test. But we are at present far from being able to do anything of the sort. For instance, until we know what a state enterprise manager's actual utility function is, we will be less able to predict how managerial discretion will be manifested in response to changes, i.e., whether increased profits, increased X-efficiency, increased employment of certain factors, or some combination of these, will result. Nevertheless, our discussion will serve to provide a framework which will facilitate an analysis of the Principal-Agent conflict in regard to the control of state enterprises we embark on below and improve understanding of the interactions involved. Hopefully it might also draw out some preliminary and "working" hypotheses and to imply directions for future research.

1.3 PREVIOUS WORK ON POSITIVE ANALYSIS

There has been little work in Australia on the development of a positive analysis of state enterprises. A recent unpublished discussion paper by Kolsen (1982) refers to the need for such a positive approach to state enterprise behaviour while Hartley (1982) does make a start at formulating a positive/behavioural approach to the establishment of state enterprise tariff structure. In Britain, too, analysis of state enterprise has been almost entirely normative in character although Rees (1976), Littlechild (1979) and Heald (1980) have stressed the need for a positive analysis of state enterprise behaviour.

In the United States of America, however, there has been for several years now considerable research effort directed towards the development of positive theories of the behaviour of regulating agencies and regulated public utilities. Amongst the more substantial contributors are Stigler (1971, 1974), Posner (1974), Peltzman (1976) and Lindsay (1976). However, except for Lindsay (1976), it appears that the American work is concerned largely with the behaviour of the privately-owned (regulated) public utilities which commonly exist there. The focus of the present study is different in that it is concerned rather with the behaviour of State-owned public utilities which may not be similar. Although the North American literature might be expected to provide certain insights, the task of formulating a positive approach to state enterprise behaviour appears to have not received much previous attention. Therefore we commence this task here.
2.1 THE PRINCIPAL-AGENT RELATIONSHIP AND THE PROBLEM OF CONTROL

We begin our analysis by noting that Rees (1976) and Littlechild (1979) have suggested that in Britain the relationship between the Government and nationalized Industry seems to provide a good example of the Principal-Agent relationship which has received considerable attention in the economic literature in recent years (e.g. Ross (1973), Williamson (1975), Mirrlees (1976), Harris and Raviv (1978), and Shavell (1979)). Since the institutional structure and characteristics of state enterprise operation in Australia are not unlike those existing in Britain, the applicability of the Principal-Agent theory to Australian state enterprises seems worth considering. As will be seen, the Principal-Agent relationship does provide some useful insights. What is just as important is that it provides a valuable analytical framework for examination of the issues involved in the control of state enterprise in Australia.

2.2 CONDITIONS FOR A CONTROL PROBLEM: CONFLICT OF INTEREST AND IMPERFECT INFORMATION

In the Principal-Agent relationship, the Agent is employed because of his superior expertise and/or less costly access to information, enabling him to perform a given task more efficiently or effectively than the Principal. Accordingly the Agent is delegated the responsibility for making decisions - supposedly in the best-interests of the Principal. The basic premise in the analysis of the Principal-Agent problem is that there exists both conflict of interest and insufficient information. That is, the Agent's preferred action may not be the Principal's, and the Principal does not have enough information to detect costlessly any non-optimality in the Agent's choices (Shavell, 1979). This clearly created a problem of control; how does the Principal ensure that as far as possible the Agent takes decisions in his interests? We address these issues in the following sections.

To begin with, in the case of state enterprise, who are the Principal and Agent? The minister/government responsible for the state enterprise can be thought of as the Principal, and the management of state enterprise as the Agent. However, in the state enterprise context it might be argued that the Principal and Agent are not really individuals but rather coalitions of sub-groups. The minister is a member of a government which must balance the interests of the groups directly represented in the party it leads. It will also be subject to pressures from 'outside' interest groups and the reactions it perceives from the electorate at large. Moreover, the minister's department contains public servants who have preferences over decisions the state enterprise might make. The 'Principal' then, is a collective noun for this entire group of interests and pressures; as the preference ordering, assuming it exists, can only result from a process of negotiation among members of this group, it already represents some kind of "group equilibrium". We have then to recognise that the preference ordering may not exist (since it is arguable that it encounters the problems confronted by Arrow's Impossibility Theorem) or, if it does exist, it may change substantially over short periods of time, as the group equilibrium changes (possibly because of changes in the identities or powers of sub-groups in the coalition). Similarly, the Agent is arguably the collective term for the collection of managers at various levels of the enterprise, and also the organised groups of workers in it.
Thus the Agent's preference ordering, if it exists, must reflect some sort of "bargaining equilibrium" among the groups of managers and workers which compromise the "enterprise coalition". Mainly on the grounds of tractability, however, we proceed as if the Principal and Agent, 'minister' and 'state enterprise manager', can be regarded as individuals.

We now turn to examine whether the necessary conditions for a control problem exist in the case of state enterprises. Firstly, do the interests of the Principal and Agent conflict? To answer this question we have to attempt to identify the interests/objectives of the Agent and compare these with the Principal's (the Victorian government) professed objective of economic efficiency (Victorian Department/Office of Minerals and Energy [1982, 1985]). Since there is no well-established theory on this subject, we begin by attempting to glean what we can from the literature on managerial motivation in private enterprise and government bureaucracy and from the recent literature on state enterprises. But first a brief discussion on the concept of economic efficiency.

2.3 THE CONCEPT OF ECONOMIC EFFICIENCY

The concept of economic efficiency may be usefully explained - particularly for operational purposes - by a breakdown into:

(a) Allocative Efficiency;
(b) X-Efficiency; and
(c) Dynamic Efficiency

(a) Allocative Efficiency

This is usually discussed in the theoretical literature in terms of achieving the conditions for 'Pareto-optimality'. In non-technical terms, allocative efficiency is concerned with decisions regarding the production of the 'appropriate' quantity/quality of the 'appropriate' goods and services. More specifically allocative efficiency embraces "price efficiency" within firms (i.e. the selection of optimum combination of inputs, given factor prices) as well as efficiency in the allocation of factors among firms, of goods among purchasers and the marginal cost/marginal valuation relationship (see Snape, 1975).

(b) X-Efficiency

Leibenstein (1966, 1976) emphasized that the non-allocative aspects of economic inefficiency - which he termed 'X-inefficiency' - could well be more important than allocative inefficiency. To quote Leibenstein (1976):

"By X-efficiency we have in mind all elements having to do with efficiency that are not involved with allocative efficiency....in its simplest sense, X-inefficiency is contrasted with allocative inefficiency. Inputs or factors of production may be allocated to the right units for use. However, there is no need to presume that the decision and performance units involved must use inputs as effectively as possible. We refer to the difference between maximal effectiveness of the utilization of inputs and the actual effectiveness as the degree of X-inefficiency."
Sources of X-inefficiency which arise out of activities internal to the firm include inefficiency in:

1. Labour utilization
2. Capital utilization
3. Time sequence
4. Extent of management/employee effort and co-operation
5. Information flow
6. Bargaining effectiveness
7. Credit availability utilization.

(Leibenstein, 1976)

(c) Dynamic Efficiency

In economy-wide terms, long-run dynamic efficiency exists when the economy is expanding along an optimal growth path at a rate which reflects a socially accepted distribution of consumption between present and future generations. In terms of state enterprise behaviour, dynamic efficiency refers to the nature and level of entrepreneurship and innovation including the responsiveness to changes in technology and consumer tastes and preferences. In the long run these dynamic changes may well be as, or even more, important than improvements in static efficiency in the energy industry. As the Centre of Policy Studies (1982) pointed out:

"The potential importance of entrepreneurial behaviour to the Victorian energy situation should not be understated. Entrepreneurship is not just a matter of selecting the most appropriate technique or product from those which are already known. It involves the active and continual search for new products and processes, with the successful entrepreneur recognizing such opportunities before his rivals. Thus, one implication of the recent increase in relative energy prices is that a whole range of new opportunities may exist for Victoria's energy industries - but it will require considerable entrepreneurial talent to take advantage of them. Clearly entrepreneurship is an important input to the production process...." (p. 5.4)
3. THE OBJECTIVES OF THE AGENT

3.1 Managerial Objectives in Private Enterprise

As is well known, Baumol (1959), Marris (1964), and Williamson (1964) were amongst the first to point out that the management of privately-owned corporations (the Agent) typically have some degree of managerial discretion which they might use to pursue non-profit maximizing goals (levels of sales, revenue and/or firm growth) which are not consistent with the interests of the shareholders (the Principal). Moreover, the amount of managerial discretion depends on the conditions affecting the survival of the managers and is limited by the lower of the costs of entry by another organization or the costs of a "takeover" bid. The use of managerial discretion depends on the combination of a manager's preferences, the relation of these preferences to his discretionary activities, and the costs of "detection" by Principals.

The use of managerial discretion in private enterprise may result in economic inefficiency including (i) the use of non-cost minimizing factor proportions; and (ii) the 'consumption' by managers of sub-optimal combinations of salary and perquisites. The first of these inefficiencies is characterised by the firm that is operating at an inferior position on its production efficiency frontier and will occur if managers derive utility from the use of some productive input over and above that which the input contributes optimally to the firm's output and/or profits. For example, if managers have an "expense preference" for a large supporting staff, they will employ excessive labour [Rees (1974), Edwards (1977)].

The second type of inefficiency concerns managerial pecuniary and non-pecuniary compensation. A frequent argument is that 'excessive' managerial salaries constitute a source of inefficiency because the higher salaries mean higher costs to the firm. It should be noted that some economists contend that such excessive salaries are not a form of inefficiency but rather a transfer of wealth from shareholders to managers. However, Snape (1975) has pointed out that property rights and rent-seeking theories give greater legitimacy to the economic inefficiency claim. Another facet of inefficiency revolves around the concept of X-inefficiency which Leibenstein (1975) argues is likely to increase as the pressure for performance from the firm's external environment diminishes (e.g., in instances such as monopoly and firms sheltered from competition).
3.2 Managerial Objectives in the Government Sector

Niskanen (1973), Wolf (1979) and Leibenstein (1982), among others, have argued that, in general, the degree of managerial discretion prevailing in government bureaucracies is likely to be greater than in private enterprise and it is more likely to be manifested in greater economic inefficiency. Leibenstein compared supply by government and a representative firm in a competitive setting. In the latter, four motivational elements for efficient production can be identified: (a) profit maximization; (b) competition; (c) survival; and (d) demand. Leibenstein considered whether such motivational forces, or some substitute, exist in the case of government:

"Profit maximization is usually deemed to be sufficient to determine cost minimization if the owners control all of the variables that determine costs. However, governments as such are not run by profit maximizing owner-management groups. The citizens are not in the same relation to government as stockholders in a closely held corporation.

Even if some private enterprises were not controlled by profit maximizing managers, the force of competition would operate in the same direction. Competition would place the non-cost minimizing firms at a disadvantage. Here, too, the analogy with government fails. Governments are not subject to competition, and they do not lose revenue, or anything else that they might desire, as a consequence of not being able to supply services at a sufficiently low cost.

A motivational force related to competition is survival. If a firm does not meet competitive standards long enough then it presumably will not survive. The fear of not surviving may not be sufficient to eliminate high level costs; however, governments need have no such fear. There may be no connection between the knowledge of costs and voters' reactions to governments so that survival as such may not be a major issue. But some cost considerations may enter indirectly via the budgetary process.

Obviously every firm is concerned with demand, and with survival through meeting market demand. However, since most forms of taxation do not depend on voluntary behaviour, demand as such does not enter directly as a factor where governments are concerned. Even the nature of the product is not assumed under government supply. The motivations and constraints on governments are not such as to lend to either minimum costs, or to any clear cut level of costs so that, on the basis of the neo-classical paradigm, we can make simply supply assertions. In other words, the cost level can be highly variable, and it can differ considerably from the minimum necessary."
Whilst Leibenstein stressed the X-inefficiency aspects of government output, Niskanen (1973) argued that excessive (allocatively inefficient) budgetary growth was also likely to occur. This is because a bureaucratic manager's rewards (in terms of the arguments in his utility function discussed earlier) are a positive function of the size of the budget. As Niskanen put it:

"As a rule, a bureaucrat can increase his salary, perquisites, etc., only by increasing his budget or by demonstrating that he can manage another bureau with a larger budget. Budget-maximization, thus, probably explains most of the use of managerial discretion in a bureaucracy." (Niskanen in Migue and Belanger 1974, p.26)

Indeed, Niskanen considered that the bureaucrat would be under pressure to operate in this way.

"My primary argument for budget-maximization, whatever the preferences of bureaucrats, is that contrary behaviour is sharply limited by the concerns of the bureau's employees and suppliers of other factors, other bureaus, and those of the review authorities. Budget-maximization does not require that all of these groups have an incentive to maximize the budget, only that one of these groups has both the incentive and the opportunity to replace a bureaucrat who has contrary incentives." (p.26)

3.3 State Enterprise Management Objectives and Constraints

What can be pieced together from the preceding in regard to the behaviour of state enterprises? While state enterprises are similar in some respects to government bureaucracies, they are also similar in other respects to private enterprises. That is, they also have commercial obligations since they are obliged to recover their costs, including a rate-of-return, from the sale of their product. However, for state enterprises, monopoly status ensures that competition is limited although there could be competition in some areas. Also, the level of profit is regulated by legislation or constrained by the unpopularity of excessive profits. Thus, in the light of the discussion in the preceding sections, it would be surprising if state enterprise management did not seek to exercise what is likely to be a substantial degree of managerial discretion, at least in part, in ways similar to their management counterparts in the private and government sectors. That is, they would be likely to operate X-efficiently and seek increases in growth, budget size and quantity/quality of output, even where this did not accord with economic efficiency. As Kolsen (1982) observed,

"It is then possible to examine some practices which are neither efficient nor equitable, and to infer managerial objectives from them. There are, of course, the usual objectives of satisficing, gold plating, and the like, which refer to benefits from a conferred monopoly position, and are bound up with rate of return on investment. Since PABU's (Public Authority Business Undertakings) are not in general regulated with respect to a rate of return, the benefits to managers, and indeed to all employees of the entity, are not explainable only in this way.
One important benefit is bigness, which increases the remuneration of managers and the security of employment of, and promotion prospects for, all employees. Where discretion exists, it would be reasonable to expect it to be exercised in the direction which maximises benefits of this kind."  

Work done overseas would support this hypothesis. Commenting on state enterprises in the United Kingdom, Littlechild (1979) observed:

"For their own part, the managers of a nationalised industry, not being able to withdraw profits for themselves, and not being held to account by profit-conscious shareholders, are likely to seek other sources of satisfaction and to minimize the complaints coming their way. The Post Office might wish to build a technologically advanced telecommunications system, or it might prefer to avoid, as long as possible, the complexities of change. It might attempt to build a large empire, to provide secure employment for its own staff and those of its suppliers, or it might seek an easy life by minimising the complaints coming its way."  

From their work in the USA on privately-owned public utilities subjected to rate-of-return regulation, Averch and Johnson (1962) among others, have argued that, in order to extend their rate-base or capital expenditure (and hence increase profit eligibility), these companies were induced to make decisions which resulted in inefficient factor use and excessive investment and output. Kahn (1971) supported this conclusion pointing out that, for public utilities in the USA such inefficient behaviour might be reflected in:

1. The resistance of many public utility companies to full peak-responsibility pricing, which would tend to hold down the expansion of demand at the peak and the consequent justification for capacity.

2. A willingness to maintain a large amount of standby capacity, in excess of peak requirements.

3. Some considerable resistance by electric utility companies to the thorough-going regional planning of investment that represents the most highly integrated form of power pooling.

4. A resistance to the introduction of capital-saving technology.

5. A reluctance to lease facilities from others since this would reduce expansion of the rate base on which the public utility is entitled to a return.

6. A tendency for public utility companies to adhere to excessively high standards of reliability and uninterruptibility of service, with correspondingly high and costly specifications.
7. A tendency to bargain less hard than they otherwise would in purchasing equipment from outside suppliers.

8. A tendency to reach out for additional business, inside or outside the sphere of their franchised public-utility operations, if need be at rates below incremental costs.

Some of these observations regarding regulation in the USA have also been expressed in regard to state enterprise behaviour in the UK and in Australia (see Hartley and Trengrove, 1983).

4. INFORMATION AND CONTROL

The preceding discussion suggests that there is likely to be a conflict of interest between the Principal's professed objective of economic efficiency and the Agent's goals. Of course, if full (and costless) information about output and production inefficiencies are available, the Principal could constrain such inefficiencies. But full information is not available. Indeed, to an important degree the Principal is dependent on information revealed by the Agent since, due to its status as a sole producer, a state enterprise is commonly the only ready source of information on, for example, demand, production and cost.

Compelling the Agent to provide information will not necessarily resolve the problem. If he knows that the Principal's choice depends on the information given, then he can provide such (mis)information which will induce the Principal to in fact choose the Agent's optimum. Even if the Principal 'mistrusts' the Agent's information and 'corrects' it in the opposite direction to that in which he expects the bias to be, the Agent can always further bias his information in such a way as to overcome this, as long as the size and direction of the correction the Principal will apply is known to the Agent (alone).

If the Principal is aware of the problem of information bias, he might be prepared, depending on the efficiency losses he perceives, to devote resources to the task of obtaining better information including estimating the relevant information himself. For instance, outside experts may be employed and Committees of Inquiry might be set up. Even greater and closer participation of the Principal in ex ante planning and decision-making might be considered necessary. All this would lead to more control/influence of the day-to-day decisions of the Agent which would be costly in resource costs and also in terms of reduced managerial efficiency (Jensen and Meckling, 1976). Some disadvantages of a more centralized system of control are held to be: more time and resources required for the decision-making process; greater information flows become necessary; deterioration in the quality of decision-making; a deterioration in state enterprise management morale and performance because of reduced discretion and responsibility; and a deterioration in general policy formation at the centre by the Principal, since he is not able to concentrate on general issues free of the pressures of detailed decision-making.

These disadvantages/costs of a more centralized system of control also provides material for the case in favour of a decentralized or "arm's length" control. This is the sort of system (see Rees, 1976) whereby:
the Principal would provide the Agent with a specified set of objectives, the expectation being that these would remain fixed for a reasonably long period of time—say five years;

the Agent would be left to make major decisions on prices, wages, investment, technology, etc., subject to—

a framework of criteria, rules and procedures laid down in advance by the Principal. Ideally these should be:

(a) chosen in such a way as to be consistent with and, where possible, provide incentives for, the achievement of the objectives;

(b) given a precise operational form; and

(c) accompanied by a specification of the procedures by which the outcomes of decisions would be monitored and assessed against objectives.

The Melbourne Institute (1981) argued in favour of such a system pointing out that:

"...part of the reason for promulgating firm guidelines and specific review processes would be to give those responsible for public enterprises greater freedom of operation within those overall constraints. The benefits of carrying out business enterprises by independent authorities rather than enlarged departments will be obtained only if genuine independence is available. The responsibility of the government for overall public sector policy will be met only if this independence is set within a context of clear and public guidelines and regular review processes." (p. 131)

The closer we can get to an effective system of arm's length control, the less the costs of non-conformance, i.e., the costs of the Agent not conforming to the Principal's objectives. But the difficulties of designing and implementing an effective system of arm's length control have been emphasized by the N.E.D. O. Report\textsuperscript{4}(1976). These difficulties suggest that some measure of non-conformance costs would inevitably exist.

The conclusion we can draw from the preceding discussion is that costs exist for both centralized control of state enterprises as well as arm's length control. The existence of these costs gives rise to the dilemma of control which can be discussed with the aid of Figure 1 (which is adapted from Buchanan and Tullock [1962]).
Centralized or Fully regulated System

Decentralized or Arm's length Control

FIGURE 1 The Dilemma of Control: Non-Conformance Costs versus Control Costs

As the degree of centralized control reduces, information required is reduced, thus C, representing the costs of control declines (from L to Z). However, D, the costs of non-conformance, is likely to increase (from O to M). Thus the problem of trade-off exists between control costs and non-conformance costs. Conceptually, the ideal extent of regulation will be at the point which minimizes the costs involved—that is, the situation corresponding to point F on the C + D schedule.5
This brief discussion indicates the difficult situation in which many Principals are involved. The more effectively they attempt to ensure that their objectives/instructions are met, the higher would have to be the costs of control and the level of complaints about excessive interference with the Agent's activities and consequent managerial inefficiencies. The greater the dependence on arm's length control, however, the greater the potential for non-conformance costs. Unless, of course, the guidelines suggested are clearly specified and contain, or are reinforced by, appropriate incentives and/or penalties. This applies to the task of implementing pricing guidelines - an important part of the system of control in Victoria - as well as other guidelines for the improvement of state enterprise performance.

5. IMPLICATIONS OF POSITIVE ECONOMIC ANALYSIS FOR POLICIES TO IMPROVE THE PERFORMANCE OF STATE ENTERPRISE

5.1 Pricing Policy

Marginal cost pricing is the traditional prescription of welfare economic theory where the objective of pricing policy is economic efficiency. For instance, as Kahn (1970) emphatically put it:

"The central policy prescription of microeconomics is the equation of price and marginal cost. If economic theory is to have any relevance to public utility price, that is the point at which the inquiry must begin." (p.65, Vol.1)

There is an extensive literature on marginal cost pricing and the welfare economic arguments are well known (see e.g. Rees [1976], Webb [1976], Joskow [1976]), thus only a brief discussion will be presented here. The basic rationale of marginal cost pricing is simple and appealing. It is that, since we operate within a market economy in which we have accepted consumer preferences as a guide to resource allocation, the case for marginal cost pricing is that it provides consumers with as much information as possible about the resource effects of their consumption decisions so that the costs to the consumer of his consumption decision reflects the costs to the enterprise.

On the level of the individual state enterprise, marginal cost pricing can also be advocated since it would maximize net social surplus (see Webb, 1976).

For the purposes of this study, it is also worth recalling here that another perspective of the marginal cost pricing principle is that it simulates the cost-price relationship resulting from a perfectly competitive market. Given the assumptions which underlie the standard exposition of a perfectly competitive market system, competition between all firms drives market price down to the level of marginal cost (and expands investment to the point where marginal value of output equals marginal cost of capital plus operating cost). With prices reflecting marginal costs, efficient consumer decisions (on which a market system depends) are facilitated. If the price of some commodity is not equal to its marginal cost, then this price would not reflect
accurately the social cost of increasing (or curtailing) output of the commodity by an additional unit and would thus fail to display the appropriate signal to purchase/produce the optimal quantity. (If, for example, price is below marginal cost, some consumers might have consumed something for which they might not have been willing to pay the cost of production).

What all this implies for state enterprise pricing is that, where competition (actual or potential) is not possible (to the required degree), as for natural monopolies and regulated systems, prices be kept down to the level of marginal costs. This is because, to the extent that demand is price elastic, the relationship between prices and costs would affect choice between:

(i) different types of services supplied, e.g. intrafirm efficiency of a state enterprise;

(ii) different forms of a service, e.g. interfirm efficiency between, say, gas and electricity service;

(iii) expenditure on the service (e.g. energy) and on other goods and services, i.e. inter-industry efficiency; and

(iv) use of the service, e.g. energy and enjoyment of the environment, i.e. inter-industry efficiency.

The preceding economic advice on the importance of cost-based pricing for state enterprises appeared at last, during the last two decades, to receive broad recognition and acceptance, in principle, in official pronouncements overseas and, more recently, in Australia. In the United Kingdom, the White Paper on Nationalised Industries (1967) declared:

".... pricing policies should be devised with reference to the costs of particular goods and services provided. Unless this is done, there is a risk of undesirable cross-subsidization and consequent misallocation of resources. The aim of pricing policy should be that the consumer should pay the true costs of providing the goods and services he consumes, in every case where these can be sensibly identified." (para. 18)

The 1978 UK White Paper on Nationalised Industries reiterated this pricing prescription. In the United States a growing number of States are requiring their electricity utilities to examine the prospects for marginal cost pricing and peak-load pricing in particular (Needham, 1983). And, more recently, in Australia a number of recent studies have advocated cost-based pricing for state enterprises, and in principle this has been accepted by the Victorian Government (e.g. Department of Minerals and Energy [1982, 1985] Davidson Report [1982]).
5.2 A Distillation of Marginal Cost Pricing

A distillation of the marginal cost pricing literature suggests three principle guidelines for state enterprise pricing policy.

**Principle I** - Prices should not fall below marginal (opportunity) cost levels and as far as possible should equal those cost levels (unless a divergence is warranted by the second or third principles).

**Principle II** - If there is a shortage of capacity (i.e., at times of peak demands) prices should be raised to higher levels (which reflect the higher costs of supply or promote rationing to higher value users) to clear markets; when there is excess capacity prices should be lowered to reflect the lower real opportunity costs of supply and to stimulate demand.

This principle is an integral part of marginal cost pricing theory where peak/off-peak demand is important. Thus, for a state enterprise subject to peak load demand, it is now well established that higher prices should be levied:

(i) to reflect the higher costs of meeting such demand (as in a multi-plant firm which caters for peak demand by using least efficient plants);

(ii) for a single plant firm, to reflect the higher opportunity cost of satisfying the marginal consumer (see, for example, Hirschleifer, 1958; Webb, 1976; Webb and Rickets, 1980; p. 83); or

(iii) simply as a means of reducing peak (excess) demand towards a target level on the grounds that price rationing is more economically efficient than non-price rationing measures such as interrupting supply (see e.g., Baumol and Oates, 1970).

Where peak and off-peak demand are responsive to price, better load management and reduced pressure for capacity expansion (which is substantially occasioned by peak demand) including the accompanying effects of energy and environmental conservation would be amongst the more tangible benefits. Indeed, the rationale of peak/off-peak pricing is already in common use in many areas in the private as well as public sectors, e.g. STD telephone calls, hotel tariffs, electricity, air fares, etc.
Principle III - If prices determined by the first two principles do not generate the desired revenue, additional revenue may be raised by higher charges on less price sensitive market segments.

This 'inverse elasticity pricing' accords with a guideline, well established in economic theory (see e.g. Baumol and Oates, 1970), that where additional revenue is required the optimal departure from marginal cost pricing requires higher additional charges on those users who are less sensitive to higher prices (so that distortions to marginal decisions are minimized). This policy is consistent with the better known commercial practice of price discrimination or 'charging what the market will bear'. All this is quite in accord with Baumol's et.al. (1962) conclusion that,

"...while incremental cost should not determine prices or rates, they set the lower boundary and demand conditions and regulation the upper boundary, within which pricing decisions should be made." (p. 359)

5.3 Problems with Marginal Cost Pricing

Although the logic of the marginal cost-based pricing principle now appears to be widely recognized in Australia, if it is to be successfully applied, we should learn from the experience of the UK where marginal cost pricing failed to be implemented despite - as we saw - having apparently strong official support. One might approach this lesson by categorizing the reasons for the failure into difficulties in (i) theory, (ii) measurement and application, and (iii) motivational absence. These are discussed in turn below.

(i) Theoretical Obstacles

(a) Short-run or Long-run Marginal Costs?

There has been considerable theoretical debate over whether prices should be related to short-run or long-run marginal costs. In theory, it seemed clear that prices should be related to short-run marginal costs although, in practice, it was arguable that the appropriate costs were long-run. The efforts to identify one or the other as the relevant cost basis now seems to have been unnecessary since the logic of both is instructive. Where demand and capacity is expanding, long-run marginal costs are the relevant costs upon which to base prices. But, in cases of excess capacity or excess demand, including the peak-load characteristic, the logic of short-run marginal costs prescribes that demand be stimulated and rationed, respectively. This eclectic approach simply recognizes that it is the effects of marginal-cost pricing which is the objective and not the application of the principle as such.
(b) The Second-Best Problem

The second theoretical difficulty concerned the theorem of the second-best. Put simply and briefly, this theorem warns that the application of marginal cost pricing will lead to an improvement in economic efficiency for the economy as a whole only where all the Pareto optimal conditions are satisfied throughout the economy. Relating prices to marginal costs in one/some sectors could encourage economic efficiency in these sectors but would not necessarily promote economic welfare - indeed could make things worse - for the community as a whole. For instance, if gas prices are increased/decreased so as to be based on marginal costs but the price of close substitutes, e.g. electricity, or complements, e.g. heating appliances are not, this could result in distortions in demand which are inefficient. This would mean that unless we are prepared to base the case for marginal cost pricing for a single industry/sector on the grounds that this would maximize efficiency (social surplus) in that sector in which case the conditions prevailing in other sectors would not matter, the desirability of marginal cost pricing may be open to question.

Indeed, in practice, some may be prepared to proceed on this basis. For instance, the French support for marginal cost pricing for electricity tariffs seems to be largely based on arguments that the industry has benefitted in terms of consumers' surplus benefits and, more tangibly, in terms of the cost-minimization, improved load management, conservation, etc., associated with peak-load pricing. Such pragmatists might argue, moreover, as Kahn (1979) did, that,

"... second-best argues no more persuasively against moving prices to marginal cost than it does against leaving them where they are."

Thus, those of this persuasion might be prepared to proceed with marginal cost pricing for a single enterprise/sector despite the uncertainty about the effects on the economy as a whole. The French electricity economists apparently were. Another school of thought, whilst insisting that public utilities should be concerned with the welfare of the economy as a whole, is nevertheless prepared to proceed - not without some uneasiness though - on the contention that only important deviations from optimality, in close substitutes or complements, which we know about, are worth worrying over. Where such deviations are discernible, the application of second-best pricing rules such as those developed by Turvey (1968, 1971) and Rees (1976) have been prescribed. In regard to energy supply state enterprises, Price (1980) argues:
"There is some debate about the justification for setting prices equal to marginal costs in an imperfect world, but there seem strong arguments for doing so in the fuel industries. Three of them are nationalised and subject to Government pricing policies, and the demand inter-relationships within the sector are much closer than those of any fuel with outside products. Thus the sector is sufficiently distinct for marginal cost pricing to be a sensible policy; no other relationship between price and marginal cost is apparent, divergence of price from marginal cost in one nationalised industry has repercussions on the others, and equality seems most appropriate given the recommendations of the Government White Papers." (p.3)

One recent development also deserves mention. The arguments of some economists in favour of pursuing first-best rules in circumstances where we have inadequate knowledge about conditions in other sectors appears to have received some theoretical support. Ng (1977, 1979) has argued that if informational and administrative costs are taken into account, the 'optimal feasible' policies may be called the 'third-best' which,

"...are not much different from first-best ones, and certainly not as complicated as second-best ones."

Interestingly, Ng argues that for an important class of situations - namely those where 'informational poverty' prevails - the simple first-best rules, such as 'equate price with marginal cost' are appropriate.

To sum up, then, rather than regard the second-best theorem as destroying the theoretical basis of many economic prescriptions, pragmatic economists are prepared to proceed albeit more cautiously - especially in regard to what effects changes in one sector will have on related sectors - due to the warning sounded by the theorem. Certainly it warns that changes in gas pricing policy, for instance, should not be considered in isolation from pricing policies of other energy authorities, indeed, from energy policy overall.

5.4 Problems in Measurement and Application

In the textbook theory, the concept and measurement of marginal cost might not seem problematical. In practice, however, the concept of marginal cost is capable of many different interpretations so that each state enterprise might justify any one of various pricing structures. Moreover, as pricing affects not past but future behaviour, it is the opportunity costs which will be incurred or which can be avoided in future that matter. Thus historical costs, although more easily measured than future costs, do not necessarily provide a useful guide to the costs that will have to be incurred. As Coase (1970) has emphasized,
"... so-called historic costs are also irrelevant. What will be lost if a supply is undertaken or continued is something which occurs in the present or the future. What may have happened in the past, or what expenditure may have been made in the past, is not relevant to a cost calculation. A delving into historical records, except as a means of discovering what is likely to happen in the future, is a sure sign that the cost calculators are on the wrong track." (p. 113)

However, future costs are inevitably uncertain and estimates of the construction costs of any future expansion of capacity are subject to significant margins of error. Even if the costs of a particular investment project can be estimated fairly accurately, this may not provide an adequate guide to the incremental costs imposed on the system as a whole - where, as in the case of energy supply, the supply system is interconnected. It is the change in total system economic costs that prices should reflect. Moreover, to the extent that demand is sensitive to prices, estimates of demand have to take account of the expected future level and structure of prices. While relatively little is known about the price-elasticity of demand, this introduces another area of uncertainty.

The foregoing explains in part the British failure to implement marginal cost pricing. The UK White Papers on Nationalised Industries (1967, 1978) provided no explicit guidance about the interpretation of marginal costs. Each industry was at liberty to choose its own definition of cost - indeed, it was required to do so. As Littlechild (1979) pointed out:

"If an industry has to decide what is a 'reasonable' interpretation and implementation of marginal cost, then virtually any pricing policy which it wished to adopt could be justified as a 'reasonable' version of marginal cost pricing. Thus, the instruction to set price equal to marginal cost appears to provide guidance to the nationalised industry and to impose restrictions on its behaviour; in fact, it does neither." (p. 14)

This ambiguity clearly would make the Principal's task of monitoring and control extremely difficult and the observed failure to implement the marginal-cost pricing principle in the UK should not therefore seem surprising.

The lesson to be drawn from the British experience then is that it will be necessary for the Principal to specify which, and how, appropriate marginal costs should be measured for pricing purposes. Moreover, that the adequacy of such an instruction should be judged in part by the ease with which it can be monitored.
Littlechild (1979) saw little hope in overcoming such (and other) difficulties of marginal-cost based pricing. However, the major uncertainties involved in defining and estimating marginal costs apply with equal force to the estimates upon which state enterprise management have to base decisions on the scope and nature of future investment programmes. In other words the required marginal cost information is likely to be obtainable from the system optimisation models which are required for use in investment or capacity planning (see Turvey [1967, 1971] and Blaydon et al. [1979]).

The prospects for more and better information depend on whether the assessment of the implications of marginal cost pricing becomes regarded as an integral part of each state enterprise's entire planning process. As the information base is improved through systematic research and analysis and through the adaption of operational procedures to produce relevant statistics as a by-product of management, more of the basic information required for pricing policy should also become available — provided, of course, that both operational procedures and research priorities are designed with this end in mind.

It is true that precise information may never be obtainable. But it should be practicable to obtain a broad indication of the direction in which prices at the margin should be moving. It should also be possible to judge whether marginal economic system costs, in general or in particular areas, are significantly above or below the average accounting costs of the system. A main priority is to remove any wide divergence between the cost to the system of increasing supply capacity and the charges currently paid by consumers for marginal supplies. As Webb and Ricketts (1980) put it:

"In conditions of limited information, risk and uncertainty, the instruction to a multi-product energy utility to relate its prices to marginal costs will not determine a unique set of prices. The structure and level of these prices will depend to a large extent on the judgement of the price-setter. This will clearly make for difficulties for the implementation of any monitoring system which might accompany such a pricing instruction. Nevertheless, while there will always be room for argument it should be possible to determine whether prices are reasonably related to marginal costs. Simple tests of this may have to suffice, such as whether the measures of costs are forward-looking and based on forecasts rather than backward-looking and related to average historic costs." (p. 109)
5.5 Motivational Absence

Even when the Principal has clearly specified how marginal cost is to be measured and applied, the interest the Agent will have in applying it faithfully will depend on what incentives and/or penalties are made available for it to do so. This is because it seems unlikely that the Agent will be enthusiastic about applying marginal cost pricing. To quote, Littlechild (1977) again:

"The second part of the explanation for the lack of enthusiasm for marginal cost pricing is that this philosophy is at best irrelevant to, and at worst an amazing constraint on, the pursuit of the real objectives of the parties concerned. The managers of the industries are precluded from taking out profits for themselves. They may derive satisfaction from an aggressive policy of expansion or modernisation, or they may prefer to take the line of least resistance, by attempting to minimise complaints from customers, suppliers, employees, newspapers and ministers. Successive governments, for their part, have ordered at one time that prices be raised to break even; now investment must be cut to lower the public sector borrowing requirement, now it must be expanded to fight unemployment. It is evident that these macroeconomic considerations have consistently taken precedence over improving the efficient allocation of resources via marginal cost pricing. Neither nationalised industries nor governments perceive the latter policy as helpful." (p. 14)

Apart from the problem of the lack of incentives on the part of the Principal for marginal cost pricing, there is still the problem of Agent motivation to contend with. And, since it is the Agent who has the superior knowledge about the production function, unless incentives can be provided, the monitoring and control costs are likely to be high. These issues are addressed after the next section where the issue of the level of state enterprise prices is examined.
In the previous section we discussed the guidance that the marginal cost pricing principle can provide state enterprise pricing policy in regard to the structure of prices. Of course, pricing policy is also concerned with the level of prices which in turn determines the revenue received by a state enterprise. What guidance can economics provide in regard to the level of prices/revenue which would be consistent with economic efficiency?

6.1 Marginal Cost Pricing and 'Cost Recovery'

The early marginal cost pricing literature provided little guidance on the appropriate level of revenue for a state enterprise. For instance, Walters (1968) declared emphatically,

"Is it desirable to increase the user charge above the level of marginal cost so that 'full costs are covered'? Would not this give rise to a more efficient system of allocation and location? The answer is an unequivocal 'no'... It is a delusion to imagine that charges above marginal cost can achieve both efficiency and equity."

(p. 97-98)

For Walters, the important thing was to relate the structure of prices to the forward-looking marginal (opportunity) costs occasioned by the provision of the various services at various times and places. If, in adhering to this policy, a state enterprise incurred a loss/deficit economic efficiency required that this should be covered by governmental subsidies funded from tax revenue (see e.g. Henderson 1947, and Coase, 1970).

The later economic literature recognised that while deviations from marginal cost pricing might lead to allocative inefficiency, the additional taxation required to fund subsidies would also generate welfare losses which could well exceed those associated with the departure from marginal cost pricing.

In addition, the assurance of subsidies would be available to offset deficits incurred by a state enterprise could well be conducive to X-inefficiency. There could also be problems of investment decision-making. Although in (social) cost benefit analysis an enterprise's deficit can be justified by reference to the existence of consumers' surplus, externalities and the use of 'shadow' prices, (see e.g. Sugden and Williams, 1978) these are difficult to estimate precisely. Clearly a convincing indication that the enterprise is worth having is when its customers demonstrate their 'willingness to pay' for its total costs by actually doing so. Requiring the enterprise as a whole and any new investments it makes to cover total costs imposes a valuable market test that guards against excessive investment or maintenance of unjustifiable operations. Moreover, there is an important equity question: why should taxpayers in general subsidize those who most intensively consume the state enterprise's output?
For such reasons, there now seems to be broad acceptance that it is desirable in principle to require state enterprises to recover their total costs. This led to guidelines in regard to optimal departures from marginal cost pricing (e.g., Baumol and Bradford, 1970). That is, when marginal cost pricing does not generate the amount of revenue considered appropriate, the required amount of additional revenue can be obtained by additional charges on users related inversely to demand elasticities. This so-called 'Ramsay' rule would minimize the efficiency loss involved since with higher charges on less elastic demands, the distortions to efficient marginal decisions, and, accordingly, the efficient allocation of resources, would be minimized. This guideline warrants elaboration.

The Ramsay Rule

Assume for simplicity that there are two demand curves that are independent of each other. The efficiency loss associated with the imposition of a cost-recovery constraint will be minimized when the marginal efficiency loss per dollar contribution towards the target is the same for both products. Since the efficiency loss equals the difference between the price paid and the marginal cost of the product and the dollar contribution to the cost recovery target is measured as the difference between the marginal revenue and the marginal cost of the product, this condition can be expressed as:

\[
\frac{P_1 - MC_1}{MR_1 - MC_1} = \frac{P_2 - MC_2}{MR_2 - MC_2} = \lambda
\]

where \(P_1\) and \(P_2\) are the prices of products 1 and 2,
\(MR_1\) and \(MR_2\) are the marginal revenue of 1 and 2,
\(MC_1\) and \(MC_2\) are the marginal cost of 1 and 2,
\(\lambda\) is a constant with a negative value determined by the size of the cost recovery target.

In reality the various products of a state enterprise, e.g., an energy utility, are often substitutes for each other and thus the demand curves are interdependent. This means that the deviation of price from marginal cost must allow for both own and cross price elasticities. The optimising condition given above must still hold, although the measurement of the marginal dollar contribution must allow for both the direct and indirect effects of the price change on the utility's revenue. In the case of two goods we have (see Rees [1976], p. 107):

\[
\frac{P_1 - MC_1}{(MR_{11} + MR_{12}) - MC_1} = \frac{P_2 - MC_2}{(MR_{22} + MR_{21}) - MC_2} = \lambda
\]
where \((MR_{11} + MR_{12})\) measures the total effect on the enterprise's revenue of a change in output of good 1, and 
\((MR_{22} + MR_{21})\) measures the total effect of a change in output of good 2.

6.2 A Rate of Return Requirement (RRR)

(i) Difficulties in Setting an Appropriate RRR

While there now seems broad agreement that, in general, state enterprises be required to recover their costs, the issue of whether, in addition, they should earn profits, or a rate of return on capital employed and, if so, how much, continues to be controversial (see e.g. Stretton [1984] p. 25). Economic theory prescribes that in the interests of (static) economic efficiency, "profits should be limited to the amount necessary to attract needed capital" (Schmalansee, 1979, p. 37). In other words, the state enterprise should earn zero economic profit on average, or alternatively, its actual rate of return should equal its average cost of capital funds. But this guideline does not seem very useful particularly where imperfect capital market conditions exist, or in a dynamic context in which higher rates of profit which reflect successful entrepreneurship and innovation seems consistent with (dynamic) economic efficiency. Thus, in practice, specification of the appropriate rate of return seems subject to judgement based on various considerations which would vary from case to case (see UK White Paper 1978, p. 37).

Nonetheless, an RRR is widely considered to be an important part of the regulations imposed on public utilities. Indeed, in the United States much of the deliberations of regulatory proceedings have been concerned with decisions in regard to maximum allowable rates of return for public utilities. In the United Kingdom, the White Papers on Nationalised Industries (1961, 1967, 1978) have considered guidelines for minimum rate-of-return targets to be an important part of the control framework. In Australia, and in the state of Victoria in particular, there has recently been considerable emphasis placed upon the requirement that state enterprises earn a specified rate-of-return on capital employed. The Melbourne Institute, in a report (1981) for the Public Bodies Review Committee concluded,

"It is our view that pricing policy should be primarily based on a target rate of return on total assets employed, valued at replacement cost prices, after allowing for depreciation at replacement cost but before interest. That is, major business authorities (i.e. state enterprises) should be required to earn a given rate of return on the current value of total assets, after allowing for their maintenance in real terms, and independently of the way in which those assets are financed. This is the essential requirement to ensure efficient use of resources in the public sector." (p. 104) (Emphasis added.)
The Office of Management and Budget Task Force set up by the Victorian Government agreed, arguing that,

"... There is a need for having guidelines for the performance of public bodies in general, and that the rate of return criteria are the best form of guidelines for such public bodies." (Department of Minerals and Energy [1982] para. 3.1)

The Government has adopted the Office of Management and Budget Task Force's recommendation that overall pricing levels of state enterprises should be primarily based on a target real rate of return of 4% on total assets employed, valued at replacement cost prices, after allowing for depreciation at replacement cost but before interest. That is, state enterprise should be required to earn a real rate of return of 4% on the current value of total assets, after allowing for their maintenance in real terms, and independently of the way in which those assets are financed (Department of Minerals and Energy [1982b], para. 3.2; Office of Minerals and Energy [1985] p. 11).

However, several writers have pointed to the limitations of an RRR as a measure of, or as a means of promoting economic efficiency and these arguments warrant some attention in view of the current emphasis accorded the RRR by the State Government and its advisers.

Reasons for an RRR

To begin with, let us identify briefly some of the main reasons put forward in favour of an RRR for state enterprises. An RRR might be useful:

1. As an aid to achieving "reasonable balance" between commercial objectives ascribed to a state enterprise and the wider objectives of policy for its sector and the economy at large.

2. As a basis for comparison of the effective use of assets between one state enterprise and another, and between state enterprises and private industry.

3. As a practical revenue target, stated in clear terms and readily altered in response to changing circumstances.

4. As a surrogate for profits, providing incentives for good management.

5. As an observable, monitorable measure useful in the control of state enterprises. The argument here is that to the extent that difficulties in obtaining the information for effective control of pricing policy persists (see Section 4) we will need to depend on more observable measures such as an RRR.
Doubts about a Dependence on RRR

There are, however, several concerns about the effects of an RRR for state enterprises which, in view of the recent emphasis on it, should also receive consideration.

It is sometimes suggested that financial targets should be in the form of self-financing ratios. However, although forecasts of these ratios are very important in estimating the state enterprise's requirements for loan funds, they are not a suitable basis for financial targets. Performance in relation to a target is a measure of how well an enterprise is using its total assets, and it is therefore necessary to relate profits earned to the total capital employed in the business rather than to the amount of its investment in a particular year. Moreover there may be a shortfall on estimates of annual investment so that a self-financing ratio target could be met or exceeded for reasons in no sense attributable to efficient management.

2. Since in an imperfect world there is no unique "theoretically correct" basis, the choice of a figure for the RRR is a matter of judgement. Indeed, the UK White Paper on Nationalised Industries (1978) argues that the specification of an RRR should take many factors into account:

"The level of each financial target will be decided industry by industry. It will take account of a wide range of factors. These will include the expected return from effective, cost-conscious management of existing and new assets; market prospects; the scope for improved productivity and efficiency; the opportunity cost of capital; the implications for the Public Sector Borrowing Requirement; counter inflation policy; and social or sectoral objectives for e.g. the energy and transport industries." (p. 26)

3. Once prescribed, the calculation of RRR actually achieved by a state enterprise is again open to interpretation and disagreement, since over short periods, the internal rate of return can be subject to considerable variation because of the lumpiness of capital expenditures. In these circumstances an average (geometric) of rates over a number of years might have to be used. Alternatively, the asset may be amortized over its economic life at its appropriate cost of capital, to reduce variation in cash flows and therefore returns. Officer (1983) warns that this internal rate of return should not be confused with the accounting rate of return which is defined as the accounting profit per book value of assets. The accounting rate of return can vary between enterprises due to different accounting procedures, e.g. through the subjective amortization of capital expenditures or capitalization of expected future cash flows as well as different valuation procedures, which may have no bearing on the performance of a state enterprise (see Fisher and McGowan [1983]).
4. Some economists have warned that an RRR for state enterprises could distort efficient investment decisions. As we saw earlier (see page 11) there is an extensive literature on how a regulated maximum RRR for public utilities in the United States has resulted in economic inefficiency (e.g. of the Averch-Johnson type). For state enterprises subjected to a minimum RRR as in the United Kingdom, and now in Victoria, Gravelle (1976, 1977) has shown that the least cost input mix will not be chosen if the target RRR exceeds the rate at which the state enterprise borrows. New investment in plant which has a long construction period (e.g. power stations) will increase net assets (and hence the revenue requirement) before the plant is in operation and generating revenue. Moreover, the RRR could encourage both the choice of less capital intensive investments and of accounting practices which write off net assets more quickly. For example, the United Kingdom Price Commission (1978) notes a criticism of the South Scotland Electricity Board for using too short asset lives, and for charging interest on power stations under construction to revenue rather than capitalising it as part of the cost of the asset. The prospect of such distortions led Webb (1978) and Gravelle (1976) to conclude that for the purpose of raising revenue, the least-cost approach would be to prescribe a simple lump sum target rather than an RRR.

5. An RRR in itself provides no guarantee of, and may, in fact, obstruct economic efficiency if it requires a departure from efficient pricing structures. (This is discussed further below.) Moreover, by focussing on a revenue requirement, the RRR could give strong reinforcement to traditional price policies such as those concerned with recovering historical or accounting costs of past investments embedded in current assets plus a mark-up to cover the RRR rather than the concern with forward-looking economic costs prescribed by economic theory.

6. An RRR by itself need not necessarily serve to stimulate managerial/cost efficiencies in state enterprises. Clearly, to exert any pressure for reductions in X-inefficiency the RRR prescribed would have to be higher than the rate of return the state enterprise itself would have chosen to achieve and there would have to be sufficient penalties for failure to achieve the prescribed target.

However to the extent that the state enterprise is a monopoly facing price inelastic demand at least for some services - as seems the case for the energy supplying state enterprises - the RRR could be achieved by price rises and/or changes in the level of product quality/service (such as reliability, durability, safety, etc). The fact that a specific RRR is compatible with many combinations of pricing and non-price dimensions of a state enterprise's behaviour is examined further below.
(a) A Rate-of-Return Requirement and Multiproduct Price Vectors

Irrespective of whether costs or demands of the different products of a state enterprise are related, there will generally be many different price-cost relationships and resulting output mixes that are compatible with a particular prescribed RRR. The only exception to this rule is where an RRR does not influence a state enterprise's own preferred profit level.

An important implication of this is that, irrespective of whether an RRR is related to the amount of capital the enterprise employs, to the enterprise's total cost, or to some other dimension of the enterprise's behaviour, additional features of the regulation will generally be required to induce the state enterprise to adopt a particular product-price vector from all those which are compatible with a particular level of RRR. In the absence of such additional features of regulation, state enterprises may adopt product-price levels and output mixes that may result in lower levels of society's satisfaction than other product-price levels that are compatible with the same level of RRR. The fact that a particular RRR is consistent with many product-price combinations is explained below with the aid of Figure 2.

In Figure 2 (c) the lines labelled ABCDE and abc, termed "iso-profit" curves, depict all the combinations of prices of two of a state enterprise's products that will result in the same level of total profit for the enterprise. The way the lines are derived is explained below (see Needham, 1983).

The upper portions of Figure 2 (a) and (b) depict the conventional demand, marginal revenue, and marginal cost curves for two of the firm's products, X and Y. Here, the demand and cost curves of each product are assumed to be independent of the price and output level of the other product. (This assumption could be relaxed without changing the shapes of the iso-profit lines in Figure 2 (c)). The lower portions of parts (a) and (b) of the figure depict the total amount of profit the state enterprise earns from each product, at different product prices and resulting quantities demanded. The level of total profit resulting from any price-output combination (a) and (b) is equal to the difference between the areas under the marginal revenue and marginal cost curves, up to the price and output levels in question. The height of the horizontal line through the "profit hills" on the lower portions of (a) and (b) represents a particular level of total profits of the firm equal to \( \pi \) in magnitude. This level of total profits can be achieved not only by any of the four price-output combinations where the line intersects the two profit hills in parts (a) and (b) of the figure but also by other combinations of the prices of the two products; these different combinations are depicted by lines ABCDE and abc in Figure 2 (c).
The iso-profit curves ABCDE and abc show all the combinations of prices of the two products X and Y that result in total profits of the state enterprise equal to $\Pi$. Similar iso-profit curves can be constructed indicating price combinations that yield the same profit/capital ratio (or RRR). In these circumstances, increases in the level of output X or Y will require more capital inputs, and a higher absolute amount of profit will be required to earn a given rate of return. Diagramatically, this merely means that the profit constraint in the lower portion of Figure 2(a) and (b) will slope from left to right instead of being horizontal; otherwise the methods of deriving the iso-profit curves is the same. Similar shapes of the curves will result; the only difference will be that the iso-profit curve corresponding to a particular rate of return will lie further toward the upper right of the diagram.
FIGURE 2  A Rate-of-Return Target with Various Product-Price Combinations

SOURCE: Needham (1983)
The preceding analysis demonstrates why regulation that specifies the rate of return on capital that a multi-product enterprise earns still leaves it a wide range of pricing options for its products. These options are shown by different points on the iso-profit curve associated with the regulated level of profit or rate of return.

(b) Effects of RRR on Non-price Dimensions of State Enterprise Behaviour

An RRR and/or regulation of pricing policies will also generally affect the level of non-price dimensions of state enterprise behaviour, such as the level of expenditure on advertising, research and development or quality dimensions of output such as reliability and durability. These effects on non-price aspects of state enterprise behaviour must be taken into account since

(1) this may affect the demand and cost conditions facing the firm, and
(2) community welfare.

There are three possible relationships between the level of any non-price dimension of the enterprise's behaviour that affects its total revenues and total costs and the profit-maximising relationship between the price and marginal cost of the enterprise's product. These are depicted in Figure 3, where the non-price dimension of behaviour is represented by the ratio of the enterprise's expenditure on product quality to sales revenue. Any other dimension of the enterprise's behaviour that affects its total revenue and/or total costs could have been selected without changing the subsequent conclusions (Needham, 1983).

FIGURE 3 Effects of RRR on Non-Pricing Dimensions of Firm's Behaviour

![Diagram showing the relationship between the level of expenditure on product quality and the level of mark up from marginal cost, with three optimal points labeled I, II, and III. The horizontal axis represents the level of expenditure on product quality, and the vertical axis represents the level of mark up from marginal cost. The diagram includes a source citation: Needham (1983).]
Equalling the increase in total revenue from an increase in expenditure on product quality to the increase in the firm's total costs resulting from the improvement in product quality implies

\[
P \cdot \Delta Q = \Delta A + MC \cdot \Delta Q = (P - MC) \frac{\Delta Q}{\Delta A} - \frac{\Delta Q}{\Delta A}
\]

where \( \Delta Q \) is the increase in the quantity of the firm's product demanded owing to the improvement in product quality \( A \), and \( MC \) is the marginal cost of producing one extra unit of output demanded. Multiplying both sides of the expression by \( A/PQ \), the ratio of total expenditure on product quality to total sales revenue \( (S = PQ) \) yields

\[
\frac{A}{S} = \frac{(P-MC)}{P} \cdot \frac{\Delta Q}{\Delta A} \cdot \frac{\Delta}{Q} \quad \text{and} \quad \frac{\Delta Q}{\Delta A} = \frac{E}{Q}
\]

6.3 Conclusion

To conclude this section, we summarize the thrust of its argument. While an RRR for state enterprise can be justified on financial and economic grounds, in itself it provides no guarantee of, and may in fact result in departures from, efficient pricing (non-price and investment) policies. The Melbourne Institute's (1981) advice that "...pricing policy should be primarily based on a target rate of return on total assets employed..." (p.104) and the State Government's evident acceptance of this advice, should be viewed in this light. Indeed, it is arguable (Heald, 1980) that an RRR should reflect sound pricing and investment policy and not vice versa.
7. BEYOND PRICING POLICY FOR STATE ENTERPRISE EFFICIENCY

Thus far this study has attempted to examine the extent to which pricing guidelines advocated by economic theory can contribute towards promoting state enterprise economic efficiency. The broad conclusion of this examination is that, despite its problems, pricing policy which incorporates the logic of marginal pricing principles is pertinent to the task of promoting state enterprise efficiency. However pricing policy has limitations which should be recognized. In brief, while pricing policy may help achieve allocative efficiency, it does not adequately address the tasks of encouraging X-efficiency and dynamic efficiency. As discussed earlier, a rate of return requirement to supplement marginal cost pricing, while desirable, is unlikely (particularly in the monopoly circumstances enjoyed by many state enterprises) to generate the requisite pressures/incentives for X-efficiency improvements. Moreover, marginal cost pricing seems to offer little by way of incentives to encourage dynamic efficiency. And, in the longer run, the dynamic changes involved with innovation and technological progress could well be more significant than the benefits from (static) allocative efficiency. As the Centre of Policy Studies (1981) argues:

"The potential importance of entrepreneurial behaviour to the Victorian energy situation should not be understated. Entrepreneurship is not just a matter of selecting the most appropriate technique or product from those which are already known. It involves the active and continual search for new products and processes, with the successful entrepreneur recognising such opportunities before his rivals. Clearly entrepreneurship is a most important input to the production process. . ." (p.54)

7.1 Policies to Complement Pricing Policy

(i) Performance Evaluation

Clearly, if state enterprise efficiency is to be pursued, policies to complement pricing policies are required. This is well recognised. As the Melbourne Institute (1981) argues:

"Authorities should also be required to develop and publish a range of performance indicators by which the efficiency of the enterprise can be assessed, particularly in regard to the performance, according to similar measures, of comparable enterprises overseas. These indicators might include output or sales per unit of input, particularly labour input, selling price per unit of output, scale of plant, administrative overheads per unit of output and more specific measures appropriate to individual enterprises." (p.135)

To provide incentives for greater efficiency, performance evaluation might serve as the basis of performance-related bonuses for management. The problem is, as the Melbourne Institute (1981) recognises,

"clearly the type of information made available by authorities for these processes will be most important." (p.135)
As this paper has emphasized, the quantity and/or quality of the information required for evaluation and control which is provided by state enterprises themselves may be expected to be influenced by the self-interests of the state enterprises.

Schmalensee (1979) has also emphasized the importance of truthful information revelation in performance evaluation and management audits of public utilities and state enterprises:

"Well-done management audits can serve to focus the attention of regulators, public opinion, shareholders, and potential new management on instances of gross inefficiency. As Doades (1978) and Sargent (1978) note, however, management auditing is not easily done well. In particular, the utility's management, because it controls the flow of a good deal of critical information plays an important role in the auditing process. Nevertheless, although management audits cannot be expected to perform their information provisions function perfectly, their more extensive use is difficult to oppose." (p.83) (Emphasis added)

(ii) Designing Incentives for Information Revelation

The provision of more resources to improve the monitoring and evaluation process might help to some extent, but the underlying incentives would not have changed. What is also required as a complementary task is an endeavour to design a system of incentives and/or penalties which would promote the truthful revelation of information from state enterprises. (See Needham (1983) for one attempt.) To the extent that this is achieved we might be able to reduce the cost, and improve the effectiveness, of state enterprise control.

7.2 Policies from Alternative Views about Achieving State Enterprise Efficiency

There are those who doubt whether the required information, incentives, monitoring and control, to ensure that improvements in state enterprise efficiency can ever be attained under the present institutional arrangements. As Porter and Clarke (1983) put it:

"Those wishing to improve public accountability have often suggested that public enterprises should provide more complete, and more frequent accounting information to the public. We have seen, however, that this raises difficult questions. Since there is no market test of the amount or type of information to provide when ownership rights are not transferable, how do we decide how much should be spent and on what? In state enterprises these decisions will probably be left to the whims of the politicians and bureaucrats. Moreover, providing more detailed information is likely to have little effect so long as members of the public have so little to gain from assessing it. Fuller reporting by state enterprises can only form part of the solution, since it does not change underlying incentives. This is possible only through more far-reaching institutional changes. (p.22, emphasis in original.)
(i) Privatisation

Some of those who hold the view expressed by Porter and Clarke above, including Liberal Party politicians have argued in favour of "privatisation" of state enterprises. Private ownership, it is argued, has several advantages over the present system of state ownership. Since the arguments have been widely publicized only a brief summary, concentrating on economic issues, is necessary here.

Firstly, it is claimed that private ownership would create a set of monitors of management performance, who do not need to be monitored themselves, because it is in their interests to see that company profits are maximised. Moreover, there are incentives to minimise the costs of monitoring (and hence to find the most effective monitoring instruments), both the extent and type of monitoring activity will be determined by market forces. Secondly, it is alleged that allocative efficiency would be promoted since private ownership would encourage more efficient pricing policies and a reduction of cross-subsidisation. Thirdly, private ownership would reduce X-inefficiency since the degree of managerial discretion and the extent it is utilised to further management interests would be less (Leibenstein 1983) and since cost reductions could be expropriated by increased profits. Fourthly, dynamic efficiency would be encouraged since incentives for innovation are likely to be stronger in (competitive) private enterprise (Wolf, 1979). (This is discussed further below.)

Some Reservations about Privatisation

There could however be several arguments raised against privatisation which also should be considered.

First, it might be argued that, since private firms would be less willing to design pricing policies catering for special groups, the practice of a public utility maintaining a comprehensive network of services through a policy of cross-subsidization will not be maintained. If it is considered however, that cross-subsidization is undesirable and should be abandoned, this result of privatisation in fact argues in favour of privatisation, rather than against it. Littlechild (1981) makes this point cogently with reference to nationalised industry in the United Kingdom:

"Nationalisation was designed to achieve political ends: to redistribute income and power. The whole purpose of public ownership is to make the allocation of resources subject to political rather than market forces. A government which has the power to intervene cannot help but exercise it even despite its better judgement whenever circumstances seem to require it, that is, as and when it is politically expedient to do so.... The lesson to be learned from the last forty years of nationalisation is that the real task is not to control the industries but to control government itself." (p. 12. The first emphasis is in the original, the second is added.)
While such competing interests would also inevitably be present under private ownership, their influence would be curtailed both by shareholder resistance to unprofitable pricing policies and by a private firm's limited resource to the public purse.

A second argument against privatisation is that state enterprises are less likely than private firms to generate harmful spillover effects. The reasoning here could be that state enterprise employees would be more sensitive than their private enterprise counterparts to harmful consequences of their actions for others, but this is not necessarily true (see Porter and Clarke, 1983).

A more important concern is the argument that privatisation could lead to monopoly power, or at least pockets of monopoly power, particularly in instances of natural monopoly where a single firm could capture the market for essential, politically sensitive services such as energy supply. As Knight, a former (1979-80) chairman of the UK National Enterprises Board, pointed out (Knight, 1981):

"The economies of scale from the main utilities are so large that monopoly is inevitable. A private sector monopoly would probably need as much supervision and regulation as one in the public sector. For this class of business, the question of ownership is largely irrelevant to that of industrial performance." (p. 31)

This is recognised even by those urging privatisation such as the Centre of Policy Studies (1982):

"Permitting private enterprise to enter would create incentives to minimise costs, seek profitable new market outlets and stiffen resistance to political intervention. But this approach has problems of its own, particularly if the firm concerned possessed considerable monopoly power. Some might argue that government regulation of the private firm's activities would solve this problem, but the difficulties of establishing a regulatory procedure which does not severely distort business incentives are well known." (p. 5.17)

Indeed the inefficiencies that such regulation is likely to generate has been well documented in the case of the United States. As Scherer (1970) succinctly put it:

"The supreme power who conceived gravity, supply and demand, and the double helix must have been absorbed elsewhere when public utility regulation was invented. The system is cumbersome, vulnerable to incompetence, and prone toward becoming ingrown and co-opted. In some respects it is directly conducive to inefficiency; in others it may be merely ineffective in altering the behaviour of the companies regulated." (p. 537)

Since political realities suggest that government regulation would almost certainly accompany the privatisation of state enterprises in Australia, it would seem, then, that the choice is between the problems of state enterprises and those of regulated
private monopoly. In either case, it seems likely that guidelines — including those for pricing policy — will continue to be required.

We turn now to examine recent theoretical developments which are of much interest to the quest for state enterprise efficiency.

(ii) Contestable Markets Theory

Baumol, et al., (1983), have argued on the basis of “contestable market analysis” that the traditional natural monopoly argument for state enterprise/public utility regulation requires reassessment. It is worth quoting Baumol at some length:

"It has been shown, for example, that to determine whether or not some particular industry is a natural monopoly is a matter rather more complex than had previously been recognised. The association between scale economies and natural monopoly is not as straightforward as is generally thought...."

Baumol goes on to note that:

"...natural monopoly has led either to public ownership or direct regulation of the firm’s pricing, investment and other major decisions. In such cases, natural monopoly has been cited as a reason calling urgently for the prohibition of entry on the grounds that the presence of additional firms constitutes wasteful duplication, erodes economies and precludes the adoption of what are said to be socially desirable arrangements, such as nationwide uniformity of pricing, despite substantial differences in the provision of a service at different geographic locations. Contestability analysis tends to confirm the economist’s traditional suspicion of such views. It shows that the threat of competitive entry can in many cases impose effective discipline upon private firms even when they are unregulated monopolies. Where an industry is in fact a natural monopoly, contestable markets analysis indicates that entry will not occur so long as the behaviour of the incumbent firms is not vulnerable to competitive incursions. Thus, in such cases, the prohibition of entry is both unnecessary and undesirable. It is unnecessary because, in the presence of acceptable behaviour by the incumbent, entry will not occur even if it is undeterred by legal impediments. Preclusion of entry is undesirable because it robs the market mechanism of its most powerful instrument for the achievement of economic efficiency and acceptable behaviour in the industry."
If this analysis is correct it also follows that natural monopoly does not automatically justify recourse to either nationalisation or regulation. Where the industry's attributes approximate those of what has been called a perfectly contestable market, it has been shown that the market mechanism is quite capable of eliciting acceptable performance without government intervention. And even where an industry is to a significant degree not contestable, it may be advisable first to consider whether there exist effective means to impart contestability to the market before embarking upon such drastic steps as nationalisation or the erection of a complex regulatory mechanism." (Baumol (1983) quoted in Porter and Clarke (1983) pp. 20-21.)

The contestability analysis suggests that competition for the market, the use of competitive franchises and so forth and, in particular, the removal of barriers to entry, may be more effective than regulation and state ownership in reducing monopolistic elements in industry and promoting economic efficiency. Freedom of entry by new enterprises would reduce the ability of public utilities to meet the rate-of-return targets simply by raising prices in protected price-inelastic sections of the market. Indeed to deter potential competition, the incumbent firm would have good reason to set prices as low as possible. Equally important, it would reduce the scope for political intervention in state enterprise, since the power of such enterprises to subsidise some market segments at the expense of others is dependent on their monopolistic position. Lowering entry barriers would also increase competitive pressure which is undoubtedly an important stimulus to economic efficiency in public or in private enterprise. As stressed in the contestability literature, the benefits of competitive pressure can arise from potential entry by new firms, for the threat of competition from potential rivals is as effective as that from existing competitors. Of special interest is that it seems likely to encourage dynamic efficiency. This is clear, Littlechild (1976) points out, from,

"...an application of the Austrian view of competition as an active process of betterment taking place over time. Producers ceaselessly compete to offer the best terms to consumers by cutting prices, modifying the product, discovering new products, encouraging the customer to develop new tastes, etc. Firms would presumably prefer not to have to compete in this way, but, unless they can prevent new competitors from taking their business, they have no option but to fight to remain one step ahead. This view of competition and the role of government is quite different from that envisaged in welfare economics. There, perfect competition consisted of a large number of firms producing an identical product with access to identical technology and with perfect information about consumers' tastes and the behaviour of each other. This resulted in single price equal to marginal cost, sufficient to yield a 'normal' profit but no more. In this alternative view of competition, competitors may differ considerably in their
knowledge of technology and consumers’ tastes and in the kinds of products they offer. They have to discover what it is that consumers want, and they have to meet these needs before their competitors do, or on better terms. Those who are successful make high profits, constrained only by the prices which the next-best competitor charges; those who are unsuccessful lose money and eventually go out of business since tastes and technology are always changing, this competitive process never ends... The alternative view put forward here does not concede that natural monopoly means the end of competition; for without legal restrictions there is still scope for rivalry to become or replace the natural monopolist, and the ever-present threat of changes in tastes and technology make this position no sinecure. Regulation, in this view, is sought precisely to avoid the rigours of competition.” (pp. 215-216)

A potentially valid argument against removing entry barriers has, however, to be addressed. This is that in some situations of natural monopoly, entrants may exploit only the most profitable sections of the market (engage in so-called “cream skimming”) which were previously subsidising other segments (perhaps because a larger share of joint costs was being recouped from this section of the market). Thus it is possible that the entire system could be degraded if entry were allowed (see Faulhaber (1975), Panzar and Willig (1977) and Panzar (1980) for a discussion of this possibility). To what extent should this possibility be allowed to impede freedom of entry? Porter and Clarke (1983) offer one view:

"....identifying such instances is difficult, and the consequences of unnecessarily restricting entry are harmful, so that universal removal of government sanctioned entry barriers seems appropriate, unless demurrers can mount an argument sufficiently convincing on economic grounds." (P. 23)

The potential advantages of increased competition and contestability appear considerable. However, in view of the uncertainties involved, it is questionable if a 'universal removal of government-imposed entry barriers' is appropriate. As Schmalensee (1979), commenting on the situation in the USA, points out,

"It would be useful if the literature on administrative behaviour permitted one to predict confidently the performance implications of structural differences. Unfortunately neither the study of administrative behaviour in general nor the analysis of public enterprise in particular has yet advanced to the point where such predictions are possible." (p. 90)

This assessment is equally true for Australia. Nevertheless there seems strong argument for considering the incorporation of the advantages of increased contestability where possible. But a judicious and gradual approach to such action based on much more information than we have at present seems advisable.
8. **CONCLUSIONS**

The broad conclusion of this study is that economics can make (indeed, has made) an important contribution to the development of guidelines which should - where economic efficiency is of concern - underlie state enterprise pricing (and non-pricing) policies. For instance, the potential benefits of peak load pricing in terms of better load management, reduced pressure for expensive capacity expansion, energy conservation, reduced pollution, etc., seem increasingly widely accepted (in principle at any rate). However, limitations of theory and practice remain and, as this study makes clear, there is still a great deal of difference between the simple statement that "Welfare economics prescribes marginal cost based pricing guidelines for state enterprises" and the development and effective implementation of operational pricing policy guidelines. Moreover, in regard to improving the X-efficiency and dynamic efficiency of state enterprises, the contribution economics has made is somewhat limited. In fact, thus far the contribution has been in improving our understanding of the problems involved rather than in finding solutions to them.

In short, we know a lot less than we should, but we are somewhat clearer about what we need to know and the directions of the further work which is required in order to do so. In particular, work on the positive economics of state enterprise is in its infancy and seems a most promising area for further research. When we can explain how and why state enterprise decisions are made we will find it less difficult to help ensure that the decision which are made are those that should be made. There is scope for much more research into the implications of strategic behaviour by state enterprises. It is simply not adequate to treat state enterprise management as passive abiding recipients of controller's commands.

This last statement has constituted the theme of this paper.
NOTES

1. When Peacock (1978) pointed out the sociological/psychological overtones of specifying managerial utility functions, Wiseman's (1978) reply is noteworthy, "I am less interested in this than in the identification of the range of discretion available for the behaviour of such people. The significant point is less how managers behave but rather that we have to depend both on their goodwill and their understanding of what we want of them, without being able to impose constraints that direct their behaviour to what we, as the community, might want. This seems to me the significant element". (p.89)

2. See also Hartley and Trengrove (1983) which extends Hartley's analysis.

3. It is worth quoting Wiseman's (1978) comment in regard to (UK) state enterprise innovative activity:

"Insofar as the nationalised corporations are legally protected from competition, it appears likely that managers will attach less significance to innovative activity than they would in the private market environment, since they have less to gain from it; there is an incentive to substitute bureaucratic for entrepreneurial behaviour." (p.81)

4. The NEDO Report (1976) argues not only that the framework of rules and criteria laid down by the UK White Paper for Nationalised industries (1967) clearly failed to have an impact on the control system but also that such a framework must necessarily fail. This is because first of all "....the strategic decisions on the future activities and policies of individual nationalized industries cannot be successfully made without the involvement of government, trade unions, and other interest groups". (p.43) And secondly, there are strong and increasing "....pressures on government to intervene or otherwise influence management decisions,..." which may be "....triggered by a variety of factors, including a commitment to implement party policies, macro-economic policy decisions, pressures from sectional interests, major industrial disputes and a variety of wider social cost/benefit considerations". (p.44)

Ministers "....do not and cannot in practice keep their involvement restricted within predetermined guidelines. The major nationalised industries' positions in the economy are too strategic and their market power too politically sensitive for ministers to accept self-denying ordinance for more than a very limited period of time". (p.44)

5. The NEDO Report suggests that the optimal control framework is a a compromise between arm's length and concerted approaches. Such a compromise approach would try to capture the advantages of the latter in terms of "continuity of policy and a greater measure of common purpose, understanding and commitment by all the main interests", with those of the former in terms of the "greater degree of motivation of management and employees, more clearly defined accountability and resulting improvement in performance". (p.44)
6. See e.g. Webb and Ricketts (1979) -

"That is, in the formulation of actual prices, the period over which marginal cost should be measured should be determined by the length of the period to which the tariff will relate. For the energy industries there are a number of arguments in favour of this period being relatively long and generally measured in years. These include the fact that frequent changes in energy prices are expensive to administer and that it takes consumers time to adjust to them. In addition, consumers of energy partly base their investment decisions for energy using complementary products on their views of the expected future prices of the different forms of energy. Thus prices relating to the long period are those required for the making of efficient investment decisions. But note that, in times of inflation, the level of charges may have to be changed fairly frequently; however, these changes should leave the structure of the tariff unchanged. The relevant question is thus, how do the energy utility's total costs vary with changes in its output during this chosen period?" (p.97)

7. For instance, as Parmenter and Webb (1976) put it,

'We recognise that the theory of second best, as well as a possible distributional and other "non-economic" considerations, destroy the naive conclusion that prices should always be set equal to marginal costs. Nevertheless we are prepared to accept as a starting point for practical purposes, to be departed from only with good reason in particular cases, that the allocation of resources can be improved by ensuring that individuals are supplied with commodities if and only if they are prepared to pay the costs incurred by society in supplying them. If, in the absence of clear evidence to the contrary, the prices paid for inputs are taken to represent their opportunity costs then measures of the marginal cost to an enterprise of providing its products are the cost concepts which are relevant for public policy aimed at improving resource allocation." (p.12)

8. See, e.g. Schmalensee (1975),

"The final condition associated with economic efficiency requires that if capacity is not to be contracted, profits should be limited to the amount necessary to attract needed capital. In other words, the natural monopoly should earn zero economic profit on average or, alternatively, its actual rate of return should equal its cost of capital funds on average." (p.37)

9. As Officer (1983) points out:

"Ideally, the rate of return on capital achieved by the enterprise should be compared with the cost of capital, to assess the efficiency with which the enterprise utilized its capital. Such a comparison can also indicate the overall performance of the enterprise providing that other factor inputs are being correctly costed and perhaps, more importantly, utilized efficiently when there is no external discipline on the enterprise. In short, the rate of return on capital can be a useful performance measure but it is not a sufficient measure for a state enterprise (or any other) when they are not operating in a competitive environment." (p.9)
10. See Littlechild (1979):

"Government instructions to the industry should be couched in objective rather than subjective terms, i.e., they should be operational, since injunctions to set price equal to MC or to appraise investments according to a test discount rate are unenforceable, they should be abandoned. In contrast, instructions to break even, to meet a target level of net revenues or to achieve a specified degree of self finance, may easily be monitored. So, too, may instructions to provide specified products at specified prices, if this is thought desirable for social reasons." (p.231)

11. See e.g. Dasgupta and Pearce (1972) for the arguments over whether the social time preference rate or the social opportunity cost rate is appropriate for use in the public sector. For state enterprises there seems broad support for a social opportunity cost rate based on the return on capital achieved in the private sector adjusted for company tax payable and risk. (Officer, 1983, p. 15). There is, however, considerable disagreement as to the actual prescribed RRR estimated on this basis.

12. Profits as reported by accountants may not be consistent from firm to firm or industry to industry and may not correspond to economists' definition of profits. Likewise, accountants' statements of assets, hence also stockholders' equity, may fail to correspond to economically acceptable definitions, because accounting practices do not provide for the capitalization of certain activities such as research and development and may not adequately incorporate allowances for inflation. These are some of the measurement problems which arise in using available accounting information to measure profitability which are generally well-recognized. Less well-recognized, however, is a deeper conceptual problem underlined by Fisher and McGowan (1983) namely,

"...that accounting rates of return, even if properly and consistently measured, provide almost no information about economic rates of return. The economic rate of return on an investment is, of course, that discount rate that equates the present value of its expected net revenue stream to its initial outlay. Putting aside the measurement problems referred to above, it is clear that it is the economic rate of return that is equalized within an industry in long-run industry competitive equilibrium and (after adjustment for risk) equalized everywhere in a competitive economy in long-run equilibrium. It is an economic rate of return (after risk and adjustment) above the cost of capital that promotes expansion under competition and is produced by output restriction under monopoly. Thus, the economic rate of return is the only correct measure of the profit rate for purposes of economic analysis. Accounting rates of return are useful only insofar as they yield information as to economic rates of return." (p.82)
13. As Schmalensee points out, in the USA,

"Regulatory neglect of quality decisions may leave regulated 'firms with strong incentives to provide high-quality products, especially if quality is capital intensive. Kahn (1970, pp. 20-25) and Spence (1975) make this point in general terms. Focussing on situations involving stochastic changes in demand, Crew and kleindorfer (1982) note that regulated firms may enhance their profits by choosing excessive reliability, and Telson's (1975) study of electrical utilities provides some support for this prediction. Excess reliability can also be useful politically by protecting both regulators and regulated firms from the storm of criticism that usually follows a major service outage. (This point echoes Lindsay's, 1976, general observation that agents tend to concentrate on those aspects of performance most easily evaluated by their principals.) Still, excess quality is no better than deficient quality in efficiency terms. The product selection problem exists and may be important in many cases, in spite of regulators' tendency to ignore it." (p.33)
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