OFFICE OF
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Compliance with the road transport law

A submission to the National Road Transport Commission

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1 INTRODUCTION

In June 1994, the National Road Transport Commission (NRTC) released a discussion paper entitled *Compliance with the Road Transport Law: Principles, Objectives and Strategies.* The paper sets out the NRTC's tentative position on various issues related to enforcement and compliance and invites comment.

The Office of Regulation Review (ORR) — located within the Industry Commission — advises on the Commonwealth Government's regulation review program. Amongst other things, the ORR provides public comment on regulatory proposals.

In this submission, the ORR comments on selected propositions from the NRTC paper. In particular, the submission focuses on the first proposition, that the objective of compliance strategies should be to *maximise* compliance with standards as cost-effectively and fairly as possible. It also provides brief comments on some related issues. To provide a background to these comments, the submission starts by making some observations about the objectives specified in the NRTC Act.

2 OVERALL OBJECTIVES OF ROAD TRANSPORT REGULATION

Under its Act, in formulating road transport laws the NRTC needs to seek "improvements to both road safety and transport efficiency and reductions in the costs of administration of road transport."

Sometimes, trade-offs need to be made between these objectives. For example, measures to improve safety, such as more stringent vehicle construction regulations or very low speed limits, can increase the costs of road transport and/or reduce its efficiency. Indeed, many regulations explicitly or implicitly involve trade-offs between safety and cost.

While the NRTC Act does not indicate how trade-offs between these objectives should be made, in practice the NRTC has largely adopted an economic efficiency approach for making such trade-offs. This is reflected in the proposition in the paper that:

> ...a decision as to whether or not regulatory intervention is justified in any particular instance depends on an analysis of the costs of the intervention against the benefits of preventing a particular harm occurring. This is consistent with the objectives of promoting road safety and efficiency, without imposing an undue administrative burden (p. 7).

The NRTC's economic efficiency approach is also reflected in its adoption of cost-benefit methodology for assessing regulations. Under this methodology, the benefits of improved safety are weighed up and traded-off against the costs to industry, consumers and government of the measures necessary to improve safety. What falls out of this approach is that the goal of road transport regulation

should not be to achieve maximum safety, for that would be too costly. Rather, it is to promote an "optimum" level of safety— that is, a level of safety that balances the benefits and costs of improving safety levels. The ORR endorses this approach.

3 AIM OF COMPLIANCE STRATEGIES

In the discussion paper, the NRTC notes that there are two elements in its proposed regulatory framework that combine to meet its overall objectives: standards and compliance measures.

These two elements are to some extent substitutes for each other. That is, stronger enforcement can "compensate" to some extent for less stringent standards, and vice-versa.

However, on the assumption that the objectives of standards themselves are to promote optimum safety outcomes, the NRTC argues that compliance strategies should aim to *maximise* compliance with standards, as cost-effectively and as fairly as possible.

While the ORR broadly agrees with the proposition as it stands, it does not agree with the NRTC's assumption that standards are formulated to equate with optimum outcomes.

There are three reasons why standards do not, or cannot, achieve optimal safety-cost-efficiency outcomes. Taken individually or together, these reasons mean that strategies which aim to maximise compliance will not necessarily be desirable.

First, it is likely that, in at least some cases, standards will be set which exceed the optimum level of safety. One reason for this is that, in the past, standards have been set in awareness that full compliance with them was unlikely, so the stringency of the standards themselves may have been increased to compensate for less than full compliance. Another reason is that, as the ORR has previously noted[1], standards across a range of policy fields are often overly stringent and heavy-handed. One example in the road transport field may have been the initial decision to apply ADR 59— roll-over standards for buses— not only to coaches and route buses but also urban transit buses which, evidence suggests, are extremely unlikely to roll-over[2]. Another example may be the decision to require the fitment of anti-lock brakes to B-Doubles despite analysis of the proposal yielding an unfavourable benefit-cost figure. Whatever the merits of these

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1 ORR, *Recent developments in regulation and its review* , Discussion Paper, November 1993, p. 21.

2 ORR, *op. cit*., p. 26. The ORR understands that, after representations from the transport industry, this problem has now been overcome to some extent by a recent decision to exempt low floor buses from the standard.

particular decisions, the ORR considers that there are incentives for regulators to err on the side of caution when developing regulations[3].

To the extent that there is a tendency for excessively stringent standards in road transport law, a case can be made for modifying compliance measures. That is, to produce an optimal balance between the safety, cost and efficiency objectives of road transport law, excessively stringent road transport regulations made would need to be accompanied by less than complete compliance.

[3] See Industry Commission, Annual Report 1991-92, AGPS, Canberra, 1992, pp. 180-181.

The second reason why some standards are unlikely to promote optimum safety-cost outcomes is that they often lack the flexibility to cope with the different variables or conditions which affect optimality in different circumstances. For matters such as speed, driving hours and vehicle load weight, the optimum level of these will vary with many factors. For example, as discussed in the attachment to this paper, the optimum speed for travelling along a particular road will vary according to weather conditions, traffic density, fuel costs and the fuel efficiency of different vehicles, importance of time to the driver, the relative speed of other vehicles and so on. For standards to promote optimality under such circumstances, they would need to be specified in such a way that these factors could be taken into account. Speed limits would need to vary, being higher in good driving conditions than in poor driving conditions. As discussed in the attachment, they would also need to differ depending on the time and other preferences of individual drivers.

"Principles" standards[4], by their nature, incorporate sufficient flexibility to do this because the courts are required to weigh up the pros and cons of the conduct for which the standard applies. Properly specified, principles standards can promote optimality.

However, "prescriptive" standards and "performance" standards lack flexibility[5]. For example, speed limits can be varied between different areas, and applied with some flexibility according to the time of day (as in 8am to 4pm school zones). However, they are insufficiently flexible to deal with the multitude of factors which affect optimal speed levels. For example, they do not vary with traffic density or weather conditions. This suggests a need for some discretion in enforcing speed limits[6].

The third reason why (prescriptive and performance) standards, if enforced rigidly, cannot promote optimality is that they are often specified in black and white terms when the problems they are dealing with involve shades of grey. Consider, for example, the issue of heavy vehicle driving hours. Under the present prescriptive standard, any number of hours up to the number prescribed in the standard is effectively regarded as "safe", whereas any number of hours beyond the prescribed limit is regarded as "unsafe". In practice, however, beyond some minimum time at the wheel, any additional period of time spent driving involves some risk of fatigue and some level of safety risk, even if it is within the prescribed limit. Likewise, additional time spent at the wheel beyond the limit also

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4 Principles-based standards describe the objective sought in general terms (eg, to drive at a speed "appropriate" to the conditions).

5 Performance-based standards specify an outcome in precise terms (as in a speed limit). Prescriptive standards specify the technical means of undertaking an activity (for example, restrictions on vehicle engine capacity or the mandatory installation of speed limiters).

6 There are of course other considerations relevant to determining the appropriate strategy for enforcing road transport standards and regulations. These include certainty in the law, administrative simplicity, equity, and limits on public resources available for enforcement. As discussed in section 4 of this paper, trade-offs may need to be made between these considerations.

involves additional risk, but this risk is itself of an incremental nature. A driver does not move from being safe to unsafe at the point when he or she exceeds the number of hours specified in the standard. A similar argument

applies to speed. A vehicle travelling 5 kmh below the speed limit is not necessarily "safe", and one travelling at 5 kmh over the limit "unsafe". Rather, different speeds involve different levels of safety, and risk increases incrementally as speed increases (other things being equal).

Inevitably, a prescriptive or performance standard can at best be a rough rule of thumb, or a reasonable average, of the optimum (or maximum) amount of time to spend at the wheel or the optimum (or maximum) speed at which to travel.

However, by themselves such standards are unable to promote optimum outcomes. Again, this means that, at least in some circumstances, full compliance with such standards will promote suboptimal outcomes. In turn, this points to the desirability of some flexibility in enforcement.

Overall, given the inability of standards to achieve optimality by themselves, the ORR considers that the objective of compliance strategies should be to *optimise*, rather than *maximise*, compliance with road transport regulations — the ultimate aim being to achieve on optimal balance of the safety, cost and efficiency objectives specified in the NRTC Act.

In its justification of the maximum compliance objective, the NRTC argues:

> For the purposes of developing objectives for compliance... it must be assumed that, irrespective of how it is formulated, any particular standard is set so as to deliver the optimum performance outcome. It is therefore axiomatic that the optimum level of compliance in respect of any standard is 100 percent. Were it not so, standards would be developed in the expectation that the best outcome will only be obtained if, say, 50% or 80% of people were to comply. Any regulatory scheme would be unworkable under such conditions (p. 8).

The ORR makes two counter-observations. Firstly, there are already many regulatory regimes which, reflecting the imperfections of the real world, work with an environment where complete compliance is not and never will be obtained, yet these schemes have not broken down. Indeed, an example is the current speed limit where many drivers exceed the limit to varying degrees, but the scheme still affects driver behaviour. Secondly, the statement by the NRTC that 50% or 80% of people might comply or not comply reflects an essentially "black and white" or legalistic view of compliance with the law. In fact, standards, such as speed limits, driving hour restrictions and vehicle weight requirements, can be breached "by degrees" and it is possible and, in the ORR's view, desirable to take this into account when designing a standard and its associated compliance strategy. The ORR accepts that regulatory schemes designed in this manner would operate differently compared with those not so designed, but it disagrees that such schemes are "unworkable."

Consequently, the ORR does not accept the NRTC's argument as to why compliance strategies should seek to achieve maximum compliance. Rather, the ORR considers that a more flexible approach is required.

4 ON-ROAD ENFORCEMENT

Because of perceived shortcomings with on-road enforcement, the NRTC favours the increased use of other approaches, such as allocating liability for breaches of standards further up the road transport chain. In criticising the on-road deterrence model, the NRTC states:

> ...there is at least anecdotal evidence calling into question the effectiveness and fairness of current compliance strategies. The reasons for this become clearer when on-road based strategies are assessed against the objective of maximising compliance with standards. Often, the stated objective may be preventive while the means employed are reactive, yet a preventive approach would seem to warrant considering measures that are proactive (p. 9).

One way fairness may be compromised is where, to achieve a given overall level of deterrence, fines may have to be set quite high if detection rates are low. This may be unjust for those individuals detected relative to those who go undetected.

The ORR agrees with this criticism although it notes that ongoing improvements in vehicle measurement technology, mentioned by the NRTC, should reduce the extent of this problem for some types of breaches (eg excess speed or weight).

The major "effectiveness" shortcoming that the NRTC sees with traditional on-road enforcement strategies is their inability to ensure complete compliance with standards.

As discussed above, the ORR considers that this goal is generally inappropriate and, as such, this aspect of deterrence based strategies need not be seen as a shortcoming. In fact, the ORR considers that conventional on-road enforcement strategies, particularly those involving systems of fines for breaches of standards, offer precisely the flexibility necessary to promote optimum outcomes.

This view is developed in detail in the attachment in the context of speed limits. The key points are that a systems of fines, together with a risk-related enforcement strategy, can provide incentives for appropriate driver behaviour modification. Such a system is equivalent to a "tax" on the problem activity, where the tax is equivalent to the fine multiplied by the probability of an infringement being penalised. Provided the tax is set with the aim of approximating the "external costs" of the activity in mind (see the attachment), decisions made by drivers should approximate optimum social outcomes. Under this approach, some drivers will continue to breach particular standards, although by less than they did previously. However, this approach is more likely to promote an optimum balance between the safety, cost and efficiency objectives of road transport law than alternatives involving the rigid enforcement of standards.

Against this background, the ORR does not consider the paper's point that some people "will not comply if they perceive a potential gain (economic or otherwise) in carrying out the prohibited activity" to necessarily be problematic. Nor does it agree with the statement by Fisse and Braithwaite, quoted at page 10, that "sole reliance on rational deterrence leaves us defenceless against cost effective crimes." The ORR notes that, in fact, deterrence strategies will reduce the extent of breaches (for example, many drivers, while still finding it cost-effective to travel faster than the speed limit, will exceed it by a lower margin than they otherwise would). Further, a fine based system offers a means of compensation to society for the higher levels of risk associated with such breaches[7].

Of course, there are limitations and trade-offs in applying such a system. For example, one argument that might be raised is that such a system, if given official endorsement, may diminish "respect for the law". Another concern is that the discretionary element implied in the above model may increase uncertainty and/or the complexity of the law[8]. A further concern is the equity implications, discussed earlier, associated with relying on on-road enforcement.

While these types of considerations may well over-ride the benefits that flow from flexible on-road compliance strategies in some cases, in others such strategies may provide a better solution. In this context, the ORR notes that improvements in vehicle monitoring and measurement technology mentioned in the NRTC paper are likely to diminish some of these concerns over time, particularly in relation to vehicle weight and speed.

Overall, the ORR considers that the NRTC's case against traditional on-road enforcement strategies is overstated. Such strategies, if intelligently applied, offer a means of providing flexible and efficient solutions to certain road transport safety problems[9].

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[7] A similar argument applies for certain pollution problems where emissions taxes are imposed. Under an emissions tax system, there is recognition that whilst pollution imposes monetary and non-monetary costs on society, the processes which produce pollution often confer benefits to society (for example, the production of goods and services). A tax on emissions aims to modify the incentives for people or firms to pollute such that only "cost-effective" pollution will occur. The emissions tax does not ban all pollution. Rather, it reduces the aggregate amount of pollution and compensates society for the costs of it.

[8] In relation to the use of discretion, the NRTC argues (p. 24) that regulatory agencies should promulgate, and make public, guidelines to cover all aspects of discretionary activity on the part of their enforcement officers. The ORR supports this approach.

[9] A further issue here is the interaction of different regulations and penalty systems. Sometimes, people may face a choice between breaching different regulations. For example, to complete a particular journey in one session of driving, a truck driver may effectively face a trade-off between driving within the speed limit but exceeding the time period permitted, or exceeding the speed limit to remain within the time period. Were higher penalties to apply to one offence relative to the other, people would be expected to undertake the less costly option. For example, higher penalties on speeding relative to driving time would mean that drivers would (other things being equal) favour driving for longer, rather than at a higher speed (and vice-versa). This highlights the desirability of ensuring that regulations and penalty systems are coordinated so as to provide appropriate signals to people about the relative risks and costs of different activities.

5 EXCLUSIONARY SANCTIONS

The NRTC discusses the use of exclusionary sanctions as a means of penalising breaches of standards. Exclusionary sanctions include license suspension or revocation. These sanctions lie towards the top of the Braithwaite enforcement pyramid (discussed in the attachment to the NRTC paper).

The ORR considers that, for certain types of breaches, exclusionary sanctions may be appropriate. These breaches include repeated breaches of "principles" standards and, possibly, extreme breaches of principles, performance or prescriptive standards.

However, there will be occasions when it is inappropriate to use exclusionary sanctions, despite persistent low-level breaches of standards. This is because, as discussed above, the nature of performance and prescriptive standards mean that there will be instances where exceeding such standards will accord with optimal safety-cost outcomes. For example, in the case of vehicle speed, if speed limits are set for poor driving conditions, it may be optimal for vehicles to exceed set limits in good driving conditions. While a fine system will still be necessary to ensure that drivers do not exceed the optimum speed in such conditions, licence revocation for persistent minor breaches of the limit in good driving conditions may send the wrong signals to drivers and thereby *unduly* restrict vehicle speeds.

6 CONCLUSION

In summary, the ORR considers that:

- performance and prescriptive standards, rigidly enforced, are unlikely to achieve optimum safety-cost-efficiency outcomes;
- the objective of compliance strategies should be to augment standards to promote optimality. In some cases, this will involve less than complete compliance with standards;
- traditional on-road deterrence systems, if designed and applied intelligently, provide a means of achieving these goals; and
- exclusionary sanctions, while having a role for some classes of breaches, can provide inappropriate disincentives for low-level breaches of some standards.

ATTACHMENT: ECONOMICS OF VEHICLE SPEED REGULATION

This attachment examines issues related to the regulation of driving speed. It provides more detail on some issues presented in the body of the submission. The specific issues examined are:

- the concept of optimum vehicle speeds;
- the variability of optimum vehicle speeds; and
- the way that a regulatory system involving speed limits, fines and risk-related enforcement can promote optimum vehicle speeds.

The attachment does not seek to cover all issues relevant to these matters. Rather, it presents a simplified model which focuses on the main points of relevance.

Costs, benefits and optimum vehicle speeds

The economic analysis of driving speed starts by categorising the effects of driving at different speeds as either costs or benefits and then, using this categorisation, specifies the conditions under which it can be considered optimal for people to drive at particular speeds.

Private costs

The costs to the driver of incremental increases in speed[10] include higher fuel consumption, potentially greater wear and tear on the vehicle and, perhaps most importantly, an increased risk of being involved in an accident.[11] Accidents may impose costs on the driver such as the cost of repairs (or higher future insurance premiums), and medical costs or personal disamenity associated with injuries sustained or death.[12]

The individual costs of increasing speed can be represented by the curve MPC_1 in Diagram 1. The curve slopes upward at an increasing rate indicating that increases in speed result in non-linear increases in costs. One reason is that, beyond very low speeds, fuel consumption rises more than proportionally as vehicle speeds increase. The risk of accidents, and their costs, are also likely to rise in this manner.

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10 It is useful to conceptualise the decision about what speed to drive at as a series of incremental decisions. Do the benefits of increasing speed from zero to 10 kmh exceed the costs? If so, do the additional benefits of increasing speed from 10 kmh to 20 kmh exceed the additional costs? If so, what about the additional benefits and costs of increasing to 30 kmh? And 40? And so on.

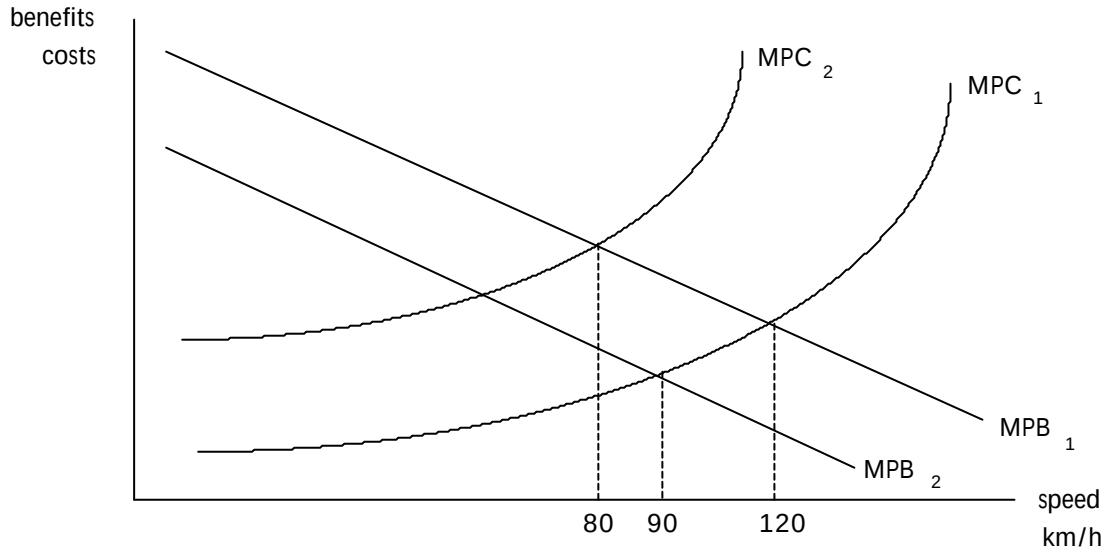
11 Over long journeys, driving at higher average speeds (up to some speed) could in theory reduce the risk of an accident were it to sufficiently reduce driver inattention and/or fatigue (by, for example, reducing total time spent on the road).

12 As discussed below, if there are speed limits and penalties in place for exceeding them, an additional cost to the individual of increasing speed (above the limit) will be the possibility of being caught and receiving a fine or licence suspension. Some people may also incur a moral or psychic cost from simply breaching the law.

The costs associated with driving at a particular speed will also vary depending on various factors. These include the weather, condition of the road, traffic densities, speed of other vehicles on the road, driver competency or experience, length of time already spent on the road (and thus level of fatigue of the driver), safety of the particular vehicle, and so on.

These factors act as "shift variables" for the cost curve. Holding other factors constant, the costs of driving at various speeds are likely to be higher in wet weather than in dry, because the risk of an accident at a particular speed will be higher. In the diagram, MPC_2 represents this possibility. On the other hand, holding other things equal, there are likely to be fewer costs associated with driving at a particular speed on a divided road than on a single-carriageway road. This scenario could be represented by a lower cost curve.

Diagram 1



Private benefits

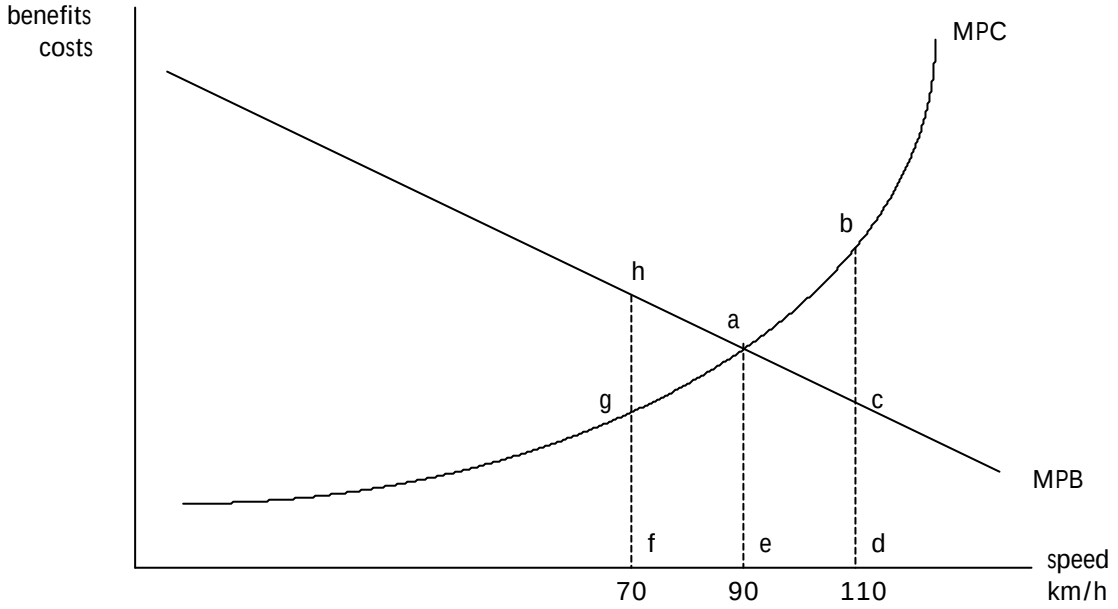
For a driver undertaking a particular journey, the main benefit of an increase speed is the value of time that will be saved on the journey. In the case of heavy vehicles, the benefits of timeliness may partly fall to the recipient of the goods being transported. For some trips, there will also be link between the average speed travelled and whether a particular trip falls within or just exceeds an allowable driving period.[13]

[13] As well as time savings, an added benefit for some drivers of driving at higher speeds might be enhanced driving enjoyment or reduced boredom/frustration. While not quantifiable or dollar-based, enjoyment and/or reduced frustration are nonetheless of value in an economic sense.

The marginal benefits to the driver of increasing speed can be represented by the curve MPB_1 in Diagram 1. The curve slopes down indicating that, as speeds rise, the additional benefits of each extra increment in speed decline. For example, the benefit of time savings when increasing speed from 10 to 20 kmh are greater than the benefits of time saved by increasing speed from 100 to 110 kmh, reflecting the greater proportional saving in time from absolute increases at lower speeds.

Different drivers (or the same driver under different circumstances) will derive different benefits from driving at particular speeds. For example, a driver with plenty of time will gain less benefits from increasing speed than one who is time-constrained. For such a driver, the benefit curve will be lower, such as MPB_2.

Diagram 2



Privately optimal vehicle speeds

A driver's privately optimal speed will occur where the difference between total benefits received and costs incurred is maximised. This occurs at the speed where the marginal private benefits from increasing speed are just offset by the marginal private costs of doing so.

This is illustrated in Diagram 2 where, for the *MPB* and *MPC* curves drawn, the optimal driving speed is 90kmh. If speed were increased beyond 90kmh, say to 110 kmh, the additional costs (*abde*) would exceed the additional benefits (*cde*), leaving the driver worse-off by the area *abc*. Similarly, if the driver reduced his or her speed below 90 km/h, say to 70kmh, the driver would forgo more benefits (*aefh*) than costs (*aefg*) and thereby be worse off by the amount (*gh*). Hence, 90 kmh would maximise this driver's welfare.

Privately optimal vehicle speeds will differ between drivers (or between the same driver in different conditions). In Diagram 1, for the same cost curve MPC_1, a driver with benefit curve MPB_1 will find it optimal to drive at a higher speed (120 kmh) than a driver with a benefit curve MPB_2 (90kmh).

Privately optimal vehicle speeds will also vary according to changes in cost conditions. Even with the same benefit curve, shift factors which cause costs to vary will change the optimum vehicle speed. For example, in Diagram 1, for a driver with the benefit curve MPB_1 , the optimal speed in the wet (with a cost curve MPC_2) is 80kmh, lower than in the dry (120kmh with cost curve MPC_1).

The main implications of this analysis are that privately optimum vehicle speeds will vary subject to a range of different factors. Hence, one speed will not be optimal for all drivers and sets of driving conditions.

External costs and socially optimal vehicle speeds

The foregoing analysis has considered benefits and costs only to individual drivers.

However, from society's perspective, whether it is optimal for an individual to drive at a particular speed depends not only on the benefits and costs for that person but also on any benefits and costs experienced by others as a result.

Driving at a higher speed can impose "external costs" on others through an increased risk of accident damage, injury or death; through increased lead and carbon monoxide emissions due to higher fuel consumption; and through calls on the public purse where, for example, injured drivers receive publicly funded medical treatment.

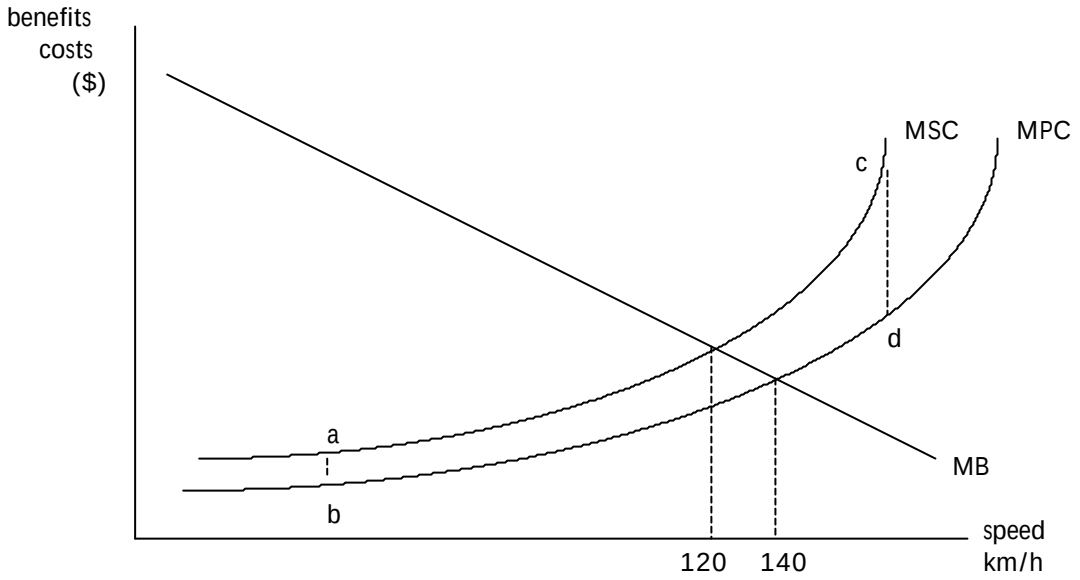
As a result of these external costs, the social costs of increasing speed are higher than the private costs of doing so. This means that the optimal speed in a particular situation from society's point of view will be lower than an individual's optimal speed.

This is illustrated in Diagram 3 where the marginal social costs of speeding are represented by *MSC*. These costs are higher than the marginal private costs of speeding (*MPC*) due to the external costs imposed on others by individuals who speed. The vertical distance between *MSC* and *MPC* represents these external costs. The external costs also increase at an increasing rate (ie a-b<c-d) because generally, the risk to other road users increases more than proportionally as vehicle speeds increase. The marginal private benefits of speeding are assumed to equal the marginal social benefits of speeding[14], and both are represented by the curve labelled *MB*. As drawn, the *privately* optimal speed for the individual occurs at 140 kmh where the marginal benefits of speeding are just offset by the

[14] This presumes that there are no external benefits from increasing driving speed and is made for analytical simplicity. In some cases however, for example where a vehicle "holds up" other vehicles, there may be some external benefits of increasing speed.

marginal private costs. However, the *socially* optimal speed is lower at 120kmh, where the marginal benefits are equal to the marginal social costs.

Diagram 3



The socially optimal speed will vary for the same reasons as the privately optimal speed. That is, for a driver with a higher private benefit curve, the socially optimal speed at which to drive would also be higher than for a driver with a lower benefit curve. Likewise, the socially optimal speed for a particular driver to drive in poor conditions will be lower than for the driver to do so in good conditions. In all cases, the socially optimal speed will change with variations in the privately optimal speed, although the socially optimal speed will generally be lower than that which is privately optimal.

What arises, then, is that there will be a range of socially optimal speeds which will depend on various factors including driver preferences, weather, road conditions, traffic densities, vehicle type, driver skill and so on.

Achieving socially optimal speeds

A basic tenet of economic theory is that people, implicitly weighing up the benefits and costs of the options available to them, seek out the option which maximises their personal welfare. In the context of driving, this implies that drivers will seek out the privately optimum speed of their own accord.[15]

[15] People will in theory be able to maximise their personal welfare if they undertake fully informed and rational decision-making. Clearly, in some cases people are likely to make less than fully informed and rational decisions. In the case of driving, male youths are often thought to drive at

As demonstrated above, however, privately optimal speeds will diverge from socially optimal speeds, due to the external costs associated with driving. This provides a rationale for government intervention to modify driver behaviour and vehicle speeds so as to promote socially optimal driving speeds.

Conceptually, one way of doing this would be to impose a "tax" on driving speeds.[16] The aim of the tax would be to act as a proxy for the external costs that drivers impose on others. In this way, individual drivers would need to take not only their private costs but also the external costs into account in determining at what speed to drive. They would be expected to reduce their speeds accordingly.

Such a tax would need to be variable in two main ways. First, holding driving conditions constant, the external costs of driving are higher at higher speeds. Hence, a higher tax would need to be applied for higher speeds. Second, holding driving speeds constant, the external costs will vary with driving conditions: they will be higher for a given speed in wet conditions than in dry conditions, for example. Ideally, the tax would need to be higher in wet conditions.

While in practice it is not possible to directly levy a tax on drivers, a similar outcome can be achieved through the use of speed limits, fines, and risk-related enforcement procedures. Under this system, a pseudo-tax applies to drivers exceeding the set speed limit[17], with the tax being equal to the level of fine multiplied by the probability that the driver will be fined. For any particular piece of road, the tax on driving at a particular speed will vary with:

- the speed limit;
- the level of fine for exceeding the limit; and
- the likelihood of being penalised.

The two requirements for variability in the speed "tax" mentioned above can thus be accommodated within this system. The first requirement — to increase the tax on drivers at higher speeds — can be accommodated, as it is at present, by having incremental fines: ie, larger fines for greater speeds in excess of the set limit. The second requirement — to modify fines with the driving conditions — can be accommodated either through variable speed limits (ie, lower speed limits in urban areas than rural areas) or through flexible enforcement practices. Flexible enforcement practices could involve:

- increased on-road enforcement of limits in poor driving conditions, higher traffic densities etc; and

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irrationally high speeds (although it can be argued that they are satisfying a preference for risk-taking). On the other hand, highly risk-adverse people and/or those who overestimate the risks of driving at higher speeds may drive at lower speeds than would otherwise be optimal. The assumptions of full information and rationality are relaxed in more sophisticated economic analyses. Real-world divergences from these assumptions do not of themselves nullify the result of the simple analysis set out here, although they may reduce the robustness of this result.

16 Other ways not discussed here include the use of principles standards and accident liability laws.

17 One limitation of this approach is that any speed below the speed limit would in effect escape taxation, even though drivers may impose external costs at those lower speeds.

- the discretion for enforcement officers to reduce the category of penalty applied in good driving conditions.[18]

Of course, in practice it would not be possible to devise a system that perfectly "internalised" the external costs of driving, and that set incentives to bring about optimum driving speeds. Nevertheless, a flexible system based on the principles outlined here could go closer to this objective than one based on inflexible compliance with set standards.

[18] The NRTC advocates the use of guidelines to specify the circumstances when discretion could be used. As discussed earlier, the ORR supports this approach.