



## Road Cost Recovery: A Second Order Issue

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### Abstract:

In recent times the national debate in the roads area has tended to concentrate on achieving appropriate levels of cost recovery for particular classes of vehicles. This paper argues that such a focus has been at the expense of the more important issues of pricing and investment. Cost recovery is argued to be a second order issue in both an efficiency and funding sense. The combined effect of imperfect knowledge of road wear characteristics, taxation issues and the goal of efficient pricing including a congestion component make it difficult to determine particular vehicle charges in the absence of further research

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## **Introduction**

A great deal of the attention on transport costs and prices has in recent years polarised on road cost recovery levels. The debate commenced in earnest with the release of the National Road Freight Industry Inquiry report in 1984 (May et al 1984), followed by the Inter-State Commission reviews (ISC 1986, 1987 and 1990), a special Australian Transport Advisory Council (ATAC) working party, and individual State analyses. In 1990 this focus was continued as part of the Special Premiers' Conference (SPC) process.

Is this attention justified? We argue the focus on cost recovery has been at the expense of the more important issues of pricing and investment. Cost recovery should be dealt with in the context of, and be secondary to, efficient pricing and investment considerations, not as a stand-alone driver of transport policy development.

Cost recovery is in our opinion a second order issue which has become dominant because the more important questions of the appropriate levels of, and relationships between, investment and pricing are not debated publicly. Each of the components has been dealt with in isolation e.g. Commonwealth Bureau of Roads (CBR) and the Bureau of Transport Economics (BTE) [CBR (1973), CBR (1975), BTE (1979), BTE (1984) and BTE (1987)] on road investment; NRFII (1984) on charging; and Cameron (1986) on funding allocations. The results are unsatisfactory: poor investments, inappropriate pricing policies and subsidies out of proportion to what can be justified on efficiency grounds. Yet this is a predictable outcome if the inter-relationships are not taken into account.

Similarly, it is not appropriate to treat transport in isolation from wider land use and economic planning.

This paper advocates pursuing pricing for more efficient road use as the first priority, rather than simply increasing charges to achieve cost recovery. Economic pricing, in addition to promoting efficient use of resources, would also assist in achieving more efficient investment by promoting greater scrutiny of transport projects by users and potential users. Another important requirement is more consistent and correct application of cost-benefit analysis (CBA) techniques.

In any event there are a priori grounds for anticipating that pricing at, or closer to, true marginal social cost (including congestion and other externalities such as pollution) may generate sufficient revenues for road construction and maintenance as to make cost recovery a second order issue in a funding sense as well (if an issue at all in the urban context).

Any shortfall in finances should be collected through efficient taxes, possibly confined to users; the taxes should be applied in a fashion which minimizes distortions in usage patterns compared with that which would occur in the absence of such taxes.

## **Road cost recovery**

Since the 1984 NRFII, and before in relation to studies and issues such as the 1976 Study of the Economics of Road Vehicle Limits (NAASRA 1976) and the 1979 owner-drivers dispute (Razor-back) which led to the removal of the road maintenance charge, there has been a preoccupation with road cost recovery. The current Special Premiers' Conference (SPC) process continues the concentration on road cost recovery. Why? Partly because of financial constraints. One approach to raising funds is to ensure "everyone pays their way" with certain users, such as heavy vehicles, coming in for special attention.

But are we clear on the objective(s) we are seeking to achieve? Cost recovery as an objective, is, we believe, of limited value.

As Travers Morgan (1990, p4) states "by far the greatest source of confusion in the interpretation of road cost recovery study results is a failure to distinguish between the concept of cost allocation and the process of price setting. There is a common, but erroneous tendency to presume that pricing policy does (or should) follow automatically from the cost allocation process".

The concentration of the current debate on financial considerations is likely to be at the expense of economic efficiency, supposedly the objective of the microeconomic reform process. Most cost recovery analyses allocate joint costs on the basis of an arbitrary parameter such as vehicle kilometres travelled or number of vehicles, with the analysis being referred to as "equity based" (Bureau of Transport and Communications Economics 1988, p25). Allocating cost recovery-derived joint costs using elasticity-based rules, i.e. charging what the market will bear, produces a form of optimal economic pricing. However, if it is based on an average costing concept, it is of limited value as a surrogate for marginal cost.

Current Australian road cost recovery exercises are based on PAYGO (pay-as-you-go), with the implicit assumption that current investment is efficient, yet evidence suggests that current investment is not efficient. The results of economic analysis undertaken by the BTE (1987) suggests that funds should be directed away from local roads towards arterials, yet at a time when funding was reduced on the introduction of the Australian Centennial Roads Development Program (ACRD) in January 1989, local roads was the only category to receive an increase. Similarly, cost recovery research in South Australia (Travers Morgan 1985, p88) indicates over-investment/servicing of local roads compared to arterials, of rural roads compared to urban, and of rural National Highways compared to rural arterials. Although cost recovery results cannot give any guidance whether the overall level of investment is appropriate or not, the cost recovery debate has led to a closer examination and quantification of costs, providing at least, a useful input to economic pricing.

Travers Morgan (1985, p88) cautioned the importance placed on getting cost recovery based charges "right":

"Thus it seems to us that the current cost recovery debate, which usually emphasises the economic advantages of applying to particular vehicle classes the principle of "user pays" may be misdirected. The extent of economic inefficiency at issue in the system of distributing the costs of roads to vehicle classes may be much less than the inefficiency consequences of the overall level and disposition of road funding".

As the BTE (1985) identified, the definition of road revenues in cost recovery studies is also somewhat arbitrary, as is the inclusion or exclusion of policing, health and safety from the cost definition. So we can get any cost recovery answer we want because everything about cost recovery is arbitrary, especially while 60-70% of costs are joint. The process leads to varying results ranging from cost recovery rates of 1.36 in the South Australian study (Travers Morgan 1990, p68), to under recovery of \$32,000 per six axle articulated vehicle (BTCE 1988, p120).

Cost recovery is often pursued in the belief that improved cost recovery for some vehicle classes (namely "heaviest") through increased charges will promote microeconomic reform by creating a "level playing field". However, intermodal competition (between rail and road) is not a critical issue. Forsyth (1985, p3) argues that "the long term elasticity of demand for freight in general has been underestimated and that this has meant that the road-rail problem has been exaggerated". The different services provided by each mode generate only limited areas of competition and in any case rail has so much ground to make up in increasing its internal efficiency that care needs to be taken that road efficiency is not sacrificed in an attempt to artificially support rail transport.

In deriving cost recovery based schemes to determine road charges, various important issues are often ignored. Of considerable importance is that taxing intermediate goods such as road transport may not be appropriate (Industries Assistance Commission, 1986), and there is little regard to enforcement and administration costs associated with schemes proposed, e.g. current SPC proposals should be costed. Income distribution and regional economic consequences and the impacts on road transport operators are generally not dealt with adequately. Long run avoidable costs only need to be covered to prevent cross subsidization (Travers Morgan 1990, p8) - the emphasis on all vehicles covering fully distributed costs has no economic basis.

Forsyth (1985, p37) provides some useful insight into the issue of taxing intermediate goods:

"Some of the outputs of road users (e.g. leisure car journeys) are final, and other (road freight) are intermediate outputs. If taxes are to be levied on commodities generally, they should be levied on car trips, or on the road use which makes such trips possible. However, it would be inefficient to levy taxes on road freight. Thus, it would be expected that car users (strictly, leisure car users) would pay marginal cost, plus an amount calculated according to Ramsey/Boiteux formulae to achieve cost recovery, plus a further amount for tax, whereas road freight would be charged marginal cost plus an amount for cost recovery".

This suggests a review of the taxing system. The road transport industry is levied indirect taxes at a level significantly higher than the economy wide average (Travers Morgan 1990, p44). Whether the significant increases in charges commonly proposed for some vehicle classes (usually "heavy") can be justified or not, operators respond to the total level of charges, which includes taxes.

One of the perceived benefits of the (cost recovery based) charging scheme proposed under the SPC process is the promotion of an efficient vehicle configuration. Cox (1991, p119) argues that "... the rationale for hoping that such pricing mechanisms will efficiently allocate resources in the road transport sector is suspect". The impact being small given that charges represent a small percentage of total operating costs, and the presence of low demand-price elasticities. Forsyth (1985, p39) picks up this point suggesting that "...the distortion costs imposed by levying charges which result in prices greater than marginal cost may be quite low". While this may be true, it does not provide support for introducing a charging scheme which could produce results at variance to an efficient ideal.

In the context of charging for road wear on rural roads, which by the nature of engineering relationships is targeted at "heavy" road transport, it is likely that as simple a scheme as possible (e.g. fuel charge) may be all that should be implemented. Whilst perhaps not addressing the so called "4th power rule" for pavement wear, the administration costs etc. are certainly lowest. In the absence of detailed costing/study of alternatives the most efficient approach will remain unclear.

Forsyth (1985, p48) suggests, however, that in the absence of better information on areas such as the elasticities of demand by different road users with respect to charges, the charging structure should probably include a mixture of charges. For example, registration charges affect vehicle ownership and intensity of use (in the sense of a high registration charge promoting higher usage in order to reduce average costs), fuel taxes have a direct impact on operating cost and hence use. A mixture of charges reduces the net impact of such distortions. Forsyth also suggests though that "complexity in road charges is unlikely to increase efficiency".

### **Economic pricing and investment**

From an economic perspective, an important goal for pricing and investment policies is the pursuit of economic efficiency. The evidence shows, however, that governments have either disagreed with this perspective, or for other reasons have chosen to ignore economic efficiency considerations. Only infrequently have efficient pricing and investment earnestly been the focus of policy formulation.

The objective is "...to ensure that the costs to the users of an extra kilometre of road use approximates the extra cost to society of that road use. We should be concerned with whether correct incentives are being given to road construction authorities to invest in roads until the extra benefits to society of road investment just equal the extra costs". [However,] "these matters bear no relation to 'cost recovery' or 'hypothecation' of taxes. Cost recovery is an artificial constraint imposed by governments and does not result in appropriate pricing" (Duldig 1989, p228).

How close does the equity based cost recovery approach get to efficient pricing? Are there other relevant issues that are (conveniently) being overlooked?

In order to maximise efficiency users need to face a price equal to marginal social cost (MSC), including recognition of peak loads and appropriately adjusted for any second best considerations which might apply. MSC covers operating and

road authority related costs, plus externalities such as congestion, environment and general pollution costs.

The debate as to whether costs should be short run or long run is worthy of a paper in itself (e.g. Travers Morgan 1990, Starkie 1979, Vickrey 1985). Short run costs by their nature only consider how to most efficiently utilise an existing investment. Long run costs by including a replacement component recognise the on-going nature of road works.

Once efficiency is established as the first priority, whether road track costs are recovered from users becomes a second order issue to ensuring that optimal road investment and usage takes place. Indeed efficient pricing may not result in a shortfall in funding requirements (Keeler and Small 1977, Forsyth 1985). Forsyth (1985, p46) concludes that "there need be little conflict between cost recovery and efficiency charging structures. If there is any conflict, it is likely to be small". The perception of a large shortfall results from ignoring congestion costs in the calculation of marginal costs. As Forsyth (op cit, p6) states "...it is quite likely that charges that are equal to marginal cost (including congestion costs) for all users will cover, or nearly cover, the total costs of providing the road system".

Whether cost recovery and efficiency are comparable depends on current capacity levels and whether scale economies exist in road works. In relation to the latter, Forsyth (1985, p11) notes that "...given the conflicting evidence, it is not possible to be certain whether the Australian road system exhibits constant or increasing returns to scale". He goes on to state that "few suggest that scale economies, if they do exist, are particularly significant. Thus if revenues fall short of costs, they are unlikely to do so by very much". Notwithstanding all this, if and when a shortfall results, it should be eliminated by the "efficiency based" (see BTCE 1988) approach to achieving financial breakeven, namely, following Ramsey pricing type rules which minimise distortions in usage patterns.

Currently investment is decided in isolation (from pricing) in terms of the overall "size of cake" and in allocations to specific road works. BTE (and CBR) identified many projects with a high benefit cost ratio (BCR), yet in many instances funds were directed to projects with a low BCR.

Some consider it appropriate that investments be considered in isolation. For example, Walters (1968) sees optimal levels of investment as being determined by CBA criteria, effectively separating pricing and investment decisions in the sense that investment in roads does not arise directly from pricing signals. However, Starkie argues that there should be a feedback mechanism from prices to investment decisions (Starkie 1978, p16). We tend to lean towards the Starkie view, but this is clearly an area warranting further research.

The rules for optimal investment analysis and decisions are provided by Cost Benefit Analysis (CBA). CBA has a long history in transport analysis, and although it has had its critics over the years, it still provides a very important and necessary input into decision making. CBA should by no means be the only yardstick to judge the merits of investment, but it is, we believe, still one of the most important indicators. Recently, effort has been directed towards improving the consistency, and correctness, of application of CBA techniques in the transport

sector (for example, Schlacter 1986, South Australian Treasury 1990, Director-General of Transport 1991). Cox (1991, p124) argues that:

"An integrated road management system which selects projects from all road facilities on the basis of Net Present Value to the community would allow an optimum total budget to be determined, an optimum apportionment between various facilities and programs as well as the selection of the most economic projects within each program".

Cox (1991, p120) goes on to suggest that a rigorous use of economic methods for ranking investment priorities has the potential to produce resource savings of \$14 billion, about 4% of GDP.

Starkie (1982, p70) suggests that "... it is arguable whether it would not be better to turn the problem inside out; to view the cost recovery issue as an investment issue and not a pricing issue". In which case total investment, during a period would be based on the amount of revenue anticipated from users.

Notwithstanding this, quite clearly there is no obligation to undertake, or adopt the findings of, CBA. This leaves investment decisions particularly open to reflecting purely political rather than economic objectives. In this respect, a further benefit of having efficient pricing may result from a link existing between efficient prices and investment, as occurs in the supply of most private goods - that prices paid in effect represent votes for a project. This is particularly true if decision makers are tempted to proceed with investments that do not pass CBA criteria but are politically, or bureaucratically, desirable. In this situation efficient pricing will act both as an efficient rationing mechanism, and also as a provider of improved signals about the value of investments

The above discussion has concentrated on allocative efficiency (i.e. undertaking correct investments and ensuring their optimal utilisation), but what of productive efficiency (i.e. producing road works at minimum cost)? When was the last time road authority standards were independently reviewed? Are some roads maintained to too high a standard and are pavements too thin or too thick? This point is also picked up by Cox (1991,p120) who compares the merits of the current approach of determining roadworks on the basis of design standards with the economic approach. Cox contends that there are two major steps required:

"The first is to determine the correct economic standard of improvement or maintenance and the second is to ensure that the projects selected (with these standards) provide the best return to the community with the available funds".

The issue of road authority practices is being investigated in 1991 by the House of Representatives Standing Committee on Transport, Communication and Infrastructure. In any case transport operators should not be responsible for additional and unnecessary costs, as Bosch (1984) recommended in relation to airport infrastructure cost recovery whereby the costs of identified excessive investment was excluded from the charge setting process.

Where does the discussion on road pricing and cost recovery leave us? In theory prices should be set at social marginal cost (appropriately adjusted for any second best considerations), any charging/pricing structure should include a congestion component, and the taxing of intermediate goods should be avoided. Is any guidance given to the appropriate structure of charges being developed under the SPC process? That heavy vehicles create more road wear relative to light vehicles is not in contention, however, a typical six axle articulated vehicle has a

fuel consumption rate (1/100km) around seven times that of a standard passenger vehicle (hence seven times the fuel impost paid) with the registration charge some 52 times greater (based on South Australian data). What the debate is about is how much more should a heavy vehicle pay.

One of the primary objectives behind the SPC process is to achieve equity in charges across vehicle classes, on the basis that this will achieve some notion of efficiency. The result has been to advocate that much higher charges be levied on the heavier road transport, with lighter vehicles receiving a rebate to achieve revenue neutrality.

However, the use of taxes on intermediate goods suggest grounds for lower charges on commercial vehicles, while still maintaining "equity" (in terms of fairness in charges levied across vehicle classes). Taking account of congestion could also indicate higher charges be levied on lighter commercial vehicles e.g. Forsyth (1985, p44) suggests as an example that "...small trucks may use highly congested city roads, while large trucks may use less congested highways. It may be necessary, on practical grounds to charge the same fuel tax, but higher per kilometre costs of the smaller trucks might be covered by a higher registration fee". Even if congestion pricing is not applied in practice for varying reasons, knowledge of the size of such costs are still relevant in determining relative charge levels.

The combined effect of imperfect knowledge of road wear characteristics, taxation issues and the goals of efficient pricing including a congestion component, make it difficult to determine particular vehicle class charges in the absence of further research.

This is not to suggest that the current situation is likely to be in any sense optimal. It does suggest, however, caution in introducing significant changes to the current system in the name of microeconomic reform, unless we can be sure that they are making a positive contribution to improving efficiency. It appears to us that the efficiency implications of the SPC proposals have yet to be closely examined. Ignoring such cautions can be particularly damaging, given the potential impact that some of the charges proposed to date could have on sections of the community. Any charge increases will undoubtedly make some groups worse off. Unless the potential political backlash can be countered by the evidence of efficiency gains a good opportunity to effect long term structural change, and its resulting benefits, may be lost.

### **Pricing and transport planning**

Given that transport is a means to an end, pricing has a role in determining the effectiveness of service and infrastructure planning. Failure to price correctly leads to obvious problems. For example, low transport prices can encourage urban sprawl and in turn create pressures to keep transport charges low. Accommodating sprawl requires network extensions at the fringe which may be expensive to provide.

The typical response to comparatively low (real or perceived) passenger car costs is to subsidize public transport beyond justified levels. Whilst this goes some way towards addressing modal imbalances, it usually results in greater than optimum transport consumption overall. Amos & Starrs (1984) suggested that the "justified" public transport subsidy for metropolitan Adelaide is only about half the actual deficit.

Other alternatives, such as urban consolidation, must be considered to break this cycle, even though such policies have their own costs e.g. reduced privacy and amenity, and considerable community opposition.

Conventional CBA suggests a greater diversion of funding to congested cities such as Sydney and Melbourne, given the high component of travel time savings in defined benefits. To what extent, however, is this the result of sub-optimal pricing?

Governments do not yet favour road pricing (Goodwin 1990) mainly because of the perceived regressive impacts: such schemes are seen to restrict access to the rich, or to those with company financed vehicles. But examples of road pricing are working in Asia and Europe and "charging is a solution to traffic congestion if charges are set to keep traffic at levels which avoid congestion, on the one hand, and to provide appropriate signals to increase road capacity at such congested locations, on the other" (Duldig 1990, p226).

Some are sceptical of the results and potentially broader application of road pricing:

- Volmuller (1987) argues that the size of any potential charge would be too small to influence behaviour and that, by its nature, charges would be average rather than marginal
- Evans (1990) objects to road pricing on several grounds: its benefits may be small, it leads to horizontal inequity between road users, and it generates perverse incentives for government.
- Borins (1982) identifies the potential for misuse of information by government.
- Adams (1990) suggests that the outcome of pricing would be to "drive" cars out into the suburbs, but there are too many cars and therefore the solution should be to reduce the overall number of them.

Oldridge (1990) argues that "it will be necessary to have a comprehensive public participation exercise to judge whether the travelling public are ready to accept the concept of paying for the use of roads in order to achieve more freedom of movement".

But what are the alternatives? How far can we continue to advocate improvements and extensions to transport infrastructure? Will constructing new roads in isolation result in overall urban optimization? If not, then directing more road funds to such areas is unlikely to solve existing problems.

Road pricing should be considered as a key element in a package of transport management measures including park and ride, bus priorities and further pedestrianisation (Goodwin 1990). Parking taxes should also be pursued. Other demand management techniques are being explored, but implementation is slow (Wayte 1991).

Equity issues should be taken into account in any proposed shift of policy. Developers have probably captured most of the "rent" resulting from lower transport prices which encourage fringe developments, resulting in a loss to current fringe dwellers from any increase in transport prices or charges (Kirwan 1990).

Our emphasis on the link between pricing, investment and planning has been in the metropolitan context; examples can also be identified in rural areas. The provision of roads to new mining or tourist ventures can be provided by the developer, with the costs recouped through tolls or through the product price. Where regional development objectives are accomplished through such projects a contribution from the public sector may be justified. Such cases should be supported by CBA - there are current examples where the project itself is of doubtful viability and the public provision of access (ostensibly on the grounds of enhancing the project) will never be recouped.

### **Conclusion: first order issues**

The first priority is to ensure that transport pricing and investment policies are incorporated into a comprehensive planning processes. A close link exists between pricing and investment, although not recognised in the public policy process. A step towards integration of the two would be separate and rigorous evaluation and application of investment and pricing in preference to the cost recovery process currently in vogue in Australia.

An efficient pricing policy should encompass peak pricing in urban areas, be applied in conjunction with other demand management techniques, and have full regard for the costs of administration and enforcement.

Greater emphasis on efficient investment should include greater public scrutiny of current transport agency practices and promotion of public tendering in addition to the analysis of the nature and location of projects under consideration. Whilst there are only a few transport 'white elephants' in that facilities built are usually utilised, this is partly due to pricing at less than marginal social cost.

The results of CBA should be made public, given that several governments now insist on such economic analysis before projects can proceed. If the reports are not available to the public it is easy to set the results aside. New policies, such as the SPC charging system, should be subjected to the same critical evaluation as the infrastructure program they are intended to finance.

Inter-related matters such as congestion and environmental costs need to be incorporated, not dealt with in isolation. Forsyth (1985, p14) sums up the requirements:

"... it is not possible to answer all the key questions surrounding efficient pricing and cost recovery but it is possible to identify them. Firstly, evidence on the level of marginal cost, including congestion costs, for different road users, needs to be gathered. Much of the confusion surrounding efficient pricing arises from ignoring the integral aspect of congestion. Secondly, the returns to scale question must be answered: it is this which determines the efficiency cost of imposing cost recovery. Thirdly, it is desirable to obtain

evidence on the variation in marginal costs from peak to off-peak, urban road to rural road. While the charging structure is likely to be too limited to discriminate, this evidence is of use in designing a second best structure of charges, and in measuring the cost of simplicity".

If the first priority is to achieve efficient pricing and investment, why have we spent so long concentrating on cost recovery? Perhaps because nobody wants to know the answers to the more important questions. Research on pricing and efficient investment may not be "what the users want" but it is still useful and necessary. It will be a bleak future if the only research to be undertaken is based on what the user wants!

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