

The Public Enterprise Concept in Transport

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INTRODUCTION AND OUTLINE

The emphasis of this short paper is on the Public Enterprise concept, not public enterprises per se. The aspects of the concept relevant for this paper are the guidelines for the determination of price, output and investment policies of such enterprise, and were developed through many theoretical discussions dating back to Dupuit¹ (1844). It is interesting to note that many of the famous economists who shaped the development of the science had a great deal of interest in transport and public utility discussions - Marshall, Edgeworth, Pigou, Barone, Taussig, Hotelling, Lewis, Little and Turvey coming most readily to mind. More recently, it has found its way into statements by governments of policy guidelines for nationalised industries. In the U.K., a White Paper entitled The Financial and Economic Obligations of the Nationalised Industries was published in 1961, and followed by a more refined version, Nationalised Industries: A Review of Economic and Financial Objectives in 1967. In Australia, a very short and very mild plea for 'General Directives' appeared in 1973 in the Review of the Continuing Expenditure Policies of the Previous Government.

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1. Not only his now well-known 1844 article but many others referred to by J.A. Schumpeter in his History of Economic Analysis (Allen and Unwin, 1954), particularly pp. 948-9 and footnote 7, p.957.

The appearance of guidelines for price, output and investment policies, at the government policy level gives renewed hope to academic and other economists interested in this field. The development of Benefit-Cost Analysis has also re-directed attention to the problems associated with the decisions about expenditures on large projects. Perhaps the taxpayer is at last getting tired of 'experienced' men making off-the-cuff decisions which bear more resemblance to tossing a coin than to any rigorous examination of the 'facts' involved. Although Benefit Cost Analysis is clearly not the perfect tool for decision making, it is a significant advance over methods used previously. There is a real problem, perhaps of definition, involved in trying to draw a line between goods and services supplied on the basis of market criteria, and those supplied on merit or public goods criteria. Though the extremes of the spectrum described by these distinctions are clear enough, it is, as usual, the areas between the extremes which provide the most difficulties. Thus having once decided that education should not be consumed on the basis of market criteria, much of the remaining problems are questions of the quantities and qualities which should be supplied, and what paternalistic requirements on consumption should be enforced. In other fields, particularly in transport, there are sectors producing substitutes in which some members of a sub-sector are treated partly as if they were producing merit goods, while other members are treated partly as if they were producing demerit goods. The obvious example is rail transport, which is subsidised out of taxation, is exempt from many taxes applied to substitutes, and is expected to perform some services in the public interest without direct payment, and road transport, which is a net payer of taxation. Other examples of the 'old' approach include the provision of port and airport facilities without direct connection between price and investment policies (though airport investments and charges are receiving attention at present); different sub-sections of the Australian Post Office with different price and investment policies; and many more.

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In some cases the attempt is made to justify such differences by reference to consumer surplus type arguments, but such attempts are usually directed at only one of a number of producers of substitutes and are rarely interested in the consumer surplus of the others.

Though this paper is also interested in the difficult problem of whether application of consumer-surplus criteria are or are not misleading under such circumstances, it is primarily concerned with criteria for outputs for which the private sector produces substitutes and/or for which no special merit can be found to distinguish them from other economic activities in the private-sector. For these it can be successfully argued that a more efficient allocation of resources will result if the producers pursue a specified instruction which connects their price, output, and investment policies in a way similar to, but not necessarily identical with, other users of scarce resources producing outputs demanded by consumers. I have put it in this slightly longer form to avoid arguments about social merit which I am sure, will be put forward by all those in particular industry. The term 'efficient' has the usual opportunity cost connotations.

The following section will explore briefly the alternative instructions which could be given which are still within the overall objective of economic efficiency. This is followed by a section examining the public enterprise or public utility approach to determine its usefulness for translating the instructions into more meaningful (in practice) and relatively more precise language. Much of this will be familiar to even the occasional reader of the current conventional wisdom in this area. Since few economic activities are undertaken de novo, and since there has been much misunderstanding of the 'bygones are bygones' argument so dear to the heart of public utility price theorists and others in the public sector, the fourth

section will examine the standard errors committed here and, hopefully, will suggest how such errors can be avoided. The final section is a summary and conclusion, with the usual excuses about lack of time and the necessity for more research.

OBJECTIVES, GUIDELINES AND 'EFFICIENCY'

'A set of simple, specific policy rules is, then, essential; and in each case we must choose the best of those available. The adoption of a simple rule does not, of course, mean that one should not consider what deviations from its observance are desirable in particular cases; but this is a very different matter from doing without the rule. A good analogy is provided by the fact that, since clocks and watches are subject to error, it is desirable to check them by astronomical observations; it is not a good idea to dispense with clocks and watches, and take astronomical observations whenever one wants to know the time'. (Farrel, (1968) p. 60).

It is surprising that economists have spent so long in debate about the 'best' price without knowing very much about what they disagreed. Fortunately, that phase is largely past, even if agreement itself is not much closer.

A brief review of some of the major reasons for confusion is useful here.

One of the simplest and oldest Guidelines for a nationally owned enterprise was derived from the dictum that 'every tub should stand on its own bottom'.¹ Revenue collected was to cover all costs. One major problem was that, when applied to multi-product industries, as it invariably is, nothing was said about the relative prices and costs of the jointly produced outputs. Furthermore, there was the 'problem' of decreasing cost industries which clearly could not simultaneously meet the efficiency condition, happily derived from the theory of Pure Competition, that price should equal long-run marginal costs.

1. See J. Wiseman, "The theory of public utility price - an empty box", Oxford Economic Papers Feb. 1957.

Hence, even if it is accepted that the objective of the industry is to act like a competitive industry, there is still room for considerable disagreement and misunderstanding about its price, output, and investment policies.

These 'problems' also suggest another which has provided many hang-ups for applied economists. Why was the industry nationalised and regulated in the first place? Leaving aside the most immediate practical reason - that private industry went bankrupt, or that political reasons were uppermost¹ or the wider effects an industry may have upon the economy - in many cases it was the size of the industry which induced public intervention. Size, in turn, was a function of economies of scale, thus giving the relationship between long run marginal and long run average costs a central place in the controversy. Economists have been apt to assume that one or both of these characteristics - size and effects elsewhere - automatically play a large role in the objectives and functions of such industries, without always establishing their existence with the same care and attention given to the graphical and mathematical exposition of the 'problems' which follow.

As the 1967 White Paper demonstrates (p. 8, para 18 and p. 14, para 37) no insuperable problems arise when social objectives are taken into consideration separately from and to some extent independent of, considerations of economic efficiency. The nation as a whole can pay for any social goals it requires any industry to achieve, leaving economic efficiency as the industry's major objectives. It still remains of interest to ensure that the social goals are achieved as efficiently as possible - e.g. that fare subsidies for pensioners do not cost more than free taxi services - but this aspect can then be the subject of a separate investigation. Decisions about 'desirable'

1. See G.L. Reid and K. Allen Nationalised Industries, Penguin 1970 pp. 17-20.

income re-distributions should certainly not be placed in the hands of managers of public enterprises. Similar arguments apply to other considerations, such as effects on other industries. Each can be separated out to prevent the lack of clarity about objectives which otherwise exists.

One other point should be cleared up here. It is sometimes argued when considering the objectives of a particular industry, that it is necessary to make adjustment for the effects of government policy elsewhere. The most frequently mentioned of these are tariff and exchange rate policies, but they include many more, such as decentralisation (unspecified and undefined), regional development and/or diversification, export promotion, employment, and anything else which has recently come to the notice of the advocates of some policy in some particular industry to 'explain' why such a policy should be adopted even though it is contrary to later loosely defined efficiency requirements. These can usually be examined separately, but it is doubtful whether most of them should be. If such policies have objectives they seek to achieve, it would surely be invalid to advocate that the effects of such policies should be everywhere offset by policies elsewhere. For example, if the tariff does raise the relative price of certain products which are inputs in some industries, it can be argued that such effects were taken into account when the tariff policy was embarked upon. This assumption is frequently not so in practice, and it is sometimes useful to point out the effects of one policy on the achievement of the objectives of another. But this simply cannot be done for each and every policy pursued by governments elsewhere which impinge upon any particular industry. Ultimately, everything is affected by everything and here, as elsewhere, it is necessary to admit that any conclusion which results will be 'wrong' because some of the assumptions are not met. The only claim is that it will be less wrong than any other conclusion that could have been reached with knowledge available at the time. The first best world exist only in textbooks.

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Though it may not seem necessary to make too much out of this point it has not been clearly understood in the recent past. Thus both the Coombs' Task Force Report (1973) and the so-called Green Paper on Rural Policy (1974) asserted that offsets to the effects of tariffs were justified. If that were so, it would be simpler to abandon the present tariff policy. This would be equivalent to offsetting its effects elsewhere. Clearly, the effects are best examined at the tariff policy making level. This is not to say that exceptions to this approach cannot be found - there are exceptions to everything. Thus it can be argued that it is politically easier to have tariff offsets than to reduce tariffs. This would then imply that it is believed that the existing tariff is too high, and that the real objective of the tariff off-set is to reduce the level of existing tariff levels. For similar situations elsewhere, acceptable arguments have to be presented to show that a particular policy imposed elsewhere has disbenefits in the industry under study which were not adequately taken into account by the original policy makers. It also has to be shown that policy off-sets have benefits which outweigh the disbenefits. Since it is clearly impossible to do this for all policies pursued everywhere, the starting assumption is therefore that the effects of policies pursued elsewhere result in input and output prices which, except in very special and carefully documented cases, are accepted as given.

The final product is a set of instructions or guidelines about the relationship between costs and prices, output and investment. Their overriding objective is to ensure, given all the difficulties, lack of knowledge, and other impediments, that resources will flow into those uses in which the value of their output contribution, measured in the market place and/or supplemented explicitly to meet other objectives, is higher or at least as high as anywhere else they could have been used. To be even more cautious, it really means that the probability of this is thought to be higher in the uses to which the

resources are actually put, than in the uses to which they could have been put instead.

The wide range of 'any price is as good as any other' apparently advocated by Wiseman (1957) is thus well outside the range of cost-price relationships which can be given enough credence to be actually worthy of examination. Though the conclusions reached by Farrel (1958)¹ that no long-run price should be less than long-run marginal cost requires additional assumptions, especially about relationships of substitution being dominant between outputs, and re-interpretation for multi-product firms, it serves as a useful lower limit. The more loosely phrased conclusion reached by Little (1962) also finds this lower limit acceptable.²

At this stage a short reminder is necessary about the usual but sometimes misunderstood convention to concentrate on price-cost relationships, rather than on output or investment. For those luck enough to have been away from modern textbooks, and unlucky enough not to have read Marshall, it is necessary to point out that models of the firm and industry, regardless of whether competition, monopoly, or anything in between is under examination, treat price, output, and investment policy as uniquely related. Given the competitive or monopolistic assumptions about the environment within which the firm industry operates, any one of the three implies something quite specific about the others. Thus if profit maximisation is the assumed objective, price, output, and the investment activity necessary to bring forth that output at lowest cost under conditions of pure competition are uniquely determined. Similar circumstances surround the monopolist model of the one firm industry, though

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1. See also H. Kolsen, The Economics and Control of Road-Rail Competition (Sydney Uni. Press 1968) Chapt. 2.
 2. '....that relative costs of production should not be allowed to get too far out of line with relative market prices'. Little (1962) p. 279.

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the relationship between prices and marginal costs will, of course, be different. To state a relationship between long run price and long run marginal cost in pure competition is thus to simultaneously state the long run output which will be produced, and the investment which must be undertaken to fulfill the least-cost requirement. To labour the obvious: at that price a particular quantity of output will be demanded, neither more nor less; and a particular input mix will minimise the cost of producing that output. A price-cost relationship thus simultaneously makes statements about output and investment, and implies (though does not uniquely relate to a market environment).

Such textbook models should not be too easily dismissed when examining so-called real life situations. The translation into more readily understandable terms for guidelines for building roads, or harbours, or airports, is readily achieved at the multi-product firm/industry level, so long as it is appreciated that we are still seeking instructions more like rules-of-thumb than blue-prints with fine lines.

GUIDELINES AND TRANSPORT EXPENDITURE

Since one of my colleagues will provide a paper on applications to a specific sector of the transport industries, I must be careful that his superior knowledge of that sector does not expose inconsistencies in my more general approach. In any case, any such inconsistencies are the results of my work rather than his.

The obvious basis to any rule-of-thumb can be stated at once. Don't incur any expenditures which produce goods or services which, when actually or notionally sold, result in revenues (benefits) less than expenditures, where expenditures are the discounted outlays which, at present prices, minimise the cost of the output. Slightly less obvious and still

relatively useless is the same statement in relative rather than absolute terms. Incur expenditure only where no higher rate of return (actual or notional) can be found. The reasons for this crude but honest beginning is that a whole range of other conditions, at a more practical level, can be deduced from this basic rule-of-thumb. This is done with the aide of Turvey's so-called 'strong assumptions' . (Turvey (1971), p.15)

- (a) The distribution of real income is not the concern of a public enterprise. It should act as if it were always ideal.
- (b) The customer (user) is always right.
- (c) There are, unless specified, no externalities.
- (d) What is now known should be ignored.

A few explanations are called: (a) is important, because it requires absence of cross-subsidisation. This has been a fairly consistent requirement on a variety of grounds by many writers on the subject.¹ Less obvious explanations might be offered for (b), which actually requires (c). The customer cannot be always right unless he is faced with alternatives the prices of which accurately describe their opportunity costs. Any uncompensated differences between social and private opportunity costs would make it possible for the customer to be 'wrong'. Finally, (d) should be taken to mean that what is not known should be ignored if it is relatively unimportant to have that knowledge and if the information is relatively expensive. Obviously, if it is important, and cheap to come by, it should not be ignored but obtained. The intentions of this assumption were to permit use of partial equilibrium analysis.

1. See A.E. Kahn, The Economics of Regulation (Wiley and Sons 1971), both vols. (See index under 'Subsidisation, internal'). D.L. Munby, 'Mrs Castle's Transport Policy', Journal of Transport Economics and Policy, May 1968 pp. 140-1
G.J. Ponsonby, Transport Policy: Co-ordination through Competition Hobart Paper No. 49.

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In the absence of any cost complexities, i.e. for a single product project or firm, the major problems which arise are concerned with differences between the long run and the short run. Some of these will be examined in the next section. Willingness to pay measures social benefit, and input payments measure social cost, in the absence of externalities. Where the output is sold in the normal way without price discrimination, the sum of the revenues is related to the sum of the costs in such a way as to make the ratio sum of revenues/sum of costs reflect the objectives of the enterprise, e.g. equal to 1 if it is to act as competitively as possible while still standing on its own bottom. The marginal efficiency conditions require that the output-price-investment policy of the enterprise is aimed at achieving a ratio of marginal social benefit to long run marginal cost > 1 . If the output is not sold in the usual way, e.g. as for a road used in the production of a single output (if there is such a thing), the ratio becomes sum of the benefits/sum of the costs subject to the same marginal constraint imposed in the example where output is sold in the usual way, i.e. marginal benefit/long run marginal cost.

It is this marginal constraint which has sometimes been forgotten, and which is the reason for making so much out of something which appears so intuitively obvious. This is because the sum of the benefits includes the area under the demand curve not included in the sum of the revenues available to the non-discriminating seller. Though much more work has to be devoted to this problem, it is clear that reliance on sum of benefit/sum of costs ratios without such qualification results in blatant misallocation of resources. The sum of benefits/sum of costs ratio is frequently used in CBA, without much worry about the constraint.

To ensure that such misallocations do not occur, an alternative approach is possible. Forgetting the impossibility

of estimating areas under demand curves for everything, leaves the necessity of estimating only what could have been sold had there been but a single price for the single product output flow. If the analogy of acting competitively while still standing on its own benefit-earning bottom is maintained, the output flow for which the project is designed would be that at which the ratio marginal benefit/long run marginal cost is > 1 at which output it will also be required that the ratio $\Sigma B/\Sigma C$ is > 1 .

It will be said that the argument is too restrictive, since it refers only to single product projects or firms, and that such things rarely exist. In this, I am only following the conventional literature. As has been stated more carefully elsewhere¹ many possibilities open up in the allegedly more complex situation of multi-product projects and firms. It is not possible to repeat this here, but some of the major points of importance may be briefly referred to. The non-permissibility of cross-subsidisation needs careful re-statement of what is meant by cross-subsidisation in joint and common cost situations, and the standard treatment of price discrimination is no longer sufficient.²

Nevertheless, meaning still attaches to the sum of benefits/sum of costs and marginal benefits/marginal cost ratios. The requirements now that: (i) no product is produced for which avoidable costs are greater than value of benefits (where value of benefits is measured as before) or where avoidable costs are greater than the revenue received from their sale; and (ii) that the quantity of any product produced is no greater than that at which the ratio marginal benefit/marginal cost or price/marginal

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1. H.M. Kolsen, D. Ferguson, and G. Docwra; Road User Charges. In print.
 2. See Kolsen, op.cit., pp. 75-80.

cost is > 1 . Long debates about which marginal costs are relevant can be avoided by simply stating the obvious: they are long-run if all factor inputs can be varied, short-run if they cannot. For those wishing to be quite precise, the ex ante or planning situation is clearly one of long run - but more of that in the next section. There are many other debates possible - e.g. about the assumption of non-discrimination - but it is not feasible to deal with everything. It should also be remembered that we are still concerned with rules-of-thumb rather than fine lines. ¹³

The wisdom (?) of stating the case for the single product situation is that it makes clear the distinction between calculations based on benefit consideration, and calculations based on revenue considerations. Revenue results from sale of products and represents willingness to pay. Benefit results if the consumer would have been willing to pay had he been required to do so, or in the paternalist situation, is judged by the decision maker to be willing to pay. To make calculations which include the consumer surplus in the estimates of benefits and to exclude it in estimates of revenues is invalid.

It may be useful to indicate what this re-statement of a problem may mean for project evaluation. It will mean little if the evaluation exercise is in the nature of a cost-effectiveness approach. By this I mean that the only requirement is to maximise benefits from a given and unalterable total sum. The major decision has already been taken in determining that sum. It is then necessary to calculate the total benefits from all permissible alternatives - e.g. for all non-access roads if the road budget is under consideration. However, unless demand elasticities show great differences between alternative sub-projects, it will be difficult to justify expenditure patterns which make the ratio marginal benefit/marginal cost different for different sub-projects. As in all these equi-marginal propositions, one would expect, with similarity in demand

elasticities, that total benefits will be maximised from any given sum where the marginal benefit/marginal cost ratio for sub-project 1 = the ratio for sub-project 2, and so on for sub-project n.¹

If, however, the total sum ear-marked for a particular purpose is not fixed in advance, but can be altered by producing evidence that it is either too small or too large, then there is a considerable difference between the approach suggested here, and the approach used in most CBA analyses. Here it is hoped that the exposition has helped to bare the obvious: if the total revenue/cost ratio in the market sector is equal to the total benefit/cost ratio in the non-market sector, greater benefits at the margin are available from an expenditure dollar in the market sector than in the non-market section IF the former excludes consumer surplus (as it usually does) from its calculations AND the latter includes it (as it also frequently does). Since the market sector includes public utilities and nationalised industries of many kinds, this also means that public expenditure as a whole is then inefficiently allocated. It is possible to draw conclusions also about what should not be done. Thus even if the apparent form of the exercise is of the cost-efficiency type, this may in some cases not be so. The double test of sum of benefits/sum of costs and marginal benefits/marginal cost being equal to or greater than one may not be met in some cases. If a marginal benefit/marginal cost ratio is found to be actually smaller than one, it is highly probably that the initial sum was too large. The analysis then reverts to CBA. Though it is not possible to draw watertight conclusions from this quick review - there are no watertight conclusions in applied economics - it is worthwhile pointing out to decision makers that they have allocated a sum

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1. The usual incantation at this point is 'indivisibilities'. These are usually technically defined, and careful examination shows them to be of little economic importance in most cases. Mr Docwra will attack this 'concept' in his paper.

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of money for a particular project or purpose which is too large, and this is simply one which makes the marginal benefit/marginal cost ratio less than one.

WHEN ARE BYGONES REALLY BYGONES?

Though I have been unable to discover who first used this phrase in the economic literature, there is little doubt that many use it now without any clear idea of what it means. Since it is apparently so obvious in its meaning, few have tried to clarify it. As with so many obvious things, this has resulted in confusions. Its original meaning was that once factors of production have been "congealed" into some specific piece of capital equipment designed to produce a particular output, there was no use in crying over spilled milk if the demand for the output turned out to be less than that at which the equipment could justify its existence and earn its replacement costs. There are a few qualifications, but it meant that the equipment would not be renewed when it was worn out. For things that lasted a very long time - especially important in transport such as earthworks, tunnels, etc., - the attempt to recoup the original cost could be harmful, as Hotelling (1938) showed.

Public authorities have taken a long time to accept this. They persisted in attempts to recover the historical costs of their instrumentalities by prices made possible only by suppression of competition by what was and is euphemistically called regulation. Economists pointed to the fallacy¹ and, eventually, practitioners began to respond. However, their response was in part that of an accountant. Such costs could be written off. The "new" balance sheet suggested

1. See especially G.J. Ponsonby, "Earnings on Railway Capital", Economic Journal, December 1960.

that there was now room for a number of "profitable" investments, preferably in long-lived and specific assets, which if "unprofitable", could again be written off. The more capital-intensive a project, the less likely that it would fail to cover just those costs which would be avoided if it, or part of it, were closed down.

There are some real problems here if the argument is put into a dynamic context. In the usual static model, however, the conclusions to be reached would be similar to those in the classical model of the firm and industry under whatever competitive or monopolistic conditions are deemed appropriate. If there are four railways with tracks and ancillary equipment between London and Manchester, under what conditions would capacity be increased? No-one would dream of increasing total capacity so long as any line could be bought for less than it would cost to build. Since the "price" for any line is based on actual and expected revenues from sales of services, it follows that no new capacity would be created until the demand for these services was such that the earnings above avoidable costs resulted in total revenue which exceeded the total necessary to justify incurring the costs of building another track. The price of a new track would then be less than the price of any of the existing tracks. Furthermore, it would also take into consideration the increase in supply which would result if another track were built, estimating earnings in the new situation and comparing them with the old. Only when demand was sufficient to justify another track would this be actually built. Or, in other words, only when the expected revenue from 5 tracks permitted at least normal profit to be earned on the fifth track.

The usual objections must now be dealt with. We don't have 4 railway lines between i and j. This makes little difference. The enterprise can be viewed as buying its own

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track before expanding capacity. The price it would pay will be the capitalised earnings over and above avoidable costs. Then we ask whether it expects to be able to earn sufficient revenue to buy both tracks which, in a static situation and forgetting about depreciation (they are long-lived assets), means earning it on twice the cost of the additional track. Strangely enough, we expect electricity suppliers to use this approach - where non-static factors would be very important - but not railways and other transport suppliers.

What difference does a dynamic environment make? It usually depresses the value of the existing assets. The question is still whether the increase in total revenue ("constrained" total benefits) is greater or smaller than the increase in total costs, given the existence of present assets. So long as the new assets are not treated separately from the old - e.g. by separate bookkeeping - even complete abandonment can be justified side-by-side with an entirely new enterprise.

These few words were meant simply to show that economists do not take their textbook models seriously enough. What seems obvious in the theory of the firm becomes obscure when placed in the environment of a large enterprise. Great benefit can be obtained from looking carefully at the models many of us treat as very abstract. After all, if there is some obvious improvement to be made to such models, let's write a textbook.

SUMMARY AND CONCLUSION

The actual and notional application of public enterprise price, output, and investment policy to sub-sectors which are not public enterprises selling goods and services in the "usual" way is an important alternative approach, especially where the outputs have good substitutes elsewhere. It has

received too little attention in the past, and seems especially important in the transport sectors. Some writers have drawn attention to the anomalies which arise if different criteria are applied to different sub-sectors¹. They have, however, been voices crying in the wilderness.

This paper has attempted a broad brush approach to argue for the public enterprise approach. It was intended to incite some interest in this approach, and is clearly deficient in the coverage of detail. If it serves to draw attention to some of the possibilities for a more efficient resource allocation between the affected industries, it will have served its purpose.

Finally, it should be made clear that this paper was completed at short notice, and that it is therefore more likely than usual that important aspects have been overlooked, and conclusions reached by too short a route. But if each of us were to wait until any paper is the perfectly polished jewel it ought to be, little or nothing would reach the conferences and journals. It is up to the reader to make his own judgement.²

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1. See D.L. Munby, op.cit., pp. 166-9.
 2. I should like to thank my colleague, Mr G. Docwra, and Mr N. Steeper of the B.T.E. for helpful comments. As usual, all remaining errors are entirely mine.

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