

MRS. CASTLE'S TRANSPORT POLICY

A Reply

By C. D. Foster and A. J. Harrison

In the fourth section of his paper,* D. L. Munby reviewed the recent Ministry of Transport Report, *Road Track Costs*, H.M.S.O., 1968. As civil servants, we cannot be expected to comment on his criticisms of the issues of Government policy involved, whether these relate to transport, fiscal or accounting policy. But we do wish to reply to some of the points of economic theory he raised.

Mr. Munby argues that the authors of the Report, in their desire to justify a position taken up in a previous Ministry publication on road track costs, were led: (1) to a conveniently arbitrary definition of long-run marginal costs which was then (2) wrongly calculated.

DEFINITION OF LONG-RUN MARGINAL COST

The definition adopted in *Road Track Costs* was quoted by Mr. Munby: "Long-run marginal cost is defined to include all costs associated with the production of an extra unit of output, capital as well as running costs. Consequently, and this is the main justification for this charging principle, existing users pay the costs that actually will have to be incurred to replace the facilities they are using and the additional users pay what it costs to provide for them" (paragraph 70). Mr. Munby accepts this definition as valid but says that its interpretation is "quite arbitrary" (page 168), and advances two alternative formulations "which would seem to have quite as good a justification as approximations to long-run marginal costs" (page 169). His two alternative formulations are: A, which treats bygones as bygones and would then begin "next year" charging for investment year by year on an "ordinary capital accounting basis" assuming 10 per cent, an 8 per cent interest rate and amortisation over 50 years; and B, which writes off all capital before 1956 only, but otherwise makes the same assumptions.

At bottom this is a dispute over definition, and Mr. Munby is, of course, at liberty to define LRMC as he pleases. All we need to do is to point out three consequences of his definitions:

- (i) They depart from traditional economic usage, which is to define LRMC as the costs that vary *as* output varies. The Report's definition conforms to traditional usage. Mr. Munby's LRMC curves, by implication, have no particular relationship to SRMC curves.
- (ii) There was a reason why most economists defined LRMC and LRMC

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pricing policy as the Report did. It is a pricing policy which allows "bygones to be bygones". While Mr. Munby's A has no bygones this year, from next it will, as present charges come to reflect past costs. His B has bygones already dated back to 1956. Thus he sacrifices the point of the traditional definition.

- (iii) What he defines as two LRMC approaches are in fact not very different from the Public Enterprise approach as developed in the Report, varying principally in the choice of interest rates, and amortisation period.

Mr. Munby complains that "the White Paper hardly discussed these issues". The choice of interest and amortisation was discussed and justified, so far as such arbitrary matters can be justified, in the context of the Public Enterprise approach where it was relevant, and not in that of LRMC pricing – where, by the definition used in the Report, it was not.

Mr. Munby rightly points out in relation to his alternatives A and B that, besides the effect of different interest rates and amortisation periods on income distribution, different intertemporal price patterns will affect the allocation of resources. This can be brought within the framework of LRMC pricing, as defined traditionally, inasmuch as there is a marginal cost of price fluctuation which justifies some smoothing. The argument used in the Report was that although charging capital as a current item would not produce a stable charge if, for example, capital expenditure were to change its rate of growth suddenly, this is in fact unlikely. But if there were to be an appreciable change some smoothing would be appropriate, so long as the present value of the smoothed curve is at least equal to that of the unsmoothed (once any calculable costs of price fluctuations have been allowed for).

Mr. Munby's smoothing, as exemplified in alternatives A and B, can surely have no relevance whatever in terms of resource allocation; and its practical effect in terms of the relationship that may be expected to result between capacity and use could even be considered perverse.

CALCULATION OF LONG-RUN MARGINAL COST

Mr. Munby criticised the approximate identification of current expenditure in the Report with LRMC. Since he discusses arguments that relate to that as if they related to the last issues, there is inevitably some confusion. He says, for example, that the statement "unlike electricity supply, where the theory of LRMC pricing is most developed, demand in one place cannot be met by facilities located in another" is not relevant to the definition of LRMC pricing chosen. Neither is it. What it is relevant to is the problem of practical calculation. It is meaningful to talk about additional users on the electricity network, as if per unit of output they imposed the same extra load on the network. It is therefore meaningful to calculate LRMC for the system or grid as the average cost of the marginal plant – which will be the "best practice" plant. But this is far less meaningful for the road network, where the provision of extra capacity has to be locationally specific. The cost of providing extra capacity varies greatly. For example, it is likely that some users coming in over the margin may use under-utilised roads almost exclusively whereas others will appear, say, in cities where the marginal cost of increasing capacity is high. Thus the road system is a multi-product enterprise and in principle there should be different LRMC calculations for different classes and kinds of users.

Another special feature of roads is that they do not wear out; they are, for practical purposes, physically everlasting assets. Very low maintenance expenditures are sufficient to enable them to continue performing adequately. Capital expenditure is therefore seldom required except to deal with only the consequences of congestion and increasing traffic. Thus roads are rarely obsolete and are not normally replaced. This means in principle that the only long-run costs incurred are for incremental traffic. But in practice it is impossible to distinguish existing from incremental traffic. These are the reasons, explained at greater length than in the Report, why "the concept of LRMC cannot, in terms of its strict definition, be applied to roads". In any case, capital costs, although important expenditure, represent only a relatively small part of the total cost of road use, and fluctuations in them could normally be easily absorbed.

To sum up:

1. Mr. Munby's difficulties over the Report's definition of LRMC arise because he defines a LRMC pricing policy differently.
2. Because roads are not a coherent network, there is no unique LRMC.
3. Because roads are for practical purposes everlasting assets, the only relevant costs are expected future expenditure levels (not the "best practice" plant).
4. The main reason for treating capital differently from other items disappears when it is a relatively small part of total user costs and when it fluctuates relatively little in relation to output.
5. If capital expenditure does fluctuate significantly, then there might be a case for smoothing: but the charge obtained would be fixed with regard to future expenditure levels and would change with expectations.

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A Rejoinder

By D. L. Munby

I find it difficult to see what Messrs. Foster and Harrison's reply adds to the White Paper on Track Costs, except for their criticisms of my alternatives. I must plead guilty to having led them astray in so far as my alternatives can indeed not properly be called long-run marginal cost pricing; they were rather put forward as alternatives as good as theirs.

Their repetition of the arguments of the White Paper does not seem to clarify the issue I tried to raise. It is not a question of the *margin* as such, *i.e.* which blocks of expenditure to include, but of the divisor to which it must be related. Cost per unit of what? The normal answer relates the capital cost of a "new" plant to the total output from it throughout its life, *i.e.* LRMC necessarily involves interest and depreciation charges over the (estimated) life of the plant, and relates these to the

output from *that* plant. (Admittedly, if the capital is everlasting the life may be arbitrary). LRMC pricing would then involve charging all units of output, from whatever plant, at the unit price thus determined. This is not the same thing as dividing investment costs per year by total output from all plants and calling these the capital element of LRMC.

I find it difficult to see how the points made about specificity of new investment projects and the everlasting nature of capital shed light on the procedure proposed. Roads are not all that different. Take the case of a system of electricity generation from a set of (relatively) unconnected hydro plants which are continually being added to, and whose capital is as everlasting as roads. Basing prices on costs at the marginal plant would involve an admittedly arbitrary spreading of the capital charges over an arbitrary life and making some allowance in some rough and ready way for the varying costs of each specific plant (*e.g.*, if there were enough of them, just averaging them). None of these practical qualifications would affect the main outlines of the procedure. (Even if one decided to write off all capital in one year, the divisor remains the output of that plant, *i.e.* the increment of output to the system as a whole, *not* the total output of the system.)

There is indeed one set of assumptions that has occurred to me which would make the White Paper's proposals the same as the normal LRMC pricing system. The additional investment relevant to long-run marginal cost has to be related to the appropriate additional output. If the ratio of this additional output to the pre-existing output is the same as the proper ratio of annual capital charges to capital expenditure, then annual investment spread over total output equals the LRMC as normally computed. Thus if the annual increase in traffic on the roads were taken as the appropriate additional output to which marginal investment were to be related, and if this was 10 per cent per year, then, if annual charges were 10 per cent of capital outlay, the annual capital charge for the whole system would be equal to annual investment. These actual assumptions might not be far from the truth. But it is to be noted (a) that neither the White Paper nor Messrs. Foster and Harrison seem to use this argument, (b) that one would need some argument to explain how the "appropriate additional output" should be calculated, and whether it could be approximated by the annual increase in traffic, and (c) that the result would still depend on the detailed figures chosen for the capital charge ratio and estimated, *e.g.*, for the rate of traffic increase.

Finally, I am puzzled by Foster and Harrison's point (4), as the White Paper figures show that capital costs are not "a relatively small part of total costs"; on the LRMC basis they turn out to be nearly half of total costs.

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