

# **Australia's future tax system**

## **Report to the Treasurer**

December 2009

### **Part Two Detailed analysis**

volume 2 of 2

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## E. Enhancing social and market outcomes

### Key points

Not all taxes should be imposed primarily to raise revenue. Sometimes governments intervene in markets to achieve more efficient or equitable outcomes. In the case of goods or services provided by government, direct user charging rather than taxpayer funding can lead to more efficient outcomes. Taxes can also be used to influence the prices faced by the consumers or producers of particular goods or services.

Markets generally allocate resources to their highest value use. But markets do not always arrive at the prices that are best for society. Individuals might make decisions based on their own private interests – including the prices they pay – but fail to take into account costs that spill over onto others. An example is traffic congestion – where motorists will often choose the quickest route for themselves, but not consider the impact of their decisions on overall levels of congestion.

Tax can sometimes be used as a tool to align private incentives with social incentives. If a socially costly activity becomes more expensive because of the tax, the level of that activity generally falls. But not all market failures or spillover costs can be effectively addressed using a tax. Sometimes other approaches, like better defined or enforced property rights, would have better outcomes. In other cases, the lack of information needed to ensure the tax rate is efficient, or the cost of getting it, may limit the usefulness of the tax.

### Improving the efficiency of markets

The most efficient way of financing some government-provided goods or services is not to tax at all, but rather to charge users a price that reflects the avoidable cost of providing the good or service. The practicality of user charging partly depends on the degree to which those who are not willing to pay can be excluded from receiving the benefit. This may change over time as new property rights are clarified or new technology becomes available to cheaply restrict access or monitor use. The circumstances in which user charging is appropriate are discussed in Section E1 User charging.

Where direct user charging is not possible, tax can sometimes be used as a tool to improve efficiency, if it can more closely align the price of an activity to the individual with the cost of the activity to society (that is, the social cost). Private costs may deviate from social costs as a result of unpriced spillovers (sometimes called externalities). A spillover occurs when a person's actions impose involuntary costs (or benefits) on others. That is, in addition to the private costs and benefits that accrue to the decision-maker, some costs and benefits can 'spill over' on to others. By imposing taxes that reflect the spillover costs, it is sometimes possible to bring the private cost of the activity (which now includes a tax) closer to the social cost (which counts costs and benefits to everybody). Such taxes give people incentives to make better decisions – about when and where to drive, how much alcohol to consume or whether or not to smoke tobacco (see Box E-1: Where tax avoidance is good for society).

### **Box E–1: Where tax avoidance is good for society**

Many taxpayers are happy to contribute their fair share to society, but almost everyone faces incentives to pay less tax. Tax administrators are constantly identifying schemes, loopholes and arrangements that people use to reduce their tax liability. Governments are constantly responding to this by amending the tax law — often making it more complicated and costly for compliant taxpayers.

But there are some taxes that the government wants you to avoid — for example, you can minimise alcohol tax or tobacco excise by drinking less or quitting smoking. Sometimes the government even helps you to do this. For example, government subsidies to help people quit smoking help people avoid tax. Here, the health of Australians is more important than the tax they pay.

A congestion tax works in the same way. People would reduce or avoid it by sharing rides to work, cutting down on unnecessary trips, and using public transport where possible. The government might also help by building additional rail lines or putting on extra buses for otherwise car-dependent communities.

Some trips at busy times will still depend on cars — for these drivers, the tax would be unavoidable. But they should benefit from faster, more reliable trips, as some of those who do have the chance to avoid the congestion tax are no longer on the road. For example, a tradesperson would spend less time in a van, and more time on paying jobs.

While it is easy to identify many activities with spillover costs, a tax will only be an efficient instrument to deal with them if the marginal spillover cost of the activity can be estimated. A tax that recovers the total spillover costs of an activity from those who cause the harm might be seen as equitable (such as a tax imposed under the polluter-pays principle), but it is only efficient if it provides incentives to improve behaviour. If the costs are high but uneven, other instruments such as regulations may be more appropriate (see Box E–2: A fat tax?)

For example, a tax on drinkers to cover the full spillover costs of alcohol abuse may be seen as equitable, but to be efficient it also needs to encourage drinkers to cut down on levels of drinking that do more harm than good to society.

### **Box E–2: A fat tax?**

The National Preventative Health Taskforce (2009, p. 104) has called on the Australian Government to conduct research into policies and tax incentives that would promote the production, access to and consumption of healthier foods. However, this would not be a simple case of imposing a per unit tax on fat, sugar or salt in food.

While obesity does involve significant health and productivity costs, the relationship between these costs and the consumption of particular products is complex. The risk of obesity is affected by lifestyle, such as diet and physical activity, as well as inherited and social influences.

This makes it very difficult to estimate spillover costs, if any, of identifiable foods or food types. In addition, any quantifiable health benefits of imposing the tax would need to be weighed against the loss to those people who are at low risk.



For reasons of practicality, a tax is usually applied only on inputs to the behaviour (an easily measurable commodity) rather than the amount of the spillover cost itself. The less closely related the taxed input is to the spillover cost, the less efficient the tax will be in creating incentives to reduce the costs. For example, taxing petrol to reduce urban congestion is not particularly effective, even though fuel is used in cars that contribute to congestion. New technology might allow better measurement or targeting of spillover costs.

Market-correcting taxes do not provide a ‘free lunch’ or costless revenue for the government. Taxes that cannot directly target spillovers will also impact on and reduce activity that does not give rise to spillovers. For example, a tax on alcohol reduces the spillover costs from abusive consumption, but it also reduces the level of consumption and satisfaction of non-abusive consumers. In determining the net benefits of the tax, governments should consider these broader effects.

Unpriced spillover costs are prevalent in the areas of the environment (see Section E2 Taxes to improve the environment), road transport (see Section E3 Road transport taxes), alcohol (see Section E5 Alcohol taxation) and tobacco (see Section E6 Tobacco taxation).

## Improving individual welfare

As well as addressing spillover costs on other people, governments sometimes seek to influence people’s choices for the purpose of improving their individual long-term wellbeing. This is particularly the case for people with reduced capacity, possibly through reason of age or addiction, to make and execute decisions consistent with their long-term wellbeing.

Addiction is a complex phenomenon, which involves, among other things, highly compulsive use, use despite harmful effects, relapse following abstinence, and cravings (Collins & Lapsley 2008b, p. 10). These effects mean that particularly addictive goods can impair the capacity of individuals to weigh their immediate choices against future consequences. Some goods and services, including alcohol, tobacco and gambling, can be highly addictive for some consumers (see Box E-3: Comparing three potentially harmful and addictive commodities).

Governments use many tools to influence choices, including public education, direct interventions in behaviour, product regulation, product bans and taxation. These interventions have different effects both on the consumption opportunities of individuals, and on their chances of living lives that they value.

Taxation has the potential to improve people’s long-term wellbeing if it provides a price signal that reflects the potential for future harm and possible addiction. People may consume a product excessively if they lack information to assess its harmful properties or if they underestimate the difficulty of giving up an addictive good. A tax can bring these costs forward to the present and potentially prevent a pattern of addiction. But, for a tax to be appropriate, the costs and addictiveness of a particular commodity, and the tendency for people to over-consume it, would have to be both well-understood and be broadly uniform across different individuals.

Non-tax regulations to address these problems can also restrict competition, and therefore create economic rent for suppliers of these goods. Taxation might be capable of capturing this rent.

### **Box E–3: Comparing three potentially harmful and addictive commodities**

Alcohol, tobacco and gambling have different consumption patterns and different effects on their users. The proportion of the population that uses these commodities, uses them at risky levels, and suffers significant damage as the result of using them, varies widely from commodity to commodity. In particular:

- Around 83 per cent of Australians aged over 14 consume some alcohol; around 20 per cent sometimes place themselves at risky or high-risk levels of short-term harm, and around 10 per cent place themselves at risky or high-risk levels of long-term harm (AIHW 2007, p. 37). Surveys from the United States suggest that the top 2.5 per cent of drinkers account for around a quarter of alcohol consumed (Greenfield & Rogers 1999).
- Around 19 per cent of Australians aged over 14 smoke tobacco (at least occasionally); of whom around 86 per cent smoke daily (AIHW 2007, p. 25). A long-term study of smokers in the United Kingdom found that ‘about half of persistent cigarette smokers would eventually be killed by their habit’ (Doll et al. 2004).
- Around 15 per cent of adults gamble regularly, excluding lotteries and scratchies. Of these, roughly one in ten are problem gamblers, who are responsible for a large share of player loss (Productivity Commission 2009a, p. 4.1).

The taxation of such commodities is a complex area, both theoretically and practically. While prices and taxes undoubtedly influence aggregate patterns of consumption — potentially improving the wellbeing of some — they are not well suited to deal with extraordinary forms of human behaviour, and in complex situations can give rise to adverse, unintended consequences. The impact may often fall on the most vulnerable members of the community for whom direct and personal intervention, rather than population-level treatment, is most appropriate.

The appropriateness and efficacy of taxes on alcohol, tobacco and gambling are considered in Sections E5, E6, and E7 respectively.

## **Equity and compensation for specific taxes**

Taxes that are designed to achieve specific social or market outcomes depend on creating incentives for people to adjust their behaviour. They are typically designed without reference to distributive effects, as attempts to shield one group from the effect of the tax means that the spillover costs continue to be borne by another group.

The distributional consequences of market-correcting taxes must, of course, be taken into account. In many cases, it may be judged desirable to compensate affected groups for the loss of purchasing power. However, this should be done using the most appropriate tool. The personal tax and transfer system is generally the most effective way of redistributing income through society, and therefore will often be an appropriate way to compensate taxpayers and

transfer recipients for increased taxation on specific goods and services to reduce the costs of market failures.

In other cases, specific compensation to particular groups might be provided by way of specific outlays – for example, additional investment in public transport infrastructure in specific locations may provide a geographically targeted form of compensation for congestion charges.

Another equity-based argument for taxing specific commodities is that the social costs of an activity that harms some people should be borne by those who engage in the activity rather than those who do not. This is essentially an argument based on transferring some of the responsibility for harm to all users of a commodity.

For example, society permits smoking, but arguably requires that smokers collectively must meet the social costs (such as public health costs) that arise, even though not every smoker will ultimately impose those costs. There is also an equity argument that non-smokers should bear some of their own costs. Such arguments operate independently of efficiency considerations, and the scope of their application relies on social and political judgments.

While the main purpose of the taxes and charges discussed in this section should be to align social and private incentives – fundamentally an efficiency purpose – equity arguments are influential in the design of some taxes, particularly those colloquially referred to as ‘sin’ taxes.

## Ensuring sustainability

The rates of taxes designed to improve market allocations should be set by reference to marginal spillover costs, not a revenue target. When a tax is used as an instrument of regulation, its goal is to change relative prices faced by producers and consumers, not to fund specific spending programs.

However, because the tax necessarily raises revenue, there may also be a perceived conflict between the revenue-raising potential of taxation, and the desire to improve market outcomes. This can make it hard for governments to introduce such taxes, or to keep the tax rate close to an efficient level (in the case of congestion, for example). For this reason, institutional arrangements to monitor spillover costs and systematically monitor taxes in this area are essential (see Section G5 Monitoring and reporting on the system).

While this Report concentrates on taxation, it is only one policy instrument available to governments. The appropriateness of taxation should be assessed in the context of the costs and benefits of other, potentially more targeted forms of both supply-side and demand-side regulation, public information and specific spending programs.

### Principle

Taxes on specific goods and services can be used to influence relative prices faced by consumers, in order to address spillover costs, or self-control problems related to highly harmful and addictive goods and services.



# E1. User charging

## Key points

Public goods should generally be funded from broad-based taxes. However, user charging can be an efficient means of financing some government-provided goods and services and of rationing individual access to community resources.

For user charging to be efficient, the user needs to be charged the cost that consuming the good or service imposes on others. This cost will often be what a well-functioning market would charge, but might need to be higher or lower depending on whether there are wider social costs or benefits.

Australian governments do not employ user charging as much as they should, particularly for natural resources. User charging should generally not be used to fund public goods, as users do not directly impose costs on others.

If it is possible to exclude some people from access to a public good, there is potential for it to be financed by a tax set by the direct beneficiaries (such as many agricultural levies). Importantly, this provides a means for the beneficiaries to reveal how much they value the public good.

Taxes and regulations can also be used to correct for spillover costs. Regulatory costs should be recovered from those who are best able to reduce the social costs the regulation is targeting. This will often, but not always, be those who impose on others the costs that lead to the need for regulation.

## E1-1 User charging and taxation

Tax revenue is described by the Australian Bureau of Statistics as 'revenue arising from compulsory levies imposed by government. There is usually no clear and direct link between payment of taxes and the provision of goods and services ...' (ABS 2005a). In contrast, user charges are voluntary and requited (that is, the person who pays the charges gets something specific in return). In many cases, the distinction is easy to see. Most people would see that there is no direct link between paying income tax and an entitlement to public health and education services. In other cases, the distinction is less clear. For example, while paying a congestion toll means that a driver can drive on a less congested road, many people would value the time they save less than the fee they have paid, even though society as a whole is better off. A congestion toll therefore combines elements of user charge (the benefit of the time saving to the payer) and tax (the benefit to others). See Section E3 (Road transport taxes) for more detail on congestion charging.

The distinction between user charges and taxation is important because user charges tend to provide positive work and saving incentives, while taxes do not. Further, user charges represent voluntary exchanges, while taxes rely on the coercive powers of the government.

Making transparent the distinction between taxes and user charges is therefore important if citizens are to be able to hold their governments accountable.

What probably matters most, however, is whether the government is reflecting the social costs and benefits of the goods and services it is providing when it sets prices, regardless of whether the revenue raised through those prices is classified as tax revenue or user charges.

The Australian and State governments also levy a number of minor taxes. Many apply to narrow bases and are motivated by specific social or industry policy objectives. Many appear to have been introduced as 'user charges' for government-provided goods or services, although in some cases it is not at all clear that they do function as such. This section sets out a framework for assessing user charging arrangements and minor taxes that may appear to function like user charges. Section E8 (Rationalising other taxes) addresses insurance taxes, luxury car tax, tariffs and minor taxes specifically.

### **What is efficient pricing of government-supplied goods and services?**

The key criteria for determining how to price government-supplied goods or services efficiently are:

- rivalry — that is, the extent to which consumption by one person affects the consumption opportunities of others; and
- excludability — that is, whether people can feasibly be prevented from enjoying the goods and services in question.

For example, it is currently not feasible to charge a car for driving on a remote country road (that is, it is not excludable), and such a trip would generally not affect anyone else's ability to use the road (that is, it is non-rivalrous). Many country roads therefore have the attributes of a 'public good'. However, cars compete for road space in the central business district of a large city during peak hours. The presence of congestion, as well as available tolling technologies, reduces the 'publicness' of some roads (see Section E3 Road transport taxes). Different goods (and services) can be categorised according to their degree of rivalry and excludability.

- Public goods, such as national security, are both non-rivalrous — access by one person to the benefits of national security does not diminish the benefits to other people — and non-excludable — it is not possible to exclude anyone in the country from the benefits of national security. Thus, these cannot be charged for and should be funded out of taxes.
- Club goods, such as a suburban swimming pool, are non-rivalrous — there is enough space for everyone to enjoy the pool (except on very hot days) — but excludable — you need a ticket to enter.
- Common pool goods, such as fishing grounds, are rivalrous — past a certain point, an additional fisher reduces the fish available to others — but may be non-excludable for various reasons, for example, if it is unclear who owns the property rights.
- Private goods, such as apples, are both rivalrous (only one person can eat a particular apple) and excludable (the owner of an apple can prevent others from eating it).

In general, markets will price private goods appropriately — sellers and buyers have incentives to reveal how much they value them. If they do not reveal their preferences, their competitors will get more business or other consumers will buy the goods and services instead.

Governments sometimes choose to finance the provision of private goods, such as electricity or postal services. (The term ‘private’ here does not refer to whether a company or government is the supplier, but the physical qualities of rivalry and excludability.) They may do so for many reasons, such as a community concern that people should consume more (or less) of a particular product than they would if left to the market, or that particular markets are unfair because their operation makes it impossible for people to develop the capabilities they need. Sometimes governments may be concerned about businesses making excess profits from undue market power. At others times, the provision of private goods may be a legacy of historical factors.

Providing public goods is a core function of government, mainly because markets tend to fail — sometimes dismally — to supply sufficient amounts of public goods. Markets undersupply public goods because people have an incentive to hide how much they value them in the hope others will pay for them — this is known as the ‘free rider’ problem. For example, if a single voter is asked to contribute to defence spending, they would have an incentive to under-report their own valuation of defence, knowing that if they pay for some defence the benefit would be shared with 22 million other Australians. Individual voters can free ride on payments for defence made by other people. In contrast, if the voter buys an apple they know that they will get all the benefit and will not be obliged to share it with others. People cannot free ride on the purchase of apples by others.

When a good or service is non-rivalrous there can be significant social benefits from some form of co-operative collective decision making about how much should be produced. This is because when a non-rivalrous good is produced, everyone can benefit from it at no cost. When a good or service is non-excludable, individuals have incentives to act individually and unco-operatively. Each person is tempted to exploit the commons for their own direct wants and needs.

Governments therefore have a clear role in financing the provision of public goods. They should generally not charge for public goods because, as they are non-rivalrous, it would be wasteful to discourage someone who wants a public good from accessing it.

In some cases, the appropriate pricing regime is not easy to determine because very similar goods and services may call for significantly different prices. For example, the Australian Bureau of Statistics (ABS) provides statistical releases on the internet at no charge. This information has some of the characteristics of a public good. Charging for access to the data would mean some people who value it would not use it, even though there is no material cost to the ABS (and the taxpayer) once the data is compiled.

In contrast, users who want the same information in book form do need to pay a user charge. Only a limited number of people can read a book at one time, making it rivalrous in consumption. Charging for the (marginal) cost of providing the book encourages people to reveal how much they value it, as well as providing the ABS with information on how many to print. This means the book goes to those who value it most and the right amount of resources is more likely to be devoted to supplying it. Importantly, as well as sending signals



about value to producers and consumers, user charging relieves the need for the book to be financed from revenue collected through other economically inefficient taxes.

A simple categorisation is illustrated in Chart E1-1, with a suggested funding mechanism for each type of good or service.

**Chart E1-1: Funding public goods**

	Rival in consumption	Non-rival in consumption
Excludable	<b>Private good</b> e.g. apples [user charge]	<b>Club good</b> e.g. agricultural levies [beneficiary taxation]
Non-excludable	<b>Common pool resource</b> e.g. fisheries, forests [user charge]	<b>Public good</b> e.g. national defence [general tax or corrective tax/regulation]

Of course, this is only a starting point for setting prices for government goods and services. Many goods have 'mixed' attributes that make efficient pricing difficult. A country road is close to a public good, whereas when it branches off to a specific farmhouse it becomes more like a private good. A local road system has the attributes of a club good, whereas when it becomes congested it is more like a common pool resource. This means that the ability to appropriately price goods is often limited by transaction costs, such as the costs of pricing technology or other administrative costs. Policy makers need to consider the costs of collecting and enforcing user charges or narrowly based taxes. It is unlikely to be worth the trouble or cost to set up congestion pricing system on a country road. This means charges may not fully reflect their marginal (social) cost – all drivers are charged the same price. Businesses make such decisions all the time. For example, some insurers have only recently moved to charging drivers premiums based on their actual mileage even though this is a relevant indicator of the chance of a claim. Those insurers that are not offering such a policy have effectively made the decision that it is too costly to remove existing cross-subsidises from short to long distance customers.

When such decisions reflect commercial choices, resources are likely to be allocated efficiently. However, governments sometimes make these decisions for equity or other reasons. For example, some States charge compulsory third party motor vehicle insurance without reference to actuarial risks, implying significant transfers between drivers unrelated to reducing transaction costs. There may also be 'second-best' reasons why full optimal pricing may not be appropriate. Sometimes problems in other markets influence the ability to set prices for some goods and services. For example, public transport may need to be subsidised so long as roads continue to be provided 'free' to users. Another example is a waste disposal fee that needs to be set with reference to the risk of illegal dumping.

Governments may also have other social objectives (apart from efficiency) for setting prices, such as a desire to provide merit goods or achieve equity objectives by helping people to develop the capabilities they need (see Box E1-1). Whenever prices are set for any but commercial reasons, the purpose and value of implied transfers should be transparent to the community.



### Box E1–1: User charging in Australia's health care system

While most government-provided health care is free to users, some parts of the system do have some form of user charging. For example, the Australian government requires people to make a co-payment for pharmaceuticals under the Pharmaceutical Benefits Scheme, and the States charge for some services, such as ambulance transport. Individuals and families may also pay user charges to non-government health care providers; for example, by paying for a private hospital visit or for private health insurance, although these premiums may be subsidised.

A mixture of charging arrangements is appropriate as health care can be considered to be a public, private or merit good. Charging for a public good, such as medical research, is often not efficient as it is not possible to exclude people from benefiting and the benefits provided are generally not constrained by the number of people receiving them. Charging for private goods — such as a private room in hospital — can support the efficient supply of health care by ensuring that the services provided respond to the price people are prepared to pay. However, even though some goods may appear to have private benefits, certain types of health care, such as child health, can also be considered a merit good that people should be able to obtain regardless of their personal preference or ability to pay. For example, full user charging may not be appropriate where health care generates spillover benefits, or where user charges may restrict access to goods and services deemed important for public policy reasons, or where they would impose high costs on those with high needs.

Where full user charging is not appropriate, partial charging (such as co-payments), safety nets and direct government transfers can also play a role in supporting access to health care services. While these mechanisms deliver a weaker price signal than full user charging, the value of these arrangements is that they still provide a price signal to users but are less of a barrier to access and also protect people from high health care costs.

## E1–2 User charging for common pool resources

Another reason why it is difficult to determine how to price many government goods and services is that the same good can be partly private and partly public. In particular, many natural resources are 'common pool'; that is, they provide common benefits to everyone, but unless potential users can be excluded, individuals have an incentive to over-exploit them.

Common pool resources — such as fisheries, underground water and forests — include a range of environmental assets managed by the government on behalf of current and future Australians (see Section E2 Taxes to improve the environment). Without government intervention, individuals may use such assets without taking into account the fact that by doing so they reduce other people's access to them. This can result in a 'tragedy of the commons', where assets are over-exploited and may, in the worst cases, disappear altogether.

Such problems can be addressed by creating property rights over the 'commons'. This relies both on the availability of technology to exclude users and on the community allowing the imposition of a charge for what it previously considered 'free'. A property right enables its owner to exclude users and charge them for any use that reduces the value of the resource.

Set properly, the right will internalise any spillover costs so the owner has an incentive to maintain the environmental value. This has been a common solution to many current environmental problems — such as the over-exploitation of northern fisheries and water in the Murray-Darling Basin, possibly because it often provides existing users with a share of the asset, satisfying community expectations of fairness.

Alternatively, governments can maintain ownership of community resources and impose regulatory fees or charges to ration their use. Setting the optimal price can be difficult because the marginal social cost may not always be apparent (see Box E1-2).

### **Box E1-2: Broadcasting licence fees**

The radio spectrum is an example of a common pool resource — without some form of regulation, individuals would have an incentive to congest the airwaves, reducing the benefit to society overall.

Broadcasting licence fees charge broadcasters for access to the bands of the radio communication spectrum that are primarily used for commercial television and radio services. Legislative restrictions on the number of licences made available also create large economic rents for the small number of licensees. Licence fees are imposed as a means of charging for access to the spectrum and recouping the rents. In 2008–09, approximately \$311 million was collected in fees: \$287 million from 55 television licences and \$24 million from 273 radio licences (ACMA 2009).

Licence fees are based on a percentage of gross earnings from broadcasting advertisements, calculated in accordance with an increasing scale under which the ratio of fee to earnings rises with earnings.<sup>1</sup> There is, however, no clear link between the fee and either the amount of spectrum that is being provided or the economic rents accruing to the licensee. Other users of spectrum pay fees for the right to use spectrum via auctions or annual taxes based on the amount of spectrum used.

The current broadcasting spectrum licence fees are unlikely to reflect the opportunity cost of spectrum and could be leaving significant economic rents to licence recipients. Charging broadcasters a fee based on spectrum use (possibly through an auction) would bring them into line with other commercial spectrum users and would encourage more efficient use of the spectrum.

Charges are particularly important for natural resource management. An environmental 'user charge' reflects the costs that individuals impose on others by exploiting common pool resources. Importantly, the user charge should not reflect the free market price. That would simply replace failing market prices with failing government user charges. For example, governments should not sell their forest timber at prices set by markets in which timber is over-exploited due to the 'tragedy of the commons'. Rather, the price should reflect the market value given sustainable management of the common pool resource.

One way to think of it is that the appropriate user charge would be similar to the price that owners with secure property rights, such as a single profit-seeking owner of the whole resource, might charge even if they were unconcerned with any environmental benefits to

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1 Section 6 of the *Television Licence Fees Act 1964* provides details of the methodology for calculating licence fees.

the wider community. In such circumstances, the monopolist (including a possible government owner) would have an incentive to maintain the sustainability of the natural resource and would charge accordingly. This should be the minimum value that Australians expect to receive for the sale of such resources (see Box E1-3).

Of course, even a price that reflects a sustainable timber yield may not reflect the full social value of timber. To the extent that there are wider public benefits from protecting some natural resources more than others, additional taxes, regulation or subsidies are likely to be needed. For example, some forest habitats may have particularly important ecosystems that make them particularly valuable to the wider society.

A sustainable system of taxes and charges should ensure that decisions to harvest native flora and fauna are informed by the environmental and social costs that harvesting can cause. In regulating harvesting activities, it is important for governments to assume that these costs are not negligible. At a minimum, governments should ensure that harvesting does not threaten biodiversity. A socially optimal level of harvesting could be delivered through a pricing structure that appropriately reflects environmental and social value.

Past governments have failed to charge appropriately for the private harvesting of flora and fauna. This has encouraged an unsustainable rate of harvesting, which has led to many species becoming vulnerable, endangered or extinct. In some cases, governments have even charged a negative price through the provision of bounties. For example, bounties were paid on 2,184 thylacines (Tasmanian tigers) prior to the species' extinction. In New South Wales, the bounties paid on more than half a million brush-tailed rock wallabies from 1884 to 1914 have contributed to the species' current listing as vulnerable. Intensive hunting by fur traders of the yellow-footed rock wallaby in South Australia in the 19th century is another example of species overexploitation that could have been avoided through the setting of an appropriate price (DEWHA 2009).

The absence of an appropriate pricing structure has enabled commercial activities to be conducted at an unsustainable rate. For example, commercial harvesting of the *cycas megacarpa* (a native Queensland cycad) for its starch has contributed to the plant becoming an endangered species (DEWHA 2009). Similarly, while concentrated commercial fishing of orange roughy began only in the late 1980s, it was harvested at an unsustainable rate. It took less than 20 years for it to become the first commercially harvested fish to be listed under the *Environment Protection and Biodiversity Conservation Act 1999* (DEWHA 2007).

### Box E1–3: Does Forestry Tasmania charge users of forests appropriately?

Tasmanian forests have important social and environmental value for all Australians. Forestry Tasmania is a State-owned enterprise, managing around 1.5 million hectares of forests for commercial, recreational and sustainability purposes.

The financial returns of Forestry Tasmania have been consistently below the risk-free rate of return (Productivity Commission 2006b and 2007).<sup>2</sup> This is difficult to reconcile with the fact that it is largely a monopoly supplier of timber, but probably reflects the strong industry focus in how it harvests and prices timber.

Forestry Tasmania harvests its forests according to a sustained yield forest management technique designed to yield the maximum annual volume of wood from a forest in perpetuity. This may have some poor outcomes for the environment, including:

- forests with negative net returns are harvested along with forests with positive returns, as little account is taken of the market price of the timber or its social value;
- harvesting a constant amount of timber each year can lead to inefficiencies, as markets are constantly changing, with prices changing frequently. As a result, social returns may be higher overall if more trees were cut down in high price periods and fewer in low price periods; and
- it may lead to a greater loss of environmental values than under alternative models of forest management as some age classes of wood, especially old growth timber, may be harvested more quickly (Moran et al. 1991, pp. 110–111).

The pricing of the timber may also reflect commercial, over more sustainable, objectives.

The conventional technique used to price native timber in Australia is the residual value pricing method (Marsden Jacob Associates 2001). This disregards the actual price of timber and instead estimates a derived demand for a timber mill by subtracting 'reasonable' costs from the prevailing market price, including an allowance for 'normal' profit. Generally, sawmills and chippers receive the same margin for each tree, regardless of the fluctuations in the market price or variances in costs between trees. The residual value method means that if prices are low, native timber can be sold at a price below its cost of 'production'. This underpricing of timber increases the rate at which native forests are logged, especially in remote areas (Marsden Jacob Associates 2001). Further, prices are generally determined through closed-door bilateral negotiations, and the public is not told what the forest (a public asset) is being sold for. This lack of transparency makes it hard for the public to determine whether they are obtaining an adequate rate of return on timber from the native forest.

Moreover, the residual value method implicitly attaches a zero value to any environmental amenity associated with the forest. If the world price of pulp is sufficiently low, even a 500 year old tree will be sold for nothing — whatever environmental amenity it might be yielding.

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2 The 10-year Australian Government bond rate is widely used as the risk-free return benchmark. The average rate of return on 10-year Australian Government bonds in 2005–06 was 5.4 per cent (Productivity Commission 2007).

## Principles

Users of rivalrous goods and services should be charged a price that reflects the value from denying the consumption to others. In many cases, this will reflect the market price.

Governments should presume that all native flora and fauna, for which they are custodian, have a positive environmental value. A sufficiently high price should be charged to those authorised to harvest native flora or fauna, to ensure that the rate of exploitation does not exceed what is socially optimal.

User charging means producers are more likely to supply, and consumers more likely to value, the good or service appropriately.

Importantly, user charging relieves the need for publicly provided private goods to be funded by taxes, which are distortionary.

If governments wish to intervene in markets where there are wider social benefits (or costs) from using particular goods or services — for example, where the goods or services help people develop the capabilities they need — they should use transparent mechanisms such as subsidies or taxes.

The size and purpose of cross-subsidies within user charges — apart from those that reduce transaction costs — should be transparent to the community.

## E1–3 Charging for club goods can reveal how much people value them

‘Club goods’ are a special type of non-rivalrous, but excludable good which can often be provided in markets. All you need to make television excludable is a scrambler and coaxial cable. By charging for an inherently non-rivalrous good — one person watching does not reduce the ability of others to watch — such goods can be left to markets. Other goods may be excludable because their spillover effects are geographically limited, so only those who live in the immediate region benefit from the spending. This is one of the arguments for levying council rates on land (see Section G3 Local government). Governments can assist in the provision of club goods by allowing the imposition of compulsory fees on certain groups, with the rate set by the beneficiaries from the spending. In effect, the tax provides a signal for how much of a local public good is demanded. These arrangements are relatively prevalent in agriculture due to the organised nature of producers and limited spillovers between industries.

### Agricultural levies

The Australian government imposes a large number of agricultural levies — 66 at December 2008 (see Table E1-1). Most of these taxes are imposed at a particular rate per unit of production. For example, cherry production is taxed at \$0.07 per kilo and exported buffalo are taxed at \$4.60 per head. Some important goods, however, are taxed at a particular percentage of value, including wheat, vegetables, wool, exported wine, barley, oats and legumes. The levies are administered by the Department of Agriculture, Fisheries and Forestry.

In total, agricultural levies raised \$594 million in 2007–08. These levies are typically charged at very low rates, resulting in very low revenue collection — 33 of these taxes collect, in total, less than \$1 million per year. The administration costs of collecting the smaller levies can be very high. At the highest end, the collection costs of the Queen Bee Levy amounted to 38 per cent of the revenue collected by it, while the collection cost of a number of levies was less than 1 per cent of the revenue (Levies Revenue Service 2008).

**Table E1–1: Agricultural levies**

Levy	Collections 2007–08 (\$m)	Levy (continued)	Collections 2007–08 (\$m) (continued)
Beef production	9.44	Apple and pear	4.96
Buffalo slaughter	0.02	Avocado	3.37
Cattle transaction	70.29	Cherry	0.50
Deer	0.06	Chestnut	0.05
Goat fibre	0.02	Citrus	1.69
Goat slaughter	0.07	Custard apple	0.08
Goat transaction	0.48	Dried fruits	0.35
Live animal export	4.38	Honey	0.46
Live animal export recovery	0.33	Lychee	0.19
Livestock slaughter	3.40	Macadamia	3.51
Livestock transaction	34.62	Mango	0.85
Pig slaughter	13.36	Mushrooms	2.11
Wool	45.10	Nashi	0.09
Egg promotion	3.40	Nursery products	1.93
Laying chicken	0.90	Onions	0.39
Meat chicken	1.39	Papaya	0.20
Coarse grains	26.18	Passionfruit	0.08
Cotton research	1.99	Persimmons	0.10
Grain legumes	4.73	Potato	1.00
Oilseeds	6.33	Rubus	0.05
Pasture seeds	0.15	Stone fruit	0.96
Rice	0.50	Strawberry	0.49
Sugar cane research	4.82	Table grapes	1.02
Sugar reform	0.01	Turf	0.54
Wheat	41.34	Vegetable	6.34
Wheat export	1.52	AFMA(a)	9.57
Grape research	2.80	AVPMA(b)	1.45
Wine export	2.90	Macropod	0.13
Wine grape	9.64	NRS(c) — game pigs	0.04
All milk	28.34	NRS — horses	0.05
Dairy adjustment(d)	228.10	NRS — ratite slaughter	0.02
Forestry	4.62	Prawn	0.11
Almond	0.46	Queen bee	0.01
<b>Total</b>			<b>594.86</b>

(a) Australian Fisheries Management Authority.

(b) Australian Pesticides and Veterinary Medicines Authority.

(c) National Residue Survey.

(d) This levy ceased to operate in February 2009.

The levies fund industry-specific research and development. Most levies have been established at the request of industry participants. Many agricultural industries comprise a large number of producers, each of which accounts for only a small share of a fairly



homogeneous industry output. This makes it difficult for a producer to capture all the benefit from research and development for which it pays individually. First, a small producer may be unable to raise the funding, or bear the risk, associated with a large research project. Second, intellectual property rights may not be robust enough to ensure that a producer gains all the benefit of its research and development; for example, it may not be possible to patent or copyright an idea or technique that is not embodied in a machine or software. By collecting a levy from all producers in an industry, it is possible to ensure that all producers share both the costs and the benefits.

For example, a single cotton grower is unlikely to appropriate all the benefits from private research into better sowing methods – other growers would be able to free ride on its innovation. The Australian government therefore taxes all cotton growers to fund the Cotton Research and Development Corporation which shares the results of its research for the benefit of all growers.

In most cases, the government sets the structure and rates of tax on advice from the relevant industry. For this reason, it is a relatively good way of revealing producers' collective judgement on funding levels, although individual producers may have varying preferences. Since the imposition of these levies involves the exercise of compulsory powers by the government, it is important that they do not disadvantage individual producers or particular classes of producers. For example, in some industries a particular type of research might be irrelevant to small producers, even though they are obliged to pay the levy at the same rate as large producers. However, the relative ease with which levies can be established provides a measure of flexibility. The Queen Bee levy, for example, was introduced when queen bee producers left the Honey Levy in 2003.

In most cases, the Australian government matches the amount collected from the levy, dollar for dollar. Such matching funding is not necessary to overcome the spillover problem and instead appears to constitute industry support.

### Principles

For taxing club goods to be feasible, the public good needs to be local and excludable; that is, the beneficiaries need to be identifiable.

The rate of tax for a club good needs to be set by a majority of those directly bearing the legal incidence of the tax.

Any government subsidy associated with club good taxation should be based on any social benefits (beyond the immediate group of taxpayers) that arise from the funded activity.

## E1–4 Public goods should generally be financed from broad-based taxes

In general, tax revenue should be raised from one of the broad tax bases of income, consumption and land. The broader the base, the lower the rate needed to raise a given amount of revenue and the lower the efficiency costs of doing so.

## Market failure can be addressed by taxation

There is a strong case for governments to use policy instruments, such as taxation and regulation, to address market failures. Where some activities result in unintended costs being imposed on others (spillover costs), there may be a role for a tax or regulatory fee. A 'public bad' is an extreme form of negative spillover where the same 'bad' imposes costs on everyone. The case for using taxation to target negative spillovers is discussed in Section E2 Taxes to improve the environment. Generally, taxation can be an appropriate tool for addressing negative spillovers where the social cost can be targeted and is highly correlated with a taxable activity.

Regulation can be used in a similar way to correct negative spillovers. For example, regulation of food preparation may mean an unhygienic restaurant faces sanction for causing harm to others, such as illness for its customers and loss of reputation for similar restaurants. Ideally, the unhygienic restaurant would face costs commensurate with the marginal social cost it imposes: the greater the risks it imposes, the more severe should be the costs.

Regulation can impose costs on people by enforcing a particular standard — for example, the unhygienic eatery needs to employ another cleaner — or by charging a fee or fine. To be efficient, the standards, fee or fine need to reflect the spillover cost. Ideally, restaurants that do not impose spillover costs should face little or no regulatory costs.

When regulatory costs are out of all proportion to actual social costs, they take on the attributes of a tax designed to raise revenue, rather than a regulatory cost correcting for a market failure. In some cases, charges that purport to recover the costs of regulation do so imperfectly and do less than they could to secure the efficient allocation of resources by the regulated industry (see Box E1–4).

### Box E1–4: Passenger movement charge

The Passenger Movement Charge (PMC) is a fee of \$47 imposed on passengers departing Australia. It raised \$420 million in 2007–08.

The PMC was originally introduced to recover the costs of customs, immigration and quarantine processing of passengers entering and leaving Australia, as well as the cost of issuing short-term visitor visas (Senate Standing Committee on Legal and Constitutional Affairs 2008). However, the charge does not recover all the costs of border services, nor does it reflect specific costs. It falls primarily on international passengers and international airlines even though airports, cargo planes and domestic passengers — as well as the broader community — all contribute to the need for border services and benefit from them.

As the PMC does not provide meaningful price signals related to the costs or risks associated with border protection, and is on a relatively narrow base, other sources of tax revenue would be more efficient. Further, the funding provided by the charge may impede the adoption of more efficient cost recovery, such as charging airports directly for some of these services.



The regulatory cost acts like a tax even if the regulation is imposed by standards, rather than fees or fines. If a restaurant is forced to adopt costly procedures — such as new equipment or additional staff — that have no effect on hygiene, then this becomes income to those who provide such goods or services to the restaurant. Alternatively, the restaurant would have an incentive to invest in improving hygiene up to the point where the costs are around the same as any potential fine. In the absence of uncertainty, a fee and a standard would produce similar outcomes. However, where there is uncertainty about how much a business would need to spend to meet a standard, imposing a fee is likely to be more appropriate. Similarly, where there is uncertainty about the size of the costs imposed on others, setting a minimum standard is likely to be most efficient.

Recovering regulatory costs from those who cause the spillover effects has a number of advantages. First, so long as regulatory services are supplied efficiently, regulatory fees or fines should recover the marginal costs of the activity that can be attributed to particular producers (or consumers). These costs will then feed into the prices of the final goods and services (see Box E1-5). Otherwise, the goods or services would be too cheap and too much would be produced and consumed. For example, if the costs of quarantine were not recovered properly, then imported goods and services posing risks to the community would have a competitive advantage over other, less risky goods. Included in the attributable costs should be any administration costs from the regulation. Regulatory administration costs should be cost-recovered, since they are one part of the social costs that the community bears from quarantining goods. In the absence of the spillover, those administrative resources could be used elsewhere.

#### **Box E1-5: Recovering the costs of regulation**

Where there is a market failure, due, for example, to information asymmetry about the standard of food preparation, regulation can play an important role in enhancing the wellbeing of society. Without such intervention a number of transactions which would improve each party's wellbeing would not occur as, due to the information asymmetry, one party would not be sure of the quality of the product they were purchasing (even though it actually meets their requirements).

Therefore, government regulation of the market reassures consumers that the product they are purchasing will be of an acceptable standard. Correcting this market failure provides benefits to both the producer (who will be able to sell more) and to those consumers who will either avoid purchasing poor products or now consume where before they would not.

However, regulations are not costless — resources to design, implement and enforce them need funding. Using general taxation to fund this cost is both inequitable and inefficient. It is inequitable, as it imposes a cost on people for regulating this market even though they do not benefit from the transactions occurring in it. It is inefficient, as those operating in the market would not face the true cost of their activities, and hence more than the socially optimal amount would be produced and consumed.

### **Box E1–5: Recovering the costs of regulation (continued)**

A better alternative is for the beneficiaries of the regulation (that is, the producers and consumers of the product) to bear the cost associated with it. It is generally most cost effective if the producer faces such charges, with the true economic cost of the regulation likely shared between the producers and consumers, depending on the elasticities of the product demand and supply (which determines the extent to which producers can pass on the cost of the regulation).

Importantly, these costs should not be over-recovered as this would constitute a tax on the particular product. This would reduce transactions that would otherwise generate value for each party, thereby reducing their wellbeing and that of society as a whole.

Second, recovering regulatory costs means that businesses can take steps to reduce the need for regulatory services (or other businesses can compete to provide the relevant goods or services in less risky ways). When regulatory services are funded from taxes, regulated industries do not face the full social costs of their actions. Businesses with riskier practices pay no more than businesses that are successful at managing risk. In the face of competition, businesses that spend money on effective risk management are worse off (see Box E1–6). This increases the burden on both the regulator and the taxpayer.

Finally, those who pay regulatory charges have an incentive to monitor the quality of the regulatory services and lobby government for better services or lower costs. This reduces the likelihood that regulatory services will be provided inefficiently.

### **Box E1–6: Recovering the costs of the Civil Aviation Safety Authority**

The Australian government taxes gasoline and kerosene used in domestic aviation. In 2007–08, the aviation fuel excise rate was \$0.02854 per litre and raised around \$75 million in revenue. The revenue is allocated to the Civil Aviation Safety Authority (CASA), which sets and enforces safety standards for the civil aviation sector. It constitutes around one half of CASA's total net resourcing.

CASA ensures aviation safety through operational surveillance, spot checks and audits, based on the risk profile of the organisation. A large, complex charter operation is inspected more often than an aerial work operation with only an occasional charter. However, since half of CASA financing comes from taxing aviation fuel used in domestic flights, airlines pay for regulation according to how much fuel they use on domestic trips, no matter how risky their operations are. Reforming CASA fees to recover costs from those requiring tighter regulation (and therefore imposing the spillover costs) would improve the efficiency of the airline industry.

However, the introduction of taxes, fees or charges that better reflect risk may have unintended effects on existing players. For example, in the case of aviation it might reduce the costs of larger airlines (who currently bear a large part of the aviation fuel excise), but increase the costs of smaller charter operations that service regional and remote communities. To the extent that such services are considered socially important — for example, because they ensure access to medical services — they could be funded directly from the budget, rather than aviation excise.

At times, governments may not want to charge for regulatory services because that would conflict with other social goals, such as concerns for equity. In addition, some forms of regulation are not attributable to a specific negative spillover. In such cases, a regulatory fee acts like a relatively inefficient type of tax. For example, governments sometimes encourage pooling of losses in some markets subject to insurance market failures. Examples include some small State taxes on the sale of cattle, sheep and goats (or their carcasses) to compensate pastoralists in case they are obliged to destroy their stock because of an outbreak of disease. Most States charge compulsory third-party insurance at fixed fees, but because risks vary across drivers, this means that low-risk drivers are subsidising high-risk drivers. In contrast, New South Wales imposes compulsory third party insurance, but with actuarially based fees. These appear to be cost recovery regulatory charges.

If regulation is effective and delivered at least cost, all market participants can potentially be better off. But regulation often benefits certain market participants more than others, leading to some redistribution. The worst types of regulation may harm community welfare while benefiting sectional interest groups. In such cases, regulation is like a tax where all of the revenue flows to a particular group.

### Principles

Public goods should generally not be charged for, but financed through general taxation.

Government costs associated with the administration and enforcement of regulation should be recovered by targeted charges or taxes, rather than being funded out of general tax revenue.

Cost recovery taxes should be levied on the parties who are best able to reduce the external costs of an activity. This is normally, but not necessarily, the parties whose activities impose costs on others.

Cost recovery taxes need to be subject to regular and systematic review to ensure that they reflect the cost of providing the regulatory service and that the service is provided in the least costly way.

### Narrow-based taxes may be a high cost way to finance spending

Narrow-based taxes that do not target social cost or provide signals on the value of a public good are no more than a relatively high cost means of raising revenue. Two types of relatively narrow-based taxes that are sometimes used are universal service obligation (USO) levies and industry restructuring levies.

#### Universal service obligations

Governments can impose USOs on some service providers, such as phone, electricity and postal services. USOs can require the provider to provide a service to a particular standard or to certain groups. This requirement needs to be financed by higher charges imposed on customers. By requiring certain users of a good or service to cross-subsidise others, the USO taxes one group and transfers revenue to another.

Where they are used, such arrangements should be made transparent to the community; for example, in government financial statements (see Box E1-7). As the USO 'tax' is on a relatively narrow base, they are likely to be relatively inefficient. Other ways of funding the USO subsidy should therefore be considered.

#### **Box E1-7: Telstra's universal service obligation**

The Telstra universal service obligation (USO) aims to ensure that standard telephone services and related services are accessible to all people in Australia for the same price. Telstra provides these services at a standard price in areas where it is not commercially viable to do so. All carriers, including Telstra, are then levied to contribute to Telstra's costs, which are determined by the Minister on advice from the Australian Communications and Media Authority (totalling \$145 million in 2007-08).

These arrangements mean that people in cities pay taxes on their telephone bills in order to subsidise regional phone calls. The Budget includes the USO as a tax (paid by all carriers, including Telstra) and a subsidy (paid to Telstra).

#### **Levies to fund industry adjustment**

Australian governments have sometimes hypothecated narrow-based taxes to particular industry adjustment programs. A recent example is the Australian government's Dairy Adjustment Levy, imposed on milk sales by processors to retailers on a cents per litre basis. The funds raised were used to fund structural adjustment in the dairy industry. The levy raised \$228 million in 2007-08 and ceased to operate in February 2009 (Parliament of Australia 2008).

Taxes of this type have much in common with minor taxes used to fund access to essential services for particular groups, such as USOs. They tend to be narrow-based taxes with relatively high efficiency costs. The fact that consumers of milk will benefit from dairy industry restructuring does not justify imposing a levy on them. Raising the consumer price for milk does not send a price signal that reduces social costs. Rather, it imposes higher costs on society as a whole than would be imposed by raising the revenue needed to fund industry restructuring through broad-based revenue-raising taxes.

Industry-specific levies can be efficiency enhancing when they replace existing regulatory barriers that are more costly. This is one reason why the World Trade Organisation supports introducing tariffs to the extent they replace non-tariff barriers. Such regulatory barriers can be more costly as regulations may not allow lower-cost producers to enhance their output. Regulatory barriers can also deliver benefits to existing industry participants, rather than providing revenue to the government. For example, replacing the existing regulatory burden on taxis with an industry-specific tax hypothecated to licence holders would be a more transparent means of maintaining the existing system, while allowing some improvement in services (see Section E3 Road transport taxes).

### **Principles**

Narrow-based taxes that do not target social costs are a relatively high-cost means of raising revenue.

The value of transfers provided through universal service obligations should be made transparent.



## E2. Taxes to improve the environment

### Key points

The quality of the environment is critical to the wellbeing of Australians, not least because it underpins our standard of living. This is particularly important since past and present generations of Australians, often guided or directed by government policies, have been degrading their water, land and air, losing many native species and contributing to global climate change.

Many market activities damage the environment, but this damage is often not reflected in the market price of the goods or services these activities produce. These 'spillover' costs are one form of market failure. Government intervention, may provide an effective mechanism for protecting the environment or for making people pay for the damage they do to the environment.

Environmental taxes are among a range of options open to governments to address these spillover effects. Taxes can help deal with these problems by changing prices in a way that encourages people to reduce their contribution to pollution or to reduce their use of a natural resource. Where such corrective taxes are effective, they can be highly efficient – delivering greater environmental benefits for a given cost to the community than other forms of intervention.

However, taxes of this type can be difficult to design and implement. In some cases, regulation or other market-based instruments may be superior.

Once introduced, the Carbon Pollution Reduction Scheme (CPRS) will be the largest environmental policy intervention in Australia. Market-based mechanisms such as the CPRS are the most cost-effective way to reduce Australia's carbon emissions. The efficiency of the CPRS should be monitored, and opportunities taken to improve it, such as by recycling the permit revenue to reduce other taxes (where appropriate), removing supplementary measures, phasing out concessions such as free permits and broadening the scheme's application (as this becomes possible).

### E2-1 Why and how should environmental taxes be improved?

The environment directly contributes to the wellbeing of current and future Australians. It provides services critical to good health such as clean air and water, as well as public amenity, recreation and aesthetic pleasure. The environment also improves wellbeing indirectly by providing resources – such as land, timber, minerals and energy – that are necessary to produce goods and services (for example, food), as well as the ecosystems necessary to absorb and assimilate waste. The environment is a key underpinning of market and non-market activity.

As with all scarce resources, trade-offs are required in allocating the environment to different uses. When markets work properly, such trade-offs tend to see resources flowing to their

highest value use; that is, the use that generates the highest monetary and social value. For example, a piece of farming land will tend to be used for the farming activity that generates the best return. However, many environmental goods are subject to market (and other) failures that result in over-exploitation. For example, people may use more land than necessary for farming if there is no market value placed on the environmental amenity that nature provides to society. These problems can be significant in terms of reduced wellbeing for society because in many cases the damage to the environment may be irreversible — a characteristic of many of Australia's most pressing environmental challenges, such as climate change and loss of biodiversity.

## The need to correct for environmental spillovers

In relation to the environment, the most common form of market failure involves spillovers (sometimes called 'externalities'). A spillover occurs when individual decision-makers fail to take into account the impact of their actions on other parties. An example of a negative spillover is where a river is polluted by inappropriate use of a fertiliser, causing harm to downstream users of the water. But spillovers can be positive too — a farmer who maintains native vegetation may deliver biodiversity benefits for the community, but will generally not be compensated for this service.

Often, these problems arise because many aspects of the environment have *public good* qualities — that is, they are both *non-rival* (able to be enjoyed simultaneously by any number of people) and *non-excludable* (individuals cannot be excluded from enjoying them). Because no-one owns them, these environmental qualities are not priced by the market, and are often used without regard to the costs that may be imposed on others as a consequence. Similarly, because they are not priced, people have no way of making financial returns from providing an environment that benefits the community. As a consequence, the environment is allocated inefficiently between its different uses, resulting in excessive environmental degradation.

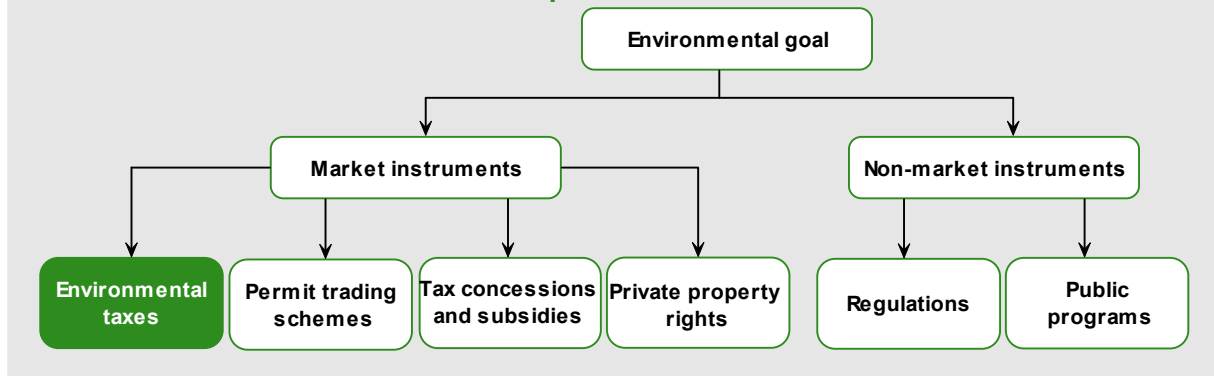
Where market failures occur, selective government intervention may result in an improvement in overall welfare. The use of environmental taxes is one way to correct for spillovers, by providing transparent price signals to purchasers of goods and services that reflect the environmental cost as well as the private costs.

This Section deals with the case for using taxation to address the problem of environmental spillovers and managing environmental public goods. A number of other specific environmental issues are addressed in other Sections in this report. In particular, noise and air pollution are discussed in Section E3 (Road transport taxes), and improving the use of community resources through better pricing of many common-property environmental goods is discussed in Section E1 (User charging).

## There is a range of options to address environmental spillovers

The use of an environmental tax is only one option for correcting an environmental market failure, and is one example of a 'market instrument'. Other market instruments include permit trading schemes, tax concessions and establishing private property rights (see Box E2-1).



**Box E2–1: Government intervention options to address environmental issues**

*Permit trading schemes* like the proposed Carbon Pollution Reduction Scheme (see Box E2–6) involve capping the desired level of pollution at the outset, issuing pollution permits up to the amount of the cap and allowing the price of the permits to be set in the market. Economically, the difference between trading schemes and environmental taxes is that fixed-rate taxes impose a price on pollution and the market determines the quantity, while a trading scheme controls quantity, creating an implicit tax (the revenue the government receives from the sale of permits) and the market determines the price of the permit.

If the world were perfectly predictable, if the government auctioned all permits, and if the CPRS were not linked with overseas abatement efforts, the economic outcome of a permit scheme would be identical to a corrective tax.<sup>3</sup> In reality, however, where uncertainty is pervasive, trading schemes can be preferable to a tax in cases where the costs imposed by pollution are very sensitive to the level of pollution — and hence where the costs of getting the level of abatement wrong are high (Weitzman 1974).

*Tax concessions* (often referred to as tax expenditures) are a type of subsidy that aim to make an environmentally beneficial action by the private sector more financially attractive than otherwise. An example of such policies is the Landcare tax concession. Since they need to be available to any taxpayer who meets specified criteria, the challenge for such subsidies is to encourage more of the beneficial activity, and not merely to deliver a financial gain to those who would have undertaken the activity anyway.

An alternative market instrument is to establish, or strengthen, *private property rights* over a common resource. For example, a common forest would quickly be cleared by hunting and logging if no person owned the forest and could prevent the public from taking the timber without their consent.

In addition to market instruments, options available to government include non-market instruments like *regulation*, which may mandate abatement levels or technology standards for emitting industries or products. An example of this is the fuel standards that mandate the qualities of petrol or diesel used in transport.

3 For instance, in Box E2-4, a trading scheme would set the quantity of pollution at  $Q^*$ . Polluters would pursue least-cost abatement to achieve this target, and the price of permits would rise to  $T$  — the same quantum as the environmental tax required to achieve a reduction in pollution to  $Q^*$ .

Another non-market instrument is the *public program*, which refers to government spending to achieve a policy objective, such as the installation of photovoltaic panels on government buildings to generate electricity.

There is no single instrument suitable for all environmental issues. The nature and scope of the market failure in question will be critical to determining the best policy approach. The appropriate instrument in any particular case is one that maximises the net benefit to society, taking into account the extent to which the instrument can adequately deal with the environmental spillover (and hence deliver a gross environmental benefit) balanced against the costs imposed in addressing the spillover plus the costs of implementation (including administration and monitoring). The decision on what instrument to use is particularly difficult given that the costs and benefits should, in principle, take into account impacts on the present and all future generations (see Box E2-2).

### **Box E2-2: Reducing environmental damage through market-based mechanisms**

When an activity damages the environment and the damage is not reflected in the market price, a 'spillover' (or 'externality') has arisen. Governments have a range of options to deal with spillovers and to ensure that consumers and producers take account of the environmental damage caused by an activity.

Various studies in Australia and other countries have canvassed the range of policy options that may be pursued to achieve improved environmental outcomes. A broad summary of the policy approaches available to government in the context of CO<sub>2</sub> emissions was included in the *Report of the task group on emissions trading* (Australian Government 2007).

That report grouped policy options into four broad categories:

- information and education campaigns;
- various forms of regulation or standards;
- fiscal measures, including grants, subsidies and rebates; and
- market-based instruments, including environmental taxes and tradable property rights.

While each policy approach may have some role to play, the report considered that market-based instruments were superior in achieving large-scale improvements in environmental outcomes at least cost to the economy.

The report noted that although information and education campaigns can play an important role in alerting businesses and households to abatement opportunities, such campaigns on their own will not drive large-scale emissions reductions.

### **Box E2–2: Reducing environmental damage through market-based mechanisms (continued)**

The report considered that implementing non-market approaches through regulations or standards was potentially viable when technologies are relatively standard and their environmental consequences known. The phasing in of new lighting standards is an example of this approach. However, the report noted that where technologies and production techniques vary widely, regulation will be inefficient in achieving environmental outcomes and likely to impose significant costs on businesses and households.

Another drawback of a pure regulatory approach, also highlighted in Box E2–3, is that it normally involves the government specifying outcomes regardless of the costs imposed. This limits incentives to innovate or undertake more abatement than the mandated level.

ABARE modelling commissioned by the Task Group showed that regulatory approaches can cost the economy substantially more than emissions pricing for the same abatement target — up to twice the GDP cost. This is broadly consistent with other modelling undertaken in this area.

The report also considered the merits of subsidising abatement from government budgets. However, this requires the government to pick winners or target specific projects. It could also involve high administrative overheads for the government and for project proponents, and impose higher costs on society from higher levels of taxation. If used extensively, significant losses in economic and administrative efficiency could arise.

Market-based approaches allow the market to determine the lowest-cost means of abatement. Such approaches therefore provide the opportunity to deliver improved environmental outcomes at the lowest economic cost. They also provide strong ongoing incentives for investment in technology research, development and deployment, and in efforts to improve energy efficiency. The report also noted that economic outcomes have often exceeded expectations as a result of market-oriented policy changes, as firms take up opportunities and incentives to innovate and improve productivity.

## **The community should be compensated for environmental damage**

Governments should consider the environment as a community (or public) good that needs to be managed for the benefit of current and future Australians.

As a general rule, approaches that implement the ‘polluter-pays’ principle (including taxes and emissions trading schemes) are preferable to others on both efficiency and equity grounds. Imposing the cost of environmental harm on those responsible provides them with an incentive to modify their behaviour and reduce the damage their actions cause. From an equity perspective, it is appropriate that those responsible for the harm are required to bear the cost, rather than those forced to live with the consequences.<sup>4</sup> For example, Australia’s rich biodiversity can be appreciated by all Australians, regardless of where they live. Those

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4 While the legal incidence may be on the producer of the good or service, often the economic burden of the tax can be passed forward. To the extent that the burden is passed forward to the consumer who demands the product which causes the damage this can still be consistent with the polluter pays principle.

who benefit from activities that harm the Australian community's ability to benefit from this biodiversity should compensate the community.

That said, in situations where it is impractical to introduce a polluter-pays approach — for instance, in situations where it is difficult to identify the polluter, or where equity considerations are outweighed by the costs involved in making the polluter pay — a beneficiary-pays principle could be applied (see Box E2-3).

### **Box E2-3: What are the benefits and costs of 'polluter pays'?**

The 'polluter-pays' principle holds that the party responsible for undertaking an activity that causes spillover environmental damage should pay for that damage. This reflects the view that the environment is a community asset and that any party damaging that asset should pay compensation to the community for that damage.

Charging for environmental damage has three advantages. First, it can encourage appropriate use of environmental resources, since environmental damage should arise only where the value of the output associated with the damage is greater than the value the community places on the environment that was damaged by the activity. Second, because the environment is a community resource, there is inherent justice in the community receiving revenue as compensation for use of the environment. Third, people wishing to use the environment for private purposes should bear any transaction costs (such as legal fees) associated with undertaking an activity that may damage the environment.

However, 'polluter pays' may sometimes be difficult or inappropriate to apply. Some forms of environmental damage may be so severe and irreversible that it would not be appropriate to allow them to proceed at any price. In these cases, marginal trade-offs between some environment services or assets and other goods may not be acceptable. For that reason, for example, lead in petrol is simply banned, rather than priced.

At other times, someone other than the polluter may need to pay if the polluter is difficult to identify or to catch, particularly if someone else can reduce the environmental costs more cheaply. In such circumstances the government could impose costs on those best able to ameliorate the pollution, even if they do not cause it. For example, business owners may be required to keep their street frontage free from litter, even if they did not drop the litter. However, business owners may be able to pass forward the cost of keeping their street frontage free from litter to their customers.

Finally, it can sometimes be difficult to determine the 'just' allocation of rights to pollute between two parties. For example, when people build a house on cheap land near an existing airport, should they then be entitled to compensation for the aircraft noise? Compensation should not set up incentives for strategic behaviour that jeopardises good environmental outcomes. Clearly defined and enduring property rights help to overcome such problems.

If the community desires spending to repair environmental damage from past (lawful) pollution, it should not raise the tax rate on future emitters of that pollution simply to generate enough revenue for the task. If set this way, the tax rate will exceed the optimal rate (that which equalises marginal social cost and marginal abatement cost) for future emissions. The clean-up should be funded from efficient general revenue taxes (that is, funded by the beneficiaries).

## Imposing an environmental tax

An environmental tax can be imposed on an environmentally damaging activity, thereby raising the cost of that activity to reflect the cost to society of lost environmental benefits.

The purpose of such a tax is to correct the market failure and reduce environmentally harmful actions to a level that yields the greatest benefit to society. While revenue will be raised through such taxes, this is a by-product, not the main policy purpose.

The imposition of the tax provides an incentive for polluters to use non-polluting inputs or processes rather than polluting ones, to the extent that doing so costs less than paying the tax. In addition, it encourages consumers to reduce demand for higher-priced products associated with pollution towards lower-priced, less environmentally damaging alternatives. Box E2-4 illustrates the theoretical underpinnings of an environmental tax.

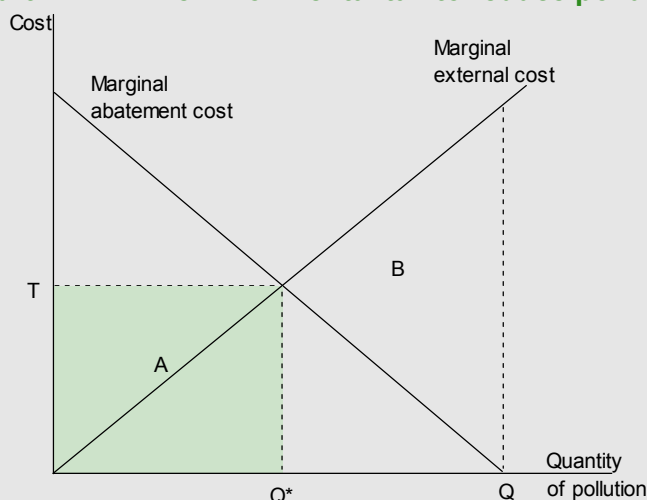
### Box E2-4: The operation of an environmental tax

Assume that a production process results in the emission of pollution as a by-product. This pollution could be reduced in a number of ways, including by adopting less polluting processes or equipment therefore reducing pollution per unit of production, by producing fewer units of production, or by putting in place mechanisms to capture the pollution.

The cost of avoiding each unit of pollution is called the marginal abatement cost. In the chart below, it is drawn as a line with downward slope, reflecting that the cost of reducing pollution increases as each unit of pollutant is abated. The cost increases because the cheaper abatement options are always taken before the expensive ones. Where the polluter pays nothing for polluting, quantity  $Q$  of the pollutant is produced (as the polluter chooses not to incur any abatement costs).

At  $Q$ , the environmental damage imposes a high cost on society (shown as the marginal external cost) but the polluter is not required to take this into account. Policy-makers note that reducing pollution by a unit would benefit society greatly and yet cost the polluter only a little.

If policy-makers have perfect information about abatement costs and the external cost of pollution, a tax of  $T$  would be imposed on each unit emitted. The polluter then has an incentive to adopt abatement measures if they are cheaper than paying the tax (reducing pollution from  $Q$  to  $Q^*$ ). The consequent increase in social welfare is represented by the triangular area  $B$ . The revenue raised by the tax (a transfer of wealth, not a net gain) is represented by shaded area  $A$ .

**Box E2–4: The operation of an environmental tax (continued)****Chart E2–1: An environmental tax to reduce pollution**

It is worth noting that, with perfect information, an identical economic outcome could be achieved through the use of other market instruments, including a permit trading scheme, where the quantity of pollution is capped at  $Q^*$ , resulting in a permit price of  $T$ .

Unlike environmental taxes, environmental charges do not seek to improve environmental outcomes by reducing spillovers. Instead they impose a charge on an activity in order to raise revenue sufficient to finance the cost of providing the environmental service.<sup>5</sup> In circumstances where the revenue raised funds the collective treatment of an environmental problem associated with the activity, such charges are consistent with a user-pays principle, and may be efficient. For example, national park access fees apply to users and pay for the maintenance of the park environment.

In situations where the service in question is used, either directly or indirectly, by a significant proportion of the population, equity considerations may be outweighed by the benefit of funding the service from general revenue.

In other cases, taxes or charges may be imposed that neither reflect the cost of environmental harm associated with an activity nor provide a service to address it, but are intended to fund environmental programs. For example, the Product Stewardship Oil Levy of 5.449 cents per litre of lubricating oil sold is used to help fund the oil recycling industry. The levy does not change the behaviour of oil consumers once the oil is purchased (that is, once you have paid the tax there is no incentive not to dispose of the oil inappropriately), nor is the associated program a cost-effective means of addressing the issue of inappropriate oil disposal (see Box E2–10).

While these charges are typically levied on narrow bases, there may be some cases where the tax and the associated spending are aligned and well-targeted, so such mechanisms can be used to deliver a 'polluter-pays' outcome and provide incentives for better environmental outcomes (see Box E2–3).

<sup>5</sup> The OECD defines environmental charges as 'payments for which a good or service is rendered in return'.



## Environmental taxes can efficiently reduce environmental harm ...

The key strength of environmental taxes (and emissions trading schemes) relative to other instruments is that they have the potential, if appropriately designed and targeted, to achieve a given level of pollution at a lower abatement cost.

Compared to regulations, which impose requirements such as uniform standards or abatement targets, market instruments can deliver:

- *allocative efficiency gains* — in situations where the costs of abatement varies between polluters, the use of a tax can minimise the cost of abatement by providing an economic incentive to reduce pollution in the least expensive way (see Box E2-5); and
- *dynamic efficiency gains* — because an environmental tax applies to each unit of pollution produced, it provides an incentive for polluters continually to seek low-cost abatement options to reduce their tax burden. By comparison, regulatory approaches may achieve compliance with a technology standard, for instance, but will not necessarily encourage polluters to make further abatement efforts.

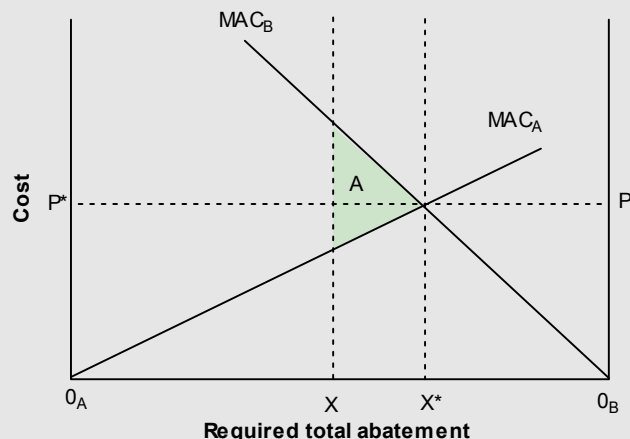
### Box E2-5: Allocative efficiency gain from the use of market instruments relative to regulation requiring uniform abatement

Assume there are two polluting firms whose marginal abatement costs differ and are represented below as  $MAC_A$  and  $MAC_B$ . The total abatement required is represented by the quantity  $O_AO_B$  in Chart E2-2 below.

The total abatement could be achieved through the introduction of a tax set at  $P^*$ , or alternatively through the introduction of a permit system that results in an identical permit price. Under both approaches, firms will abate up to the level where their individual cost of abatement is equal to the cost of the tax (which in the case of permits is equal to the cost of a permit). As a consequence, Firm A undertakes a greater share ( $O_AX^*$ ) of the abatement effort due to its lower marginal abatement costs.

By comparison, if firms were required by regulation to undertake a uniform reduction in pollution, then both firms would undertake the same level of abatement (that is,  $O_AX$ ,  $O_BX$ ), incurring an additional cost represented by the area A.

**Chart E2-2: Lower abatement cost using market instrument**



Another advantage of environmental taxes compared to many other instruments is that they raise revenue. While this is not the purpose of the tax, it is valuable in that it can be used to reduce other taxes or be used to fund additional government spending. The use of environmental tax revenues is discussed below.

### **... but the scope for using environmental taxes is limited**

The scope for applying environmental taxes is limited by two significant practical concerns.

#### **The environmental harm caused by the pollutant needs to be relatively uniform**

In order for an environmental tax to reduce environmental harm in a cost-effective manner, the damage from each unit of the activity should be constant so that a constant tax rate can reflect the cost of the damage. Greenhouse gas emissions are one example of a uniform impact, as each 'unit' of gas contributes equally to climate change, regardless of where it is emitted.<sup>6</sup> However, such situations are uncommon on a national scale. For instance, the human health costs imposed by air pollution are likely to be significantly greater in cities than in less populated areas.

Where the spillover cost of a unit of pollution varies across the area of concern, a uniform tax will be unable to capture these differences. Some sources of pollution would be over-taxed and others would be under-taxed. In net, the use of an environmental tax in such situations could be welfare-reducing and other options (for example, regulation) should be considered.

#### **... and the pollutant needs to be measurable**

To apply an environmental tax effectively, the environmentally damaging activity needs to be measurable and verifiable by both the tax authorities and polluters.

For many environmental problems, it is very difficult to measure environmentally damaging activity, particularly where the spillover effect comes from a large number of sources (for example, run-off from hundreds of farms may pollute a river).

Due to difficulties in measurement, some environmental taxes are better applied to a related input or output as a proxy for the pollution, rather than to the pollution itself. Using a similar principle, the Carbon Pollution Reduction Scheme (CPRS) would apply to the carbon content of fuel, avoiding the need for costly monitoring of actual carbon emissions from motor vehicles. While taxing a proxy may be more practical and less costly to implement, it is also less precisely targeted and, unless the pollution is highly correlated with the proxy, the environmental benefit that can be achieved from such an approach may be limited. The carbon content of fossil fuel is reasonably well correlated with actual emissions when it is burned. Taxing the amount of fuel supplied is therefore a relatively accurate way of taxing the amount of emissions. However, if technology develops to allow motor vehicles to capture and store emissions directly, then alternative arrangements will be needed to ensure that the incentive to deploy those technologies is not lost.

Taxing the production or consumption of a good to reduce the cost of its inappropriate disposal (by reducing overall demand for it) has an impact on beneficial uses of the good as

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6 While there are a number of greenhouse gases, their impact is compared using CO<sub>2</sub> equivalent measurements.



well as its environmentally harmful uses. This increases the economic cost of the tax. For example, taxing plastic bags to reduce littering may reduce litter, but it will also impose costs on the many people who use plastic bags and dispose of them appropriately.

Where a tax is levied on a product that typically causes environmental damage, the tax will reduce the damage, but forgoes the opportunity to improve environmental outcomes by developing alternative production methods that do not use the damaging input. For example, some rechargeable batteries contain cadmium, which is a toxic heavy metal and may cause water or soil pollution if it leaches out of landfill. Hypothetically, if a government imposed a tax on the purchase of any rechargeable battery, this would reduce consumption (and therefore, disposal) of rechargeable batteries. But such a tax would provide no incentive for rechargeable battery manufacturers to reduce the level of cadmium in their product, nor would it provide any incentive for consumers to buy non-cadmium or low-cadmium rechargeable batteries.

Such limitations make it difficult, but not impossible, to use taxation to help solve environmental problems.

### Principles

Environmental taxes (or emissions trading schemes) should:

- be used to address environmental objectives, rather than raise revenue;
- have their revenue recycled to reduce the associated tax (and transfer) distortions, should governments wish to avoid increasing the aggregate burden of tax; and
- be integrated with existing taxes and transfers.

An environmental tax is more likely to be appropriate in situations where:

- environmental damage due to economic activity is relatively constant (so that a constant per-unit tax reflects the cost);
- the factors causing the environmental damage are measurable/verifiable by both the tax authorities and the agent causing the damage, or there is an input or output proxy that is closely correlated with the damage being targeted;
- the only cost-effective way the taxpayer can reduce their tax liability is to reduce the activity causing the damage (rather than, say, simply dumping waste illegally); and
- other instruments (such as spending and regulation) have been considered and found to be more costly.

### Decisions to introduce a tax should be guided by cost–benefit analysis

Decisions about whether to intervene to correct an environmental market failure – and about whether to use a tax or some other policy instrument if the decision is to intervene – should be based on the relative costs and benefits of the available alternatives.

While the costs involved in introducing an environmental tax can be estimated with some degree of accuracy, calculating the benefits is more challenging because of the non-market values involved. The fact that many environmental problems extend over long timeframes, and can involve issues of inter-generational equity and transfers, further complicates cost-benefit analysis. Of course, the fact that such assessments are difficult does not mean that taxes should not be used, particularly if the risks of significant costs from environmental damage are high.

### **Environmental taxes also impose costs**

If environmental taxes are used, the rate of tax needs to be set so as to achieve the amount of pollution that produces the highest net benefit for society as a whole. Environmental taxes, while potentially able to address an environmental spillover in a more cost-effective manner than other interventions, still impose costs. Pollution has a value to those producing it, as well as to those who benefit from the products or services produced from a polluting process. It is the cost of forgone production and/or consumption that needs to be weighed against the overall social benefit from taxes that successfully improve environmental outcomes. For this reason, an environmental tax is not intended to eliminate pollution completely, but rather to 'rebalance' the use of environmental resources to the point where the additional costs of reducing pollution further would outweigh the additional benefits such a reduction would deliver.

### **Is there a 'double dividend' from introducing a tax?**

Intuitively, an environmental tax appears to have two benefits. The first is the benefit from increasing the price of an activity that damages the environment. Society overall is better off because the increase in price would cause a lessening of activity and hence a reduction in environmental damage. Damage reduction (not revenue-raising) should be the only reason an environmental tax is introduced.

The second apparent benefit is the opportunity to use the revenue raised by the tax for other social purposes, such as reducing other distortionary taxes (for example, labour taxes that reduce the incentive to work). In particular, environmental taxes could potentially provide a 'double dividend' of less pollution and less incentive-distorting taxes if the revenue were used to reduce existing labour income or corporation taxes (for example, Pearce 1991).

In the absence of other market distortions, an environmental tax set at a rate equal to the marginal external cost of an environmentally damaging activity would discourage inappropriate use of the environment. To the extent that market production falls, society is better off since less production means an improved environment. Before the tax, resources were misapplied to conducting socially damaging activities. At the margin, the value of lost market production — for example, the workers no longer employed in a polluting industry and the lower wages in other industries — would equal the value of improved environmental amenity. The tax effectively values the environment, generating revenue that would otherwise be appropriated by those continuing to damage the environment. This revenue could then be used by governments to achieve other social goals without any cost to the economy. In this sense, environmental taxes are 'costless' sources of revenue.

However, governments already collect taxes for general revenue-raising, such as the GST and income tax, as well as other purposes. And taxes interact in complex ways. Without

understanding how the present tax system affects consumption and production decisions with environmental consequences, it is not possible to know whether a particular environmental tax proposal is actually welfare-enhancing. For example, an environmental tax may be passed on to consumers in higher prices and would add to tax distortions already in place.

There are some cases, however, where even in the presence of existing distortions an environmental tax can improve both environmental outcomes and the value of market production, delivering a 'double dividend'. Some environmental problems can directly affect work incentives. For example, recycling the toll revenue from a congestion charge as lower labour income taxes not only substantially improves environmental amenity, but also encourages people into work (Parry & Bento 1999). Some environmental problems can also have long-run feedback effects on health and productivity. Sometimes existing tax systems are so poor that an environmental tax or charge can raise revenue more efficiently. For example, the CPRS will apply to a broader range of fuels than the existing fuel excise. As the CPRS displaces some of the existing fuel excise, the overall economic cost of raising revenue from fuels should fall. This benefit is in addition to the environmental objective the CPRS aims to achieve.

Empirical studies suggest that, while there may be important exceptions, cases offering a 'double dividend' are not likely to be common (Bovenberg & Goulder 2002). Further, many of the 'second benefits' can be achieved without the need to use the explicit revenue from an environmental tax. Indeed, if there were no institutional constraints, this would ideally be the case. By using specific policy tools for specific targets, governments can ensure that the best instruments are used to most effectively tackle social problems. If there are better options for raising revenue more efficiently than current taxes, then they should be adopted. If there are better options for addressing environmental options than a tax, they too should be used. By mixing objectives in a single instrument – the environmental tax – governments might not use other instruments that could be better at addressing each objective individually.

Of course, environmental taxes should still be considered even where no double dividend exists. In such cases, an appropriately designed environmental tax would see the benefit to the community outweigh the costs.

### **Earmarking revenue constrains government spending choices**

Several submissions to the review have argued that revenues raised by environmental taxes should be hypothecated or 'earmarked' to spending on related environmental programs.

While this may promote public acceptance of a tax, it constrains the ways in which the government can allocate limited revenue between competing priorities. It can result in revenue being spent on hypothecated programs when it could have delivered greater social benefit if directed elsewhere, including through lowering existing taxes.

Hypothecation also creates a risk that the rate of an environmental tax would be dictated by the expenditure requirements of the associated program, rather than by the marginal social cost of the environmentally harmful activity the tax is meant to address.

Hypothecation may be desirable if there is a close connection between the source of funds and their subsequent use. This is because the tax provides signals to producers about the demand for the environmental good or service. In such cases, the levy or charge effectively constitutes a user charge for the provision of goods or services (rather than an environmental tax), which promotes efficient resource allocation. Examples of such charges include national park charges and the Great Barrier Reef Environment Management Charge (for more examples see Section E1 User charging).

Additionally, if the environmental tax is set at the rate that reflects the marginal external cost of the targeted pollution, then net benefit is maximised and no further government spending on that environmental objective will deliver a further net benefit to society.

Even hypothecating the tax raised from ameliorating one environmental problem to fund a program aimed at overcoming another environmental problem is likely to lead to poor outcomes. This reflects that it is unlikely that the funding required for expenditure programs that would pass a social benefit–cost assessment will approximate the tax revenue collected by an environmental tax set at the marginal external cost.

### Principle

There is no general case for hypothecating (that is, earmarking) environmental tax revenues to environmental spending programs. However, hypothecated user charges (as opposed to taxes) that reflect the true cost of providing a good or service can be an efficient means of funding environmental programs.

## Using additional instruments is likely to be inefficient and costly

A well-targeted environmental tax addresses a spillover by providing a transparent price signal that reflects the marginal external cost of environmental harm. As noted above, once such a tax is applied, there is unlikely to be a need for additional instruments that target the same environmental issue. As a general rule, multiple instruments should be considered only if they complement each other in a predictable way to achieve the desired outcome, and if a single policy instrument could not achieve the outcome in a more efficient and effective way. In particular, supplementary measures may be needed when the measurement of pollution is uncertain or costly. For example, supplementary measures to reduce carbon emissions from sectors difficult to include in the CPRS may reduce the cost of overall abatement.

### Principles

In general, a single policy instrument should be used to target a single objective.

Multiple instruments should be considered only where one instrument is not capable of achieving the desired objective, and where the instruments are complementary in nature.

## Tax concessions are a blunt tool for dealing with environmental issues

The provision of concessional tax treatment for selected expenditure is another means by which government can give taxpayers an incentive to undertake environmentally beneficial activities.

A number of submissions to the Review have argued that existing tax concessions should be extended to encourage activities and investments to address local environmental issues, such as land degradation, inefficient water use and environmental conservation. Some submissions considered it inequitable that businesses enjoy concessional tax treatment for environmental expenditures while people who are solely doing conservation work do not.

Tax concessions or cash subsidies can, in principle, have equivalent allocative effects to environmental taxes but they have quite different distributional effects. Environmental taxes impose burdens on polluters whereas tax concessions and subsidies impose costs on the whole community through the higher taxes needed to fund them.

However, there are situations where providing a subsidy may be appropriate. These include situations where an effective ‘polluter-pays’ mechanism, such as regulation or taxation, is not practical – for example, where the polluter cannot be easily identified. Another situation where targeted subsidies may be appropriate is where a government wishes to ‘purchase’ environmental goods on behalf of the public. An example is the Australian government’s Caring for our Country – Environmental Stewardship program, which involves direct payments to landholders in return for biodiversity conservation and improvement (see Box E2-9).

In such cases it is preferable that subsidies be provided directly through grants programs rather than through broad-based tax concessions. Direct grants can be more tightly targeted towards areas of public benefit, are more transparent, and allow for the merits of environmental subsidies to be compared directly with other spending priorities. Further, unlike tax concessions where the size of the benefit of any marginal expenditure is related to the taxpayer’s marginal tax rate, a subsidy can be designed to reflect better the marginal benefit of the environmental outcome.

### Principles

Since tax concessions with environmental objectives tend to lack transparency, be poorly targeted, impose costs on all the community rather than just polluters and reduce the efficiency of the taxation system, other more effective mechanisms should generally be preferred.

The environmental impact of any other tax concession should be evaluated before it is introduced. Existing concessions should also be evaluated for their environmental consequences.

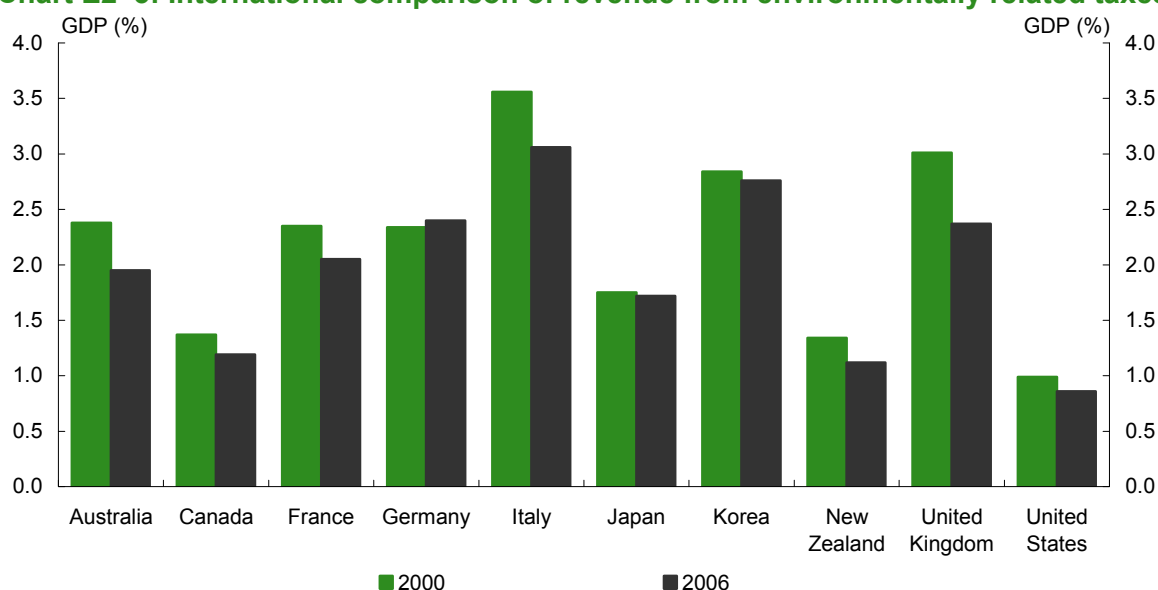
## E2-2 Revenue from environmental taxes

The OECD (2006) defines 'environmentally related taxes' as any compulsory, unrequited payments to the government that are levied on tax bases deemed to be of particular environmental relevance. In Australia, regulatory approaches have historically been the primary means of addressing environmental issues. While more environmentally related taxes have been used in Australia recently, not all have been well-targeted or effectively implemented. A number of concessions to encourage positive environmental action, such as tax incentives under the Australian government's Landcare program and for water facilities, have also been introduced.

A number of Commonwealth and State charges, fees or levies are classified as environmentally related but do not address a market failure directly. For example, the purpose of taxes such as the Product Stewardship Oil Levy is not to provide taxpayers with an incentive to reduce an environmental spillover, but to generate revenue to be spent on programs with environmental objectives.

According to OECD data, environmentally related taxes in Australia raised revenue equivalent to around 1.95 per cent of gross domestic product in 2006 (see Chart E2-3). Nearly all of this revenue came from excise on motor fuels and from taxes on motor vehicles. These taxes were introduced to raise revenue, not to achieve environmental objectives.

**Chart E2-3: International comparison of revenue from environmentally related taxes**



Source: Heady (2009).

The Australian Government intends to introduce the Carbon Pollution Reduction Scheme (CPRS) in 2011 to reduce the production of greenhouse gases in Australia. Under accounting standards, revenue from the sale of emissions permits will be classified as taxation revenue and hence the scheme will be responsible for raising a significant proportion of environmental tax revenue in Australia (see Box E2-6 for a description of the CPRS and its revenue estimates).



### Box E2–6: The Carbon Pollution Reduction Scheme

Climate change is one of the key economic and environmental challenges facing Australia and the world. The central element of the Australian Government's climate change policy framework is the introduction of the Carbon Pollution Reduction Scheme (CPRS). The CPRS, planned to commence on 1 July 2011, is an emissions trading scheme that would cap greenhouse gas emissions and issue tradeable emissions permits up to the cap. For the first year of operation, a transitional fixed price of \$10/tonne CO<sub>2</sub>-equivalent would be applied. Thereafter, emissions prices would be determined by the market (subject to an increasing price cap).

Unlike a fixed-price carbon tax, where the level of aggregate emissions would depend on an emissions price set by government, the CPRS would give the government control over the number of domestic emissions permits released and would allow the permit price to be determined by the market. Under either approach, emissions-intensive goods would be made more expensive relative to low-emission goods, creating an incentive for consumers and businesses to cut emissions by changing what they consume and their methods of production.

The CPRS emissions cap would decline annually, consistent with the Government's emissions reduction targets of between 5 and 25 per cent below 2000 levels in 2020, and 60 per cent below 2000 levels in 2050. The cap trajectory to the end of 5 years would be announced on a rolling basis to provide certainty. Each year the government would issue emissions permits equal to the cap, either through auction or administrative allocation.

Entities covered by the CPRS would be free to emit at any level, within the shrinking overall cap, but would be required to surrender a permit for every tonne of emissions. It is expected that emitters would buy permits if their internal costs of abatement were higher than the permit price, and would reduce their emissions if their abatement costs were lower than the permit price. Similarly, businesses holding permits are likely to sell them and undertake abatement activity if the market price for permits exceeds their cost of abatement. These market incentives work to move permits to their highest value use and to encourage the cheapest abatement to be undertaken first, ensuring that reductions in emissions are achieved at least cost to the community.

In the Australian government budget, revenue from the auctioning of permits is treated as a tax, subject to guidance to be issued under the UN System of National Accounts. The CPRS is expected to generate revenue from permit auctions of around \$11½ billion in 2012–13.<sup>7</sup>

The Australian Government has indicated its intention to allocate 'free' permits to emissions-intensive trade-exposed industries and to use revenue from auctioned permits to assist households and businesses manage the transition to a low-carbon economy.

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7 2009–10 Mid-Year Economic and Fiscal Outlook p. 37.

## E2–3 Reforms and implications for correcting environmental spillovers

### Recommendation 58:

Once the Carbon Pollution Reduction Scheme (CPRS) is operational, additional measures which seek to reduce emissions (in sectors covered by the CPRS), and which are not justified on other grounds, should be phased out.

### Recommendation 59:

The industry assistance arrangements introduced in consequence of the CPRS should be regarded as transitional. The Government's policy is to commission an independent review of the CPRS, including in relation to emission-intensive trade-exposed (EITEs) assistance, every five years starting in 2014. To complement this, the Productivity Commission should be asked to undertake and publish an annual review of CPRS-related assistance arrangements for the life of the CPRS to provide a basis for future decisions on assistance policy. To assist the Productivity Commission, an Associate Commissioner with appropriate knowledge and industry expertise should be appointed to the review.

### Recommendation 60:

The government should continue to monitor tax concessions aimed at supporting environmental outcomes, and consider replacing them with targeted spending programs where this would be a more effective and efficient method of achieving the appropriate environmental outcome.

## The Carbon Pollution Reduction Scheme

The proposed CPRS is a broad-based permit trading scheme applied directly to greenhouse gases (and to highly correlated proxies in the case of fuels). As such, it can be expected to achieve given reduction targets in a cost-effective manner relative to other instruments. The Review has not considered the underlying policy goal, or the design, of the CPRS itself.

### Supplementary measures to the CPRS

Some submissions to the Review have argued that the CPRS alone will not be enough to achieve sufficient cuts in Australia's carbon emissions, and have proposed a range of additional tax incentives such as accelerated depreciation for investments that reduce carbon emissions, and differential stamp and registration duties for cars.

These arguments are not convincing. Under the CPRS, the quantity of emissions permits will be fixed in aggregate, resulting in a price for carbon. It is the quantity of permits that delivers the reduction in greenhouse gas emissions achieved through a range of abatement activities that respond to the price for carbon across a range of sectors. The principle of the CPRS is that decisions about how this abatement occurs *within the economy* are best left to the ingenuity and innovation of private decision-makers in response to price signals. If more aggressive emission cuts are needed, the most cost-effective way to achieve this would be to lower the quantity of permits.



With the CPRS in place, and provided it retains its design integrity, imposing measures to accelerate the uptake of particular technologies or practices in the sectors covered by the scheme will not deliver additional abatement, but will generally reduce efficiency and increase the costs of reaching the abatement target (see Box E2–7).

### Box E2–7: The Carbon Pollution Reduction Scheme and supplementary policies

Under the CPRS the Australian government sets an overall emissions cap and then requires emitters to acquit carbon permits for each tonne of greenhouse gas emissions. Capping emissions below current levels creates demand for scarce permits that leads to the emergence of a carbon price. Over time, the carbon price drives structural change in the economy by increasing the cost of more emissions-intensive goods and services and encouraging the development of low-emissions technologies and processes.

A key benefit of broad-based emissions trading schemes is that, like taxes, they do not dictate how businesses and households reduce their emissions. They are technology-neutral and allow affected entities, which have the best information about their abatement options, to decide the least-cost means of reducing their emissions.

Supplementary policies used in sectors of the economy covered by the CPRS will not achieve more abatement than the CPRS alone. In the example below (Chart E2–4 Panel A) illustrates an emissions trading scheme operating in isolation. The abatement required to meet the emissions reduction target is the horizontal distance A1, and is achieved with permit price P1.

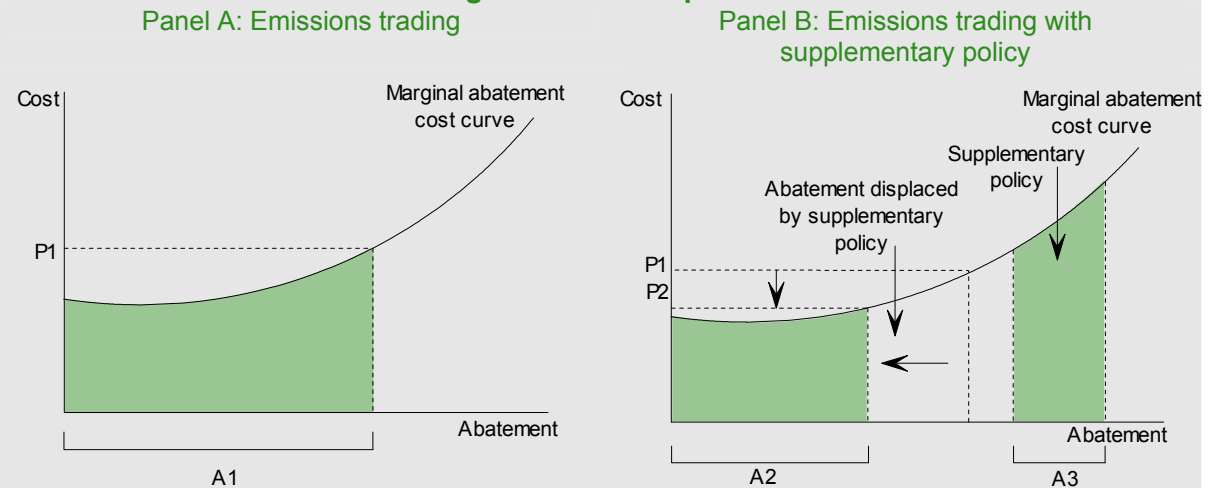
The marginal abatement cost curve is upward-sloping, reflecting that each unit of abatement becomes more expensive as cheaper abatement opportunities are exhausted. The cost of abatement is given by the shaded area under the marginal abatement cost curve.

In Panel B, a supplementary policy is introduced that achieves a quantity of abatement, shown as A3, the cost of which is reflected by the shaded area above A3. As the supplementary policy generates abatement of A3 the abatement required from the emissions trading scheme to meet a specified target falls by the same amount (that is, A1 falls to A2 where  $A1 = A2 + A3$ ). Total emissions, therefore, are the same with and without the supplementary policy.

In this example, the supplementary policy has encouraged more expensive abatement. This is reflected in Panel B which results in a larger shaded area below the marginal abatement cost curve (that is, the shaded area above A2 and A3 in Panel B is greater than the shaded area above A1 in Panel A).

### Box E2–7: The Carbon Pollution Reduction Scheme and supplementary policies (continued)

**Chart E2–4: Effect of a supplementary policy in the presence of a general carbon price**



Source: Treasury, based on Productivity Commission Submission to Garnaut Climate Change Review 2008.

Supplementary policies do not affect the environmental outcome, but they may affect the economy-wide cost of achieving an emissions reduction goal and who bears the cost. For example, suppose the government introduces concessional tax treatment for one particular form of abatement in a sector covered by the CPRS. The tax concession would lower the after-tax costs faced by firms undertaking the abatement, encouraging a higher level of abatement in the particular sector where the tax concession was introduced. This would be matched by a commensurate decrease in required abatement elsewhere in the economy. Further, instead of polluters paying a tax to society, they would receive payment from society for achieving abatement.

In the example above, the abatement achieved by the supplementary policy comes at a relatively high cost (including the cost borne by the taxpayer as the government uses taxes to fund the concession) as it displaces relatively cheaper abatement. That is, if the abatement undertaken due to the supplementary mechanism were as cheap as the next unit of abatement under the CPRS, the supplementary mechanism would not be required because the abatement would have occurred anyway. This highlights the importance of targeting supplementary policies at clearly identified market failures that create barriers to the take-up of cheaper abatement opportunities.

In addition to raising the costs of abatement, ill-targeted supplementary policies can affect the predictability of the carbon price. For example, while raising the overall cost of abatement, the supplementary policy in the example above results in a lower carbon price (that is, P1 moves to P2). This could delay investment decisions and ultimately raise the cost of achieving structural change in the economy.

Supplementary policies to deliver additional greenhouse gas abatement should be considered only where there are clearly identified market failures not adequately addressed by the CPRS. They should only be undertaken where the benefits of intervention outweigh the costs. Areas where there may be scope for supplementary measures include:

- the provision of information where information failures prevent individuals or businesses from adopting cost-effective abatement options; or
- where cost-effective abatement opportunities are available in sectors not covered by the CPRS.

Unless they are consistent with these principles, existing tax concessions for emissions-efficiency investments should be abolished (see Recommendation 58).

### **Differentiated car stamp duties and luxury car tax**

The Council of Australian Governments requested on 2 July 2009 that the Review:

consider the merit of financial incentives for the purchase of fuel efficient cars and assess the merits of differential stamp duty and registration regimes linked to environmental performance.

Also, the Australian Government requested that the Review consider:

phasing out the Luxury Car Tax and phasing in a tax on vehicle fuel inefficiency and consequent greenhouse gas emissions ...

Both Queensland and the Australian Capital Territory (ACT) have different rates of stamp duty for certain 'environmentally friendly' cars. In Queensland stamp duty varies depending on the number of cylinders, or whether the vehicle has a hybrid fuel/electric engine. The ACT scheme charges different rates according to fuel efficiency of the car. Further, Victoria charges a higher rate of stamp duty on used cars (where the value of the car is less than \$57,010) than on new cars on the premise that used cars are less fuel-efficient than new cars.

In relation to vehicle registration renewal, all states levy an annual tax that is higher for heavier vehicles and/or for vehicles with larger engines.

Measures that provide subsidies or impose penalties through registration fees or stamp duties to encourage the purchase of more fuel-efficient vehicles are not supported. Such supplementary measures serve only to increase the overall costs of abatement.

Moreover, targeting vehicle fuel efficiency as a means of achieving reduced emissions is a blunt instrument compared to targeting emissions directly by reflecting the cost of carbon emissions in fuel prices. Individual emissions levels depend not only on the efficiency of the vehicle, but also on other factors, particularly distance travelled, weight carried and driver behaviour. Proposed subsidy schemes would reward people who purchase a fuel-efficient vehicle yet travel large distances, and penalise people who purchase a less expensive, less fuel-efficient vehicle, but travel rarely. Such instruments are less cost-effective than relying on a pollution charge alone.

Furthermore, equity and cost issues arise if stamp duties are used as the basis for delivering a point-of-purchase incentive. Since stamp duties are levied as a proportion of the price of a

vehicle, a discounted rate for more efficient vehicles would provide a far greater subsidy to purchasers of expensive efficient cars, even though the higher price delivers no greater fuel saving. Conversely, the price difference between an efficient cheap car and an inefficient cheap car may be too small relative to the lifecycle fuel consumption benefits of the efficient car.

Further, such schemes do not consider the lifecycle greenhouse gas emissions involved in the production and recycling of cars. If levied on second-hand cars, as current stamp duties are, the tax may encourage premature scrapping of older cars in favour of new cars.

Differential luxury car tax, stamp duty and registration schemes aimed at encouraging the purchase of more fuel-efficient vehicles should be abolished once the CPRS (or equivalent scheme) is introduced.

Any lack of readily available information about fuel efficiency could affect efficient vehicle purchasing decisions. This market failure is already addressed directly by requiring that fuel consumption information be displayed on new vehicles.

### **Longer-term operation of the CPRS**

While the CPRS would deliver cost-effective abatement relative to other intervention options, over the longer term the efficiency of the scheme could be further improved by phasing out unnecessary instruments that may reduce its cost-effectiveness and broadening the base, and recycling any revenue raised, in excess of that needed to fund household and other transitional assistance, to reduce other taxes.

### **Phase out other carbon reduction policy instruments**

Australian and State governments have, in the absence of a clear price signal for greenhouse gases, introduced a range of subsidies, tax concessions and expenditure programs to promote greenhouse gas reductions. As noted by Wilkins (2008):

Currently there are in excess of 200 relevant programs around Australia in the States and Territories. Many have the potential to interfere with an emissions trading scheme.

To the extent that these programs do not address market failures other than those covered by the CPRS, they are unnecessary, inefficient and will ultimately result in higher costs being borne by the Australian public (see Recommendation 58). They should be phased out as quickly as practical once the CPRS becomes operational. The Australian Government's response to the Wilkins Review has removed some of these unnecessary programs but further action, including a rationalisation of state programs, would be beneficial.

One program that should be reconsidered once the CPRS becomes fully operational is the expanded national Renewable Energy Target (RET). The RET legislation is designed to ensure that 20 per cent of Australia's electricity supply is from renewable sources like solar, wind, geothermal and biomass by 2020. Wholesale purchasers of electricity are required to contribute proportionally to an additional 45,000 gigawatt hours (GWh) of renewable energy per year by 2020.

The RET will assist the energy sector transition to the introduction of the CPRS, by helping accelerate the deployment of renewable energy in the shorter term. As noted by Garnaut (2008), a RET will force the use of renewables in instances where non-renewable generation

options (like gas) would achieve the CPRS target at lower cost. This implies unnecessarily high electricity prices, leading to higher costs for goods and services produced using electricity as an input (Garnaut 2008). The RET will conclude in 2030 as the CPRS matures.

### ***Broaden the base of the CPRS if it will result in a net benefit***

Ideally, the base to which a trading scheme is applied should be as broad as possible to maximise opportunities for low-cost abatement. The sectors covered by the current design of the CPRS account for around 75 per cent of Australia's greenhouse gases.

Additionally, the broadness of the CPRS may deliver benefits over the current tax arrangements in some areas. For example, to the extent that the CPRS will apply to liquefied petroleum gas (LPG) whereas excise does not, the broader base is likely to reduce misallocation of resources by reducing the tax bias in favour of LPG.

### ***Carbon-sink forests and biodiversity***

Carbon-sink forests can be included within the CPRS framework on a voluntary basis following accreditation. Associated tax arrangements provide for immediate deduction of establishment costs for such forests until 2011-12, after which the costs would be subject to tax depreciation at the same rate as horticultural plants.<sup>8</sup> Carbon-sink forests are a potentially low-cost means of reducing net emissions while providing the landowner with revenues through progressive harvesting and replanting.

A possible side-effect of these arrangements is the planting of inappropriate, single-tree species, with associated reductions in biodiversity.

While recognising this potential problem, proposals to limit carbon-sink forests to the planting of biodiverse forests are not supported. A number of studies suggest that the use of carbon-sink forests can be a cost-effective means of offsetting carbon emissions (for example, Richards & Stokes 2004, Lubowski et al. 2005). A Senate committee heard recently that the cost of planting a forest with around 40 species of tree is approximately twice that of planting a single-species forest (Senate Rural and Regional Affairs and Transport Committee 2008). Consequently, requiring that only biodiverse forestry projects be accredited under the CPRS would significantly reduce the scope for forests to be utilised as a cost-effective abatement measure.

A more effective means of improving biodiversity outcomes would be to compensate forest providers directly for the additional costs of multi-species forests. This would properly reflect the fact that government is, in effect, purchasing an environmental service, while also targeting spending to the most effective areas.

Arrangements like the Environmental Stewardship Program or Victoria's BushTender program may be appropriate mechanisms to deliver management agreement payments that remunerate carbon-sink forest investors for the additional costs of planting and maintaining biodiverse forests in perpetuity.

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<sup>8</sup> S40-1005 ITAA97 expenditure can be claimed as a tax deduction at 7 per cent a year. See page 16 of [www.environment.gov.au/minister/wong/2009/pubs/wilkinsresponse.pdf](http://www.environment.gov.au/minister/wong/2009/pubs/wilkinsresponse.pdf).

### Phase out transitional assistance

Under the proposed arrangements, all revenue raised by the CPRS would be returned through targeted assistance. This assistance includes:

- *household assistance*: through increases to income support, family payments, tax offsets to support low- and middle-income households and energy efficiency measures;
- *fuel tax adjustment*: reducing fuel excise to maintain the overall tax on petrol over the first three years of the scheme's operation;
- *industry assistance*: comprising free permits provided to emissions-intensive trade-exposed industries (EITEs), which may not be able to pass on costs in the absence of a global agreement on emissions reductions, free permits to some existing coal-fired electricity generation plants, and support for clean technologies;
- *targeted support*: including support for information provision, for medium and large enterprises to reduce the impact of CPRS-related electricity price increases, for the food processing industry, for small business and community organisations to invest in energy efficiency equipment, as well as grants for innovative projects; and
- *structural adjustment assistance*: for those adversely affected by the scheme's introduction.

Assistance in general should be viewed as transitional in nature and, apart from appropriately designed household assistance, be abolished in the longer term. Of course, this will depend in part on future development of CPRS targets and international developments.

The household assistance arrangements applying to transfers will result in automatic and ongoing increases in assistance to reflect any price increase caused by changes in the CPRS target. As a result, no further assistance for transfer recipients for such price changes is required. As wages are not indexed in such a manner, if assistance is to be provided to the broader public it should be done through the income tax system (for example, through the current LITO or through increases in the tax free threshold). Such an approach is aimed at maintaining incentives for workforce participation for those members of society who are particularly sensitive to real wage movements (as higher prices result in lower real wages). Providing such income tax cuts may be important for macroeconomic stability as the proposed tax cuts will lessen the pressure for compensating wage increases (Freebairn 2008).

Assistance to individuals and families in the form of compensation to overall income (such as tax cuts and income support increases) maintain the carbon price signal and therefore the incentive to reduce carbon emissions. On the other hand, any assistance arrangements that would blunt carbon price signals should be avoided.

The fact that the CPRS imposes a price on the domestic production of carbon, for those emitters covered by scheme, is important in considering other forms of assistance to trade-exposed Australian-based businesses emitting carbon. Without other nations imposing mechanisms to price carbon, this could lead to investment in Australia, particularly in EITE industries, moving offshore for no net reduction in global emissions – compared to where no CPRS is in place. On the other hand, investors will consider the risk that carbon pricing will be introduced in other countries before it is actually introduced. In some cases, the



certainty provided by an established carbon pricing system may increase the attractiveness of Australia.

Assistance provided to EITEs is scheduled to phase down by 1.3 per cent per annum via the carbon productivity contribution. In 2014 the Independent Expert Review will report on the appropriateness of EITE assistance, including detailed work by the Productivity Commission on carbon constraints in other jurisdictions.

The Government's policy is to commission an independent review of the CPRS, including EITEs assistance, every five years starting in 2014. To complement this, reviews should be undertaken annually by the Productivity Commission to provide a basis for future decisions on assistance policy and should take into account the extent of effective carbon pricing in other countries. To assist the Productivity Commission, an Associate Commissioner with appropriate knowledge and industry expertise should be appointed to the review (see Recommendation 59).

In relation to support for energy efficiency purchases, support for specific abatement activities is redundant under the CPRS and will serve only to increase the overall cost to the economy of achieving any given abatement target. The extent to which energy efficiency will contribute to national emissions reductions should be left to the market.

Similarly, there is no convincing evidence of significant market failures associated with innovation and low-cost technologies to address climate change over and above those addressed by existing intellectual property rights and general support for research and development. Through putting a price on emissions, a key benefit of the CPRS would be to provide a strong incentive for the development of emissions-reducing technologies and practices, whether or not other countries also implement carbon-reduction policies. If there were to be a market failure in research and development, it should be addressed through existing broad-based arrangements to support research and development rather than through targeted, industry-specific programs.

### Implications for existing environmental tax concessions

The tax system currently incorporates a number of tax concessions intended to promote environmentally beneficial activities such as Landcare operations and environmental protection expenditures. The majority of these concessions are directed towards primary producers. Three-quarters of land in Australia is in private hands and, consequently, private landholders have an important role in preserving and improving the environment.

Tax concessions are not a successful means of targeting the degradation problems that cause the largest public costs (Mues, Moon & Grivas 1996). Moreover, some commentators, such as Edwards, Dumsday and Chisholm (1996), have suggested that providing subsidies for remediation and rehabilitation may perversely encourage land degradation, since the marginal cost of repairing it is lower.

Furthermore, every tax concession increases the complexity of the tax system. While only a small proportion of taxpayers may be eligible for a given concession, the extra costs associated with understanding, claiming and administering every concession, and their interactions, build up. The cost of this increasing complexity should be considered whenever governments look at options for delivering programs (see Section G4 Client experience of the tax and transfer system).

## Environmental land management

The environmental impacts of land use are among Australia's most significant environmental challenges. Major problems include the loss of biodiversity, the pollution of water ways, soil erosion, salinity and soil acidity (Australian State of the Environment Committee 2006). Significant changes in land management practices are needed to avoid passing irreversible environmental damage on to future Australians.

However, the tax system is generally not a practical or efficient means of driving this change due to the limitations of tax concessions discussed above.

There may be considerable national benefit in governments collectively developing and adopting a comprehensive national approach to environmental land management. A central element should be a legislated 'duty of care' on landholders, as proposed by the then Industry Commission in 1998 (see also House of Representatives 2001). This would reflect the principle that the community's right to a clean and sustainable environment overrides the rights of individuals to unrestricted use of their private property.

Several States have already moved in this direction, in relation to specific problems, by legislating for an environmental duty of care including weed control (under which farmers are obliged to take steps to prevent the spread of certain weeds on their property). Another example of such an approach is Queensland's recent strategy to protect the Great Barrier Reef from agricultural runoff pollution (under which primary producers are obliged to adopt practices that limit runoff from their land).

Indeed, duty of care arrangements — which impose obligations on land owners in order to achieve social objectives — have a long history in Australia's urban areas, being used to achieve objectives such as preserving architectural heritage or significant trees.

Some States have also legislated for a general environmental duty of care<sup>9</sup>, though these provisions do not appear to have been operationalised to any great extent, possibly due to uncertainty about what *standard* of care the duty actually imposes on landholders (see Box E-8).

### Box E2–8: A framework for an environmental duty of care

The objective of introducing a statutory environmental duty of care would be to prevent future environmental harm. It would not demand remediation of past environmental damage. It would require land managers to take all reasonable and practical steps to prevent harm to the environment.

Desired outcomes, focused on preserving ecosystem integrity, would be developed in consultation with affected parties, and incorporated into the legislative framework. Land managers employing practices insufficient to meet the desired outcomes would be considered in breach of their duty of care.

The main challenge would be to define the standard of care required precisely enough to give land managers certainty about their obligations.

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9 Queensland: *Environmental Protection Act 1994* s319; Victoria: *Catchment and Land Protection Act 1994 (Vic)*; also South Australia and the Australian Capital Territory.



Voluntary codes of practice or guidelines for catchment or sub-catchment areas would be developed. These codes would reflect best practice and provide guidance to land managers about appropriate land management practices. Adoption of a code, while voluntary, could be a defence against enforcement action.

A phased approach could be used to encourage compliance, ranging from positive measures such as providing information and advice to official warnings, administrative compliance orders and civil penalties.

Over time, scientific knowledge and technology will improve. This will have implications for the appropriate standard of care. What is expected under the duty of care should therefore be periodically reviewed.

To address this, the introduction of a statutory duty of care would need to be complemented by other instruments, such as codes of practice, indicating how the duty of care can be met. These codes should be included in all relevant jurisdictional legislation, but with the applicable standards developed and applied at an appropriate regional level to reflect environmental and geographical differences. It is important that these standards allow the adoption of flexible and innovative approaches by landholders, and minimise compliance costs.

A duty of care may impose some additional cost on landholders, but this would better reflect the true cost of production. In addition, funding available under existing government programs, such as the \$2.25 billion *Caring for Our Country*, could be used to help landholders transition to the required standard where necessary.

Under this approach, services of high environmental value that are beyond the standard of care required (such as extensive remediation of past damage) could be purchased from private landholders by governments through programs such as the Environmental Stewardship program (see Box E2-9).

#### **Box E2-9: The Caring for our Country — Environmental Stewardship Program**

Under the Environmental Stewardship Program, the Australian government purchases high-value environmental and ecosystem services on behalf of the broader community from individuals or organisations that own or manage freehold, leasehold or native title land. Landholders enter long-term contracts under which they are paid to deliver such services. The Victorian BushTender program (on which the Environmental Stewardship Program was modelled) operates in a similar way.

The objective of programs like Environmental Stewardship program and BushTender is the same as the objective of current environmental tax expenditures for primary industries, but they avoid many of the problems associated with tax expenditures. Specifically, these programs allow spending to be targeted to high-value conservation and ecosystem service areas identified by the government. The benefit the landholders receive is based on the service they offer the public, rather than the marginal tax rate they face, or whether they operate a business. In addition, government expenditure on these public goods is transparent and is reported in annual budget publications.

## Implications for existing environmental taxes

Existing environmental taxes should be retained only if they effectively address a clear market failure and if their quantum reflects the size of the spillover effect involved.

As noted earlier, some existing 'environmental' taxes are not, themselves, intended to address an environmental spillover, but are intended primarily to raise revenue to fund associated environmental programs. For example, the waste levies imposed by some States are unlikely to match the costs of providing landfill services and the environmental spillover associated with landfill. Revenues are sometimes earmarked to environmental programs (see Box E2-10).

### Product stewardship schemes

Some product stewardship schemes have the effect of raising revenue to fund associated environmental programs rather than directly targeting the environmental spillover. They target the purchase of the good that may lead to the environmental damage. Those benefiting from that production or consumption should therefore fund any programs designed to deal with the environmental damage that may occur.

If this approach is used it is important that taxing and spending programs are closely aligned. For example, using a tax that then funds a payment (of the same amount) when the product is returned for correct disposal clearly links the tax to the refund.

Product stewardship arrangements aim to reduce the environmental impact of a product throughout its lifecycle. This usually involves holding manufacturers responsible for designing and selling products that have minimal environmental impact while holding consumers responsible for ensuring their use and disposal of a product does not harm the environment.

The Commonwealth Product Stewardship Oil levy (see Box E2-10) is an example of where a levy is applied to all importers and manufacturers to fund the collection and recycling of used oil. South Australia's beverage container deposit legislation is another example. It is most likely that these taxes are passed onto consumers in the form of higher prices.

Governments should implement such arrangements only when the costs of the scheme are less than the cost of damage to the environment, human health and public amenity that the arrangements will prevent. Such schemes are most likely to be appropriate where the damage done by inappropriate disposal is high and it is difficult to prosecute the people responsible.

Reducing the consumption of resources is not sufficient reason for governments to intervene, since the price mechanism reflects scarcity. There has to be a spillover or external cost to society from consuming or disposing a particular product.

Also, each policy instrument needs to be assessed on its individual marginal benefit to the environment. For example, the benefit from applying a tax on pollution arising from production of a good should be considered and assessed independently from the benefit of reducing environmental damage arising from that good's disposal.

When evaluating these arrangements, governments should also consider the incentives they may unintentionally create. For example, beverage container deposit schemes can reduce the

viability of kerbside recycling by removing high-value glass and aluminium from the waste stream.

### **Box E2–10: Examples of environmental taxes and charges intended to raise revenue**

#### **State waste levies**

Most States impose a levy on waste disposed of in landfill as well as to the gate fee (a user charge). The levies are intended to discourage waste going to landfill. Some States hypothecate the revenue to environmental programs. The revenue collected through these levies can be substantial. For instance, the NSW Waste and Environment levy is estimated to raise \$260 million in 2008–09.

As noted by the Productivity Commission, the externalities of disposal to a properly located, engineered and managed landfill are typically small, broad landfill levies are not a practical way to target any residual externalities and, in some States, the levies impose unwarranted costs on the community (Productivity Commission 2006a, pp. 220–228). Moreover, the levies may encourage illegal dumping of waste, rather than waste minimisation.

#### **Product Stewardship for Oil Program levy**

This levy is imposed on the purchase of virgin petroleum-based motor oil produced or imported into Australia, at a rate of 5.449 cents per litre. This rate was based on an estimate of the cost of the associated used-oil recycling program.

In 2007–08 it collected \$27.6 million.

Used oil can result in significant environmental harm if it is disposed of inappropriately. However, the levy is not intended to change behaviour in relation to oil disposal. Rather, the levy raises revenue used to fund a used-oil recycling program. The merits of the associated oil-recycling program should be reviewed. As noted by Productivity Commission (2006a), the provision of a greater subsidy for recycling used oil into ‘high value’ products distorts the used-oil market. In particular, the merits of a used-oil collection subsidy should be explored.

## **Implications for other existing concessions that impact on the environment**

Tax concessions introduced for non-environmental purposes but which promote behaviour with adverse environmental consequences should be reviewed. Such a review would consider whether the social benefit of the activity supported by the concession outweighs the social cost associated with the environmental damage. Key tax concessions identified by the Review as having environmental consequences include the concessional application of fringe benefits tax to cars and certain concessions provided to the primary production sector.

### **Fringe benefits tax**

The current statutory formula for valuing car fringe benefits applies so that the taxable value of a car fringe benefit falls as total kilometres rise.

At the margin, these arrangements may create an incentive for individuals to travel additional kilometres, adding to carbon pollution and congestion. To address this issue, the

Review is recommending that car fringe benefits be valued at a single statutory rate of 20 per cent that would apply regardless of the kilometres travelled (see Recommendation 9b, Section A1 Personal income tax).

### **Concessional treatment for primary production**

Tax concessions that favour agriculture and forestry include undervaluation of natural livestock inventory increases, and accelerated depreciation for plantation forestry and horticultural crops. These provisions encourage higher levels of the favoured activities. Environmental spillovers may include excessive stocking rates and expansion of primary production into marginal areas (Freebairn 2009).

A range of petroleum excise exemptions may have unintended impacts on the environment. The petroleum excise system is considered further in Section E3 Road transport taxes.

## E3. Road transport taxes

### Key points

Current road tax arrangements will not meet Australia's future transport challenges. Poorly functioning road networks harm the amenity, sustainability, liveability and productivity of society. Moving from indiscriminate taxes to efficient prices would allow Australia to leverage the value of its existing transport infrastructure. Less congested roads, shorter travel times and investment in road infrastructure that addresses user demand would provide a foundation for further productivity growth, improved living standards and more sustainable cities.

In major cities, location-specific congestion charges would vary according to the time of day. City roads would be less congested during peak periods, with higher travel speeds and shorter travel times saving time for road users, reducing vehicle costs and reducing greenhouse emissions. The revenue from congestion charges on existing roads should flow back to the community, initially to finance public transport in affected areas.

Heavy vehicle charging would ensure that individual trucking operators pay their own specific costs and no longer cross-subsidise other operators. Truck operators would have incentives to avoid route choices and vehicle configurations that cause the highest costs, but would have access to roads and bridges where and when they are willing to pay. Revenue from road-wear charges would directly fund road maintenance.

Negative spillovers not currently amenable to pricing would be addressed through regulations. The transport sector would pay for greenhouse emissions through an economy-wide scheme, not through ad hoc sector-specific taxes.

In exchange for targeted charges, road users would pay less tax, including less fuel tax. Motor vehicle stamp duties would be abolished, compulsory third party insurance would be fairly priced, and taxi licence quantity restrictions that push up taxi fares would be removed.

The revenue from efficient charges could help finance new urban transport infrastructure, and cover the cost of heavy vehicle damage. But these charges would not pay for the full cost of providing and operating the road network. The remaining costs could be funded from general tax revenue, or by retaining a network access charge (such as annual vehicle registration) or a variable charge (such as fuel tax) set to recover the efficient costs of road provision. Important non-economic community objectives would still be funded from general revenue through well-defined community service obligations.

Spending on roads should match anticipated need. This should be determined strategically according to comprehensive and transparent benefit-cost analysis. This would help ensure new roads are built where needed, and roads are maintained to minimise total life-cycle costs, including costs to road users. Road users with specific needs could enter commercial agreements with road suppliers.

### Key points (continued)

Existing institutions have not led to the most efficient use and supply of roads. Prices are essential to making the best use of roads, but they must be coupled with improved governance that better serves the needs of road users, now and in the future. New investment based on economic criteria, and accountability for investment decisions would help ensure that roads are in place to address future needs.

The challenge is formidable. It requires coordination across all levels of government. But reform would promote the best investment in and use of our roads, lift national productivity, and improve the lives of millions of Australians.

## E3–1 Quicker, more reliable trips on less congested, better maintained roads

Every industry depends on an efficient and competitive transport sector for the timely movement of people and goods between geographically dispersed centres and for access to domestic and global markets. Australia's transport sector is also critical at a social level, providing access to jobs, services and other people. Most people use roads and bridges most days of their lives, whether as a motorist, a pedestrian or a cyclist, to get to work or school or to participate in the community. Road transport is an input to almost all the goods and services we consume.

But despite the fundamental demand for roads, road markets are subject to major market failures and poorly adapted institutions. In particular, congestion costs in urban areas are almost entirely unpriced. Road-wear charges for heavy vehicles do not accurately reflect the damage that particular vehicles do to the roads. These deficiencies impose large costs on the Australian economy.

These costs affect not only individual drivers, but also reduce the nation's wealth — much of which is generated in urban areas that are affected by congestion. Capital cities contributed 78 per cent of the nation's economic growth between 2001 and 2006 (Infrastructure Australia 2008). Much of the innovation and invention that drives sustainable growth occurs in cities and has led to the saying that 'cities are the engines of growth' (Lucas 1988). However, opportunities for growth are hindered by poor use of infrastructure.

In making decisions about where, when and how to drive, road users sometimes make choices that delay others, damage public roads or pollute the environment. Road prices that reflect congestion, road-wear and environmental costs would give road users both the information and the incentive to reduce the trips that are most costly to society. (The potential to use motor vehicle taxes to improve the environment is discussed in Section E2 Taxes to improve the environment.)

This section proposes a major reform of road transport taxes. The vision for road tax reform is for quicker and more reliable trips on roads that are less congested and better maintained. All road users, private and commercial, would save time, vehicle and fuel costs. All drivers would have real incentives to choose different routes, times or transport modes, so as to produce lower emissions and less noise, and help create more sustainable and liveable cities.



Taxes on roads or road user charges should principally be used to provide signals that improve the use or building of roads. There is also a case to recover a fixed-cost component of road use as an access fee or user charge. Coupled with institutional reforms, this could improve accountability in the provision of roads. Fuel tax and other transport taxes are not an efficient or equitable means of financing general government expenditure.

The reforms to road transport taxes proposed in this section would help achieve a road system that meets the social and economic demands of both the general public and the freight industry. The financial incentives for transport agencies would be more closely aligned with the demands of road users. Businesses with specific transport needs could negotiate with road suppliers to provide key infrastructure or service guarantees.

The current institutional architecture is not well-g geared to the efficient use and supply of roads. In conjunction with improved pricing, the institutional structure needed to mediate the efficient supply of, and demand for, road infrastructure must be considered. This will require cooperation among governments.

The discussion of roads in this Review is predicated mainly on existing technology for road pricing. In the long term, further technological changes may enable further reforms. The changes to institutional arrangements suggested in this section would facilitate innovation based on such developments.

### Principle

Transport-specific taxes should only be imposed where they improve the way that people, businesses and governments make decisions. In general, this means that transport taxes should be designed to correct market failures in the transport sector – specifically, to ensure that users of transport make decisions based on the full costs of their activities on the community (including unpriced costs that spill over to others and the cost of consuming infrastructure).

## E3–2 The current system raises revenue, but harms efficiency

In 2006–07, the Australian Government collected around \$14 billion in fuel tax, of which roughly \$4 billion (ATO 2008) was returned through the fuel tax credit scheme. While fuel tax credits primarily remove tax paid on off-road use, they also make fuel tax used in heavy on-road vehicles partially refundable. Part of the fuel tax credit is withheld as a ‘road user charge’. Light vehicles, including vehicles used for business, are not entitled to fuel tax credits. Deducting fuel tax credits from fuel tax revenue leaves net fuel tax of around \$10 billion per year for the Australian government.

In the same year, the States collected a further \$6 billion from road users through annual motor vehicle registration charges, stamp duties on the sale of new and used vehicles, surcharges and levies on compulsory third party insurance, car parking space levies, and other minor taxes (Clarke & Prentice 2009, p. 29).

Collectively, this amounts to around \$16 billion collected annually from road users in additional taxes. This combination of annual motor vehicle registration and fuel excise could be viewed as a crude ‘two-part tariff’ for road usage. While road taxes are not hypothecated

(that is, earmarked) to road spending, revenue from these taxes does cover the direct cost of infrastructure spending on roads and bridges, which was \$12 billion in 2006–07. A range of additional costs are also borne by governments in relation to roads (for example, policing, justice, emergency services and additional health expenditure). Nevertheless, it is an open question whether these should be financed through specific taxes on road users, or whether the community at large should pay through more efficient taxes.

There are a range of costs that are not, and cannot be, efficiently priced using the traditional 'fuel tax and rego' model. For example, the costs of urban congestion (which vary according to location and time of day) as well as the costs of road-wear caused by heavy vehicles (which vary according to the mass, distance and location of travel) cannot be efficiently priced through fuel tax. This is because the costs are not closely related to the amount of fuel used. These costs are large, and if not addressed through changes to the way roads in Australia are priced, are set to grow further.

Moreover, the supply of roads and bridges, and access to them for heavy vehicles, is not always responsive to the economic needs of businesses and other users.

### **Finding**

The existing structure of fuel tax, annual registration and other road-related taxes is designed primarily to raise revenue. These taxes more than cover the direct costs of providing road infrastructure, but are not capable of providing specific prices that vary according to location or time of use.



## E3–3 Road pricing should reflect social costs

### Recommendation 61:

Governments should analyse the potential network-wide benefits and costs of introducing variable congestion pricing on existing tolled roads (or lanes), and consider extending existing technology across heavily congested parts of the road network. Beyond that, new technologies may further enable wider application of road pricing if proven cost-effective. In general, congestion charges should apply to all registered vehicles using congested roads. The use of revenues should be transparent to the community and subject to further institutional reform.

### Recommendation 62:

The Council of Australian Governments (COAG) should accelerate the development of mass-distance-location pricing for heavy vehicles, to ensure that heavy vehicles pay for their specific marginal road-wear costs. Revenue from road-wear charges should be allocated to the owner of the affected road, which should be maintained in accordance with an asset management plan. Differentiated compliance regimes to enforce this pricing policy may need to be considered to balance efficiency benefits from pricing against the costs of administration and compliance for some road users.

### Recommendation 63:

States should improve compulsory third party insurance to better reflect individual risks.

### Recommendation 64:

On routes where road freight is in direct competition with rail that is required to recover its capital costs, heavy vehicles should face an additional charge on a comparable basis, where this improves the efficient allocation of freight between transport modes.

For road users to make the best decisions about where, when and how to travel, they need to know the relative costs and benefits of each available choice. They most often choose the trip that is quickest or cheapest for them. The most obvious costs they incur are the private costs of vehicle operation, any road tolls and the time taken to travel. Each individual and business faces these costs and makes decisions based on them.

But there are additional costs that road users do not pay. The cost of the delay they cause others at peak hour, the wear that a particular truck causes to a specific road, or the local pollution caused by an individual trip, are all costs that ‘spill over’ onto other road users and the community at large. Because these costs are not priced directly, road users have little incentive to take them into account.

Some level of spillover cost is unavoidable. The costs that spillovers impose on society need to be balanced against the costs of reducing them. The road-wear cost saved by closing a road to heavy vehicle traffic may be far less than the cost of the freight going by a longer alternative route or not being transported at all. The costs of eliminating congestion entirely would far outweigh the benefits.

If people faced prices that included the costs of spillovers, they would make better decisions from the point of view of society as a whole. Congestion costs can be reduced by travelling at different times of the day, by taking a different route, by choosing to catch a bus or train, to cycle or walk, to share a private car or taxi, or by using the telephone or internet instead. A well-functioning and efficient road network would help achieve the best use of infrastructure for society by providing clear and direct price signals to potential road users.

In technical terms, potential road users should face the 'short-run marginal social cost' of accessing the road. They are 'short-run' because they consider the use of only the existing road, without regard to how future roads would be financed. 'Marginal' means that it is the impact of the additional (or next) decision to use the road that is relevant. For example, the marginal cost of driving outside peak times is much lower than the average daily cost (which includes congested peak times). Finally, 'social' refers to the costs to society as a whole — including spillover costs. In contrast, 'private' costs are the costs incurred by the individuals whose activities give rise to the costs.

Individuals mostly make decisions based on private costs. If private and social costs can be brought into alignment, individuals will make the best decisions for society as a whole.

### Principle

Variable road prices should be set to reflect the short-run marginal social cost of road use, which includes spillover costs.

## The costs and benefits of targeted prices

The more closely targeted the price is to the activity that gives rise to costs to society, the better the resulting allocation of resources. Blunt instruments do little to improve efficiency. For example, while fuel tax marginally reduces road use, it has a relatively trivial impact on spillover costs such as congestion or road damage that depend on where and when vehicles travel. To have much effect on congestion, fuel tax would need to be set at a high rate that would significantly over-tax drivers on uncongested roads.

Improved road pricing also has some offsetting costs, particularly administration and compliance costs. The theoretically ideal pricing system would have prices continuously varying by time and location. While technology is advancing rapidly, the costs of pricing the entire network this way and the ability of road users to respond to the information mean that, in practice, a great deal of averaging over time and location will be necessary, pending major improvement in the cost-effectiveness of emerging technology.

This should not prevent the realisation of substantial gains from efficient pricing using current technology. Most congestion costs are highly concentrated at certain places and times and road-wear costs are significant only for specific types of vehicle.

The degree to which road taxes should be targeted therefore depends on a trade-off between the economic gains from better resource allocation and the economic costs and community acceptance of imposing a road pricing regime.

### Principle

Taxes or charges to improve efficient use of infrastructure should be imposed only where the benefits of improved resource allocation outweigh the additional administration and compliance costs. Compliance regimes should be designed to ensure that implementation and transaction costs are not disproportionate to the benefits.

This trade-off between costs and benefits is changing. The cost of road pricing technology has fallen significantly in the past few decades, and the technology is now sufficiently mature to support limited road pricing for specific applications (see Box E3-1). For example, full electronic tolling under free-flow conditions is already in place on many urban toll roads. If current trends continue, the cost of technology will continue to fall.

### Box E3-1: Telematic technology in heavy vehicles

Excise fuel taxes have been the primary method of collecting road charges for close to a century. While this form of revenue collection has low costs and is easily administered, technological advances have the potential to enable road pricing that can vary according to vehicle types on specific roads. These telematic technologies have high up-front costs, including the installation of in-vehicle units (IVUs) and toll gates, but could make road user charges for heavy vehicles based on mass, distance and location a reality and facilitate enhancements to road networks.

Telematics technology is only in its infancy but it has much potential. European Union countries currently use IVUs to charge congestion fees and road user fees for heavy vehicles according to the vehicle's class, mass, duration and time of travel. Further advances in telematic technologies and reduced costs would make the installation of IVUs in small vehicles feasible and create the possibility of integrated road networks.

Integrated road networks with telematics technologies can provide real-time traffic flow data to traffic management systems, from which automobile navigation systems can calculate optimal travel routes, coordinating the entire road network and reducing overall travel times. Telematics can also enhance the safety of the network by switching vehicles to auto navigation in the event of a near collision. Additional benefits include telematic drive-as-you-go insurance, mobile data transmission and emergency warning systems.

### Urban congestion

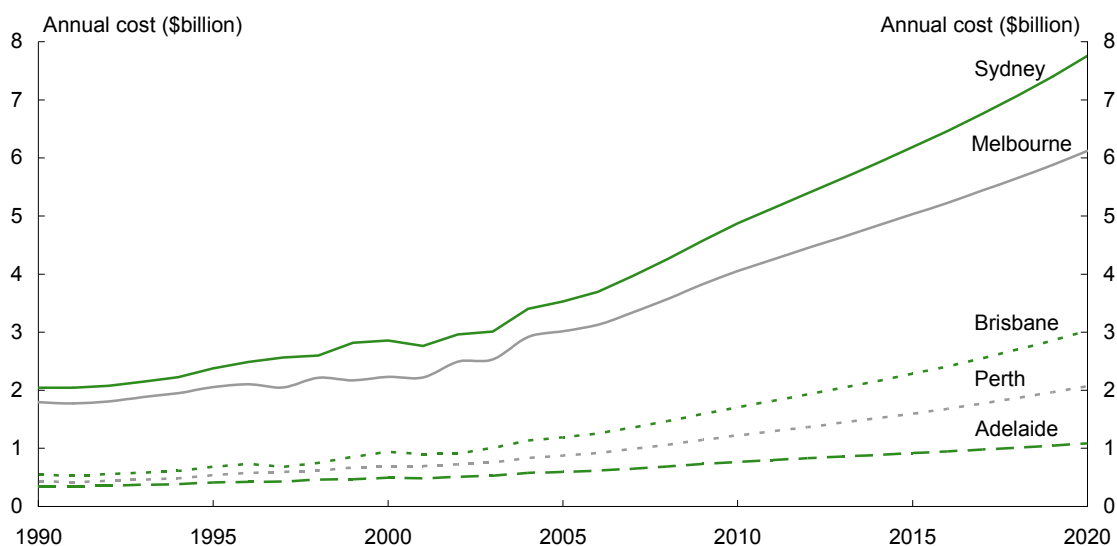
One of the largest spillover costs from road transport is congestion in Australia's major cities. The typical costs associated with congestion include travel delays, variable travel times (unreliability), higher vehicle operating costs (including higher rates of fuel consumption), reduced productivity, increased driver and passenger stress, additional greenhouse gas emissions, poorer urban environment and air quality (as vehicles under congested conditions emit more pollutants than vehicles under free-flow conditions) and, as a consequence, higher health costs.

Congestion costs are increasing. In the absence of road pricing, the Bureau of Transport and Regional Economics (2007) forecasts that the avoidable social costs of congestion will rise to

around \$20.4 billion by 2020. This estimate is based on 'business as usual' assumptions about road investment and management.

These costs are concentrated in large capital cities at peak times. The projected costs are set out in Chart E3–1 below. They increase with population growth and economic activity.

**Chart E3–1: Social costs of congestion for Australian metropolitan areas**  
Base case projected estimates (1990–2020)



Projected costs for Canberra, Hobart and Darwin are less than \$1 billion in 2020. Time costs are based on deadweight losses for current congestion. That is, social costs refer here to the estimated aggregate costs of delay, trip variability, vehicle operating expenses and motor vehicle emissions — associated with traffic congestion — being above the economic optimum level for the relevant network.

Source: BTRE (2007, p. 109).

Congestion not only imposes costs now, but evidence suggests it also harms long-run growth in heavily congested cities. One reason is that congestion is felt largely around work times, which affects the cost of doing business and getting to work. Congestion acts like a tax on employment, but without any revenue flowing to government. For example, a recent study estimated that, in the United States, a 10 per cent increase in congestion for a heavily congested city such as Los Angeles reduces long-run employment growth by around 4 per cent (Hymel 2009). Poor management of infrastructure therefore reduces productivity.

### Findings

Traffic congestion is concentrated in Australia's largest cities. Under a 'business as usual' scenario, the avoidable costs of congestion may grow to around \$20 billion in 2020. These costs are concentrated in specific locations, with levels of congestion varying throughout the day.

Most other roads are uncongested virtually all the time, and many urban roads are uncongested at night. Vehicles on these roads impose negligible congestion costs.

### Non-price policy responses are limited

Faced with an imbalance between demand for road space and its supply, one option is to increase the supply of roads. While this may have worked in the past, it is likely that for most major Australian cities the cheapest supply-side options have already been taken.

Acquiring more land for urban roads, building new bridges or digging new tunnels are expensive ways to meet future needs. While additional investment in new roads does expand road capacity, it does not lead to an efficient allocation of road space.

Even where expanding capacity is affordable, there is also a question of how many additional roads — and how much additional traffic — can be introduced without undermining the liveability of Australia's major cities, the sustainability of the urban environment and the management of urban sprawl. Evidence from cities in the United States between 1983 and 2003 found that the extension of most major urban (unpriced) roads induces a proportional increase in traffic (Duranton & Turner 2009). A survey of several studies suggests that, within three years, 50 to 100 per cent of new capacity is filled with induced traffic — that is, with new road users (BITRE 2008).

Non-price measures to reduce congestion, such as TravelSmart, also give rise to induced traffic.<sup>10</sup> The additional capacity they create is soon filled up by new road users. This effectively expands supply, which brings economic benefits to the additional travellers.

Introducing congestion pricing does not negate the need for expanded supply of roads in many cases, or other non-price measures. However, pricing is needed to leverage the value of urban road space, to ensure that investment in road capacity is put to its highest value use.

### **Congestion can be reduced by targeting prices to time and location**

Congestion can be reduced by imposing a charge or tax that varies according to prevailing levels of congestion. In practice, this means a variable tax that rises at peak periods, falls away as usage falls, and is zero when there is no congestion. In theory, the tax should be different for different roads and should change at each intersection along any particular road. The purpose of this tax is to reflect the social marginal cost of congestion, and provide incentives for some people to avoid the tax by changing their travel behaviour.

Traffic flows would improve, as fewer vehicles would demand access to roads at peak times. There would be less delay and roads would be used more evenly throughout the day. Congestion would be more widely spread geographically as some road users shifted from the most congested roads to other roads. The purpose of congestion charging is not to eliminate congestion altogether, but to ensure that road users make decisions that reflect the full costs their travel imposes on society.

In theory, a congestion charge or tax would apply to all vehicle types and road users. It would take into account the size of different vehicles. For example, a motorbike takes up significantly less space on the road than an articulated truck and would be charged accordingly. Limited exceptions may be necessary in some circumstances (most obviously, for emergency vehicles).

Congestion charges should be the same for both business and private users, as the spillover costs of congestion are the same for each (see Recommendation 61). However, individual road users will place different values on faster travel, better reliability and reduced driver stress. Road users who need to arrive at their destination quickly or punctually, such as a

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<sup>10</sup> TravelSmart programs by the Australian and State governments ask people to make voluntary changes in their travel choices, encouraging people to use other ways of getting about rather than driving alone in a car — for example, using buses, trains and ferries, car-pooling, cycling or walking, or through tele-working.

courier or a person going to a job interview, would probably be better off despite having to pay the congestion tax (see Box E3–2 following).

### **Box E3–2: Getting to the airport on time**

While much of the cost of urban congestion falls on commuters, for some people the costs can be more acute. A missed flight not only costs money, but ruins holidays and throws out business schedules.

Tollways already serve many of Australia's major airports, using technology that could readily be adapted for variable pricing.

If at least one lane, to and from the airport, were priced to keep traffic flowing, then an express option with a higher fee would always be available to passengers to get to the airport on time, or to get into town quickly. It would provide an express option when the congestion charge costs less than missing a flight or a meeting.

Moreover, by taxing only one lane, the congestion charge would be optional. People who leave plenty of time before flying would not need to take the express lane. This would also demonstrate the practical benefits of congestion charging compared to conventional roads.

Congestion charges are fundamentally different from conventional road tolls. Road tolls are typically designed to recover the capital cost of building a particular facility (for example, a specific road or bridge). Typically, the toll is the same whether a vehicle is driving at night or at a peak time. In fact, contractual arrangements between toll road operators and State governments often prevent prices from being adjusted to manage congestion levels (Clarke & Hawkins 2006). By contrast, congestion charges are set on a variable basis to ensure the best use of the asset, and fall to zero at times of low demand.

The costs and benefits of particular congestion charging arrangements would vary from city to city and between different parts of the same city. As a first step, there are likely to be benefits from introducing variable congestion charges on individual tolled lanes, or from converting existing toll roads to congestion pricing (see Recommendation 61).

The introduction of simple congestion premiums on the Sydney Harbour Bridge and Tunnel shows that time-variable pricing is feasible using technology that is already in place on some Australian roads (see Box E3–3). Moreover, a major Australian toll road provider is currently building a road in Virginia in the United States, with some lanes that will be tolled using fully electronic time-variable pricing, designed to ensure a free flow of traffic in those lanes at all times.



### Box E3–3: Electronic time-of-day tolling on Sydney Harbour Bridge and Tunnel

The objective of time-of-day tolling for the Sydney Harbour Bridge and Tunnel was to encourage use of the road network outside peak times, thereby easing congestion on the network during the peak times. The tolling arrangements are:

- Motorists travelling from 6.30 am to 9.30 am and from 4 pm to 7 pm on weekdays pay an increased toll of \$4 to use the harbour crossings.
- For motorists who travel during 9.30 am to 4 pm weekdays and from 8 am to 8 pm on weekends the original \$3 toll applies.
- At all other times motorists pay a reduced toll of \$2.50.

The full impact of time-of-day tolling is difficult to quantify due to the influence of other factors that affect driver behaviour.

However, to date the data show an increase in the number of vehicles travelling into the city via the harbour crossings in the hour before the peak period, and a corresponding decrease in the volumes during the 6.30 – 9.30 am peak period in 2009, as compared to the same period in 2008.

Source: Road Traffic Authority NSW (2009).

Where tolls are levied by private infrastructure operators, State governments should negotiate to compensate operators if the switch to variable tolls involves a loss of revenue. If there is a gain in revenue, the operator should be required to pass the gain either to the government or to road users through reduced toll levels at off-peak times.

The effect on other parts of the road network of pricing just one part means that the costs and benefits of partial pricing need to be carefully considered, as do the institutional arrangements for setting and monitoring congestion charges. Over time, congestion pricing should extend to all significantly congested parts of the road network, subject to cost-benefit assessment and the pricing technology available.

The introduction of direct congestion pricing would allow indirect measures to deal with congestion, including parking space levies in inner cities, to be withdrawn.

### Finding

Road pricing technology already in use on tolled Australian roads could be used to introduce variable congestion pricing in a range of circumstances.

### Compensation for congestion pricing

Charging for congestion has different effects on different road users. Those who value their time most highly, and have the means to pay, would receive a net benefit from a faster, more reliable and less stressful journey in exchange for paying the charge. Road users who are unwilling to pay the charge would have options to travel via different routes or at different times, to car-pool, to take public transport, or not to travel at all. Other road users —



particularly those who do not already have access to frequent and reliable public transport services — would have no alternative but to pay.

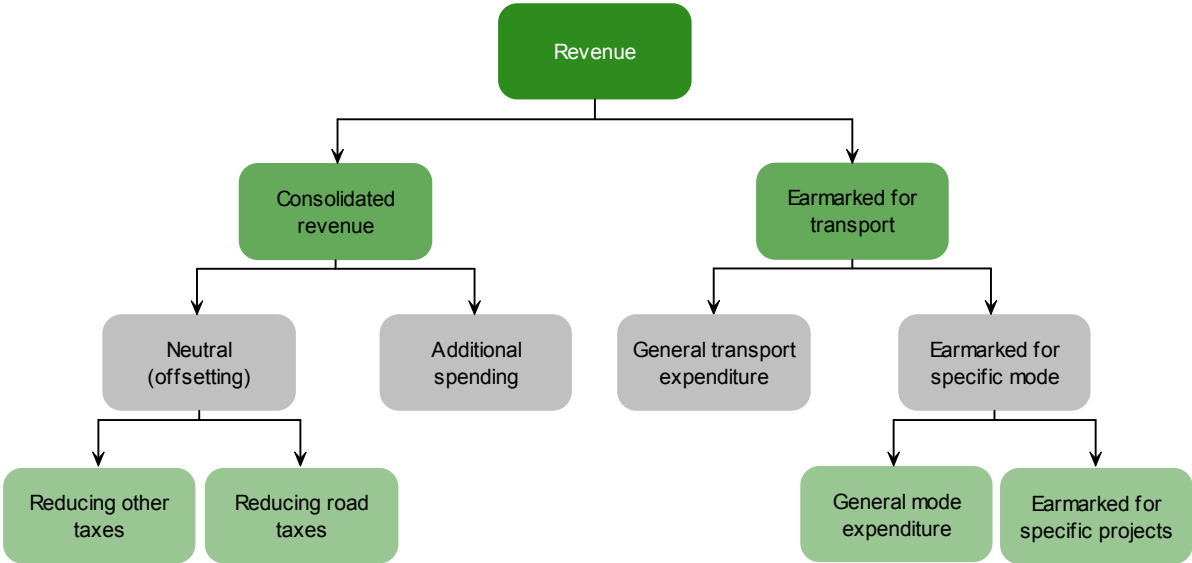
In the long run, people and businesses would adapt, which could lead to more compact urban centres. People would make different choices about where to live, work and study after taking into account the currently unpriced costs of congestion. City dwellers and road users would benefit from improved traffic conditions.

However, for some motorists time savings may not outweigh the cost of the charge, or an absence of transport alternatives in some areas may give groups in some areas little alternative but to pay the tax. Given that the goal of this tax is to correct a market failure, not to raise revenue for government, some form of compensation for these groups could be necessary to ensure broad community support (Hubbard 2009).

This issue of how funds are used is important. If revenue from congestion charging is available for State general purposes, they would have an incentive to allow congestion to increase — in effect charging a rent tax on cities. For this reason, how congestion revenue is used needs to be made transparent (see Recommendation 61).

The Bureau of Infrastructure Transport and Regional Economics (2008) surveyed a range of potential options for using the revenue from congestion charging (see Chart E3-2).

**Chart E3-2: Options for disbursement of (net) congestion charging revenue**



Source: Adapted from BITRE 2008.

Of these, there is a strong theoretical argument for using congestion revenue to cut taxes on the labour of affected workers (Parry & Bento 2001), though it would be difficult in practice to identify and target all potential users of the congested roads. Coordination between Australian and State governments may be needed to ensure that motorists are not paying twice for roads, and that the impact on vertical equity of road pricing is appropriately addressed.

In the short term, the introduction of congestion pricing on existing roads would place stress on existing public transport services, and make it more apparent where these are inadequate. For this reason, the introduction of congestion charging needs to be coordinated with (and to help finance) additional investment in public transport for affected communities. Congestion

charges can also help finance the provision of new road capacity in congested areas (see Section E3-4 How should roads be financed?).

### Heavy vehicle road-wear

Another significant cost of road use is the wear on the road. Australia's road network comprises more than 337,000 kilometres of sealed roads (BITRE 2009, p. 32). Roads deteriorate over time, and require ongoing maintenance to keep them up to standard. Some deterioration is purely time- and climate-related. However, the Productivity Commission's (2006) survey of cost allocation studies for road maintenance expenditure showed that between 32 and 100 per cent of maintenance costs are due to heavy vehicles. The remaining unattributable costs are the same regardless of usage. Cars do negligible damage to roads.

Road-wear attributable to heavy vehicles increases exponentially in accordance with the loaded axle-weight of the vehicle. However, the current fuel-based road user charging is levied at a flat rate per litre of fuel – independent of the vehicle, where it is driven or the actual road-wear caused. While fuel use increases with the mass of the load being carried, it does so at a decreasing rate due to economies of scale in vehicle size (Productivity Commission 2006, p. 120). If fuel-based charges alone were used to pay for road-wear, they would over-recover costs at the low end of the range of heavy vehicle sizes and under-recover at the high end. In practice, registration charges that increase with vehicle size are used to make up the difference.

These current arrangements (see Box E3-4) still lead to over-recovery from some heavy vehicles (those that travel fewer annual kilometres, are more lightly laden than the average or are less fuel efficient) and under-recovery from others (those that travel further than the average, or are more heavily laden, or are more fuel-efficient than the average).

Existing charges do not fully reflect the wear that trucks do to individual roads. Pavement durability varies across the road system. Generally, the more heavy vehicles use a road, the greater the appropriate level of investment in pavement durability and in other road assets, such as bridges. Pavements on minor roads are constructed with less strength and therefore suffer more wear from heavy vehicles. Prices that do not differentiate between individual roads give users limited incentive to consider the full road-wear consequences of their decisions about mode, route and types of truck.

### Box E3–4: Existing heavy vehicle charging

The Australian Transport Council is responsible for the national operation of a road user charging system for heavy vehicles. This system is designed to recover the cost of ongoing road maintenance for the wear caused by heavy vehicles transporting road freight, as well as making a contribution to the fixed costs of the road network.

The National Transport Commission determines heavy vehicle user charges so as to recover fully those infrastructure costs attributed to heavy vehicles. This includes all vehicles in excess of 4.5 tonnes that access the road network. Charges are recommended by the Commission and decided by vote of the Australian Transport Council, comprising ministers for transport from all jurisdictions. Charges recommended by the Commission are set so that the total revenue generated by these charges recovers that portion of road expenditure associated with heavy vehicles.

The charges comprise a per-litre reduction in eligibility for fuel tax credits and an annual registration charge that varies by vehicle class. The fuel tax component (called a road user charge) is levied by the Australian government. From 1 July 2009, the road user charge is 21.7 cents per litre.

The Productivity Commission (2006) noted that around 30 per cent of the costs associated with heavy vehicle road use are recovered through State government registration fees. These fees are adjusted each year to help keep pace with road spending. Since 2006, the registration proportion has risen and the annual adjustment has been extended to the road user charge component.

The current arrangements also prevent road owners from receiving compensation from users for damage to their assets. Instead of being compensated through road damage charges, road owners (such as local councils) sometimes try to protect the value of their assets through prescriptive regulations or access restrictions.

### Finding

Heavy vehicle charges may currently cover the aggregate costs of road-wear, but these charging arrangements do not generate prices or revenues that are closely aligned with social costs. Australia's heavy vehicle task is diverse; as a result there are significant cross-subsidies between different trucks on different routes. This provides little incentive to choose combinations of route, vehicle configuration and loaded mass that take into account the impact on roads. Moreover, road owners, including local governments, do not receive compensation directly from heavy vehicles for the road-wear they cause.

Trucks should pay for the specific road-wear they cause. Charges for road-wear would be based on the actual loaded weight of a truck and vary according to the particular roads on which it travels. Revenue from these charges could be used to compensate road owners (including local governments) for the maintenance costs attributable to the truck.

This process would need to be accompanied by transparent institutional arrangements, to ensure that road owners do not have incentives to maintain roads poorly in order to increase road-wear charges. For this reason, the receipt of revenue from road-wear charges should be contingent on the road owner adhering to a management plan based on economically or

socially warranted standards of road condition and pavement durability (see Recommendation 62).

#### **Box E3–5: Avoidable capital costs of pavement durability**

There is a view that heavy vehicle pricing should allocate the capital costs of building stronger pavements to heavy vehicle classes. Under this approach, the additional capital cost of building pavements to handle trucks that cause above a given amount of damage is allocated to those trucks.

However, road use pricing theories suggest that this approach does not make best use of available resources once the investments are made. The benefits should be compared with the costs before decisions are made about the most damaging truck types to allow on the network, the maximum loads they are permitted to carry and the pavement strengths to provide.

Once the pavements have been built, it is wasteful to exclude trucks from the network by charging above the short-run marginal costs they actually impose. On the other hand, this approach to road pricing requires that the general taxpayer pays the infrastructure costs of roads attributable to heavy vehicles. In practice, the opportunity cost for government in making these investments might be high.

There may be supply incentive and horizontal equity arguments favouring an allocation of these costs to trucks, and to generate revenues to road owners making these investments; however, these come at some cost to efficiency.

#### **Introducing mass–distance–location pricing**

Through its Road Reform Plan, the Council of Australian Governments (COAG) is developing better charging arrangements for heavy vehicles. Its investigation of the feasibility of mass–distance–location pricing is scheduled for completion by December 2011. This process includes a research and policy reform agenda that aims to lay the foundations for alternative models of heavy vehicle road pricing, and to evaluate the costs and benefits of moving to more direct road pricing. Receiving this report earlier could accelerate road pricing reforms (see Recommendation 62).

Pricing based on mass, distance and location would not necessarily require a sophisticated technological solution installed in every truck, particularly those whose road-wear damage costs are small or whose use is occasional. In such cases, the costs of installing and maintaining technology, such as telematic units, might outweigh the efficiency gains from targeting costs. Where possible, technology should be used to support implementation of the policy – but the implementation of technology is not itself a tax policy goal. This approach recognises that the road freight task in Australia is exceptionally diverse.

At one end of the spectrum are very heavy vehicles such as B-triples – weighing up to 82.5 tonnes and measuring up to 36.5 metres in length. These vehicles are used primarily on long-haul intercity routes, and are employed almost constantly throughout the year. Many of them are already fitted with telematic devices for their own fleet management purposes. If road damage is to be priced through mass-distance-location pricing, then a targeted compliance regime for this policy may require information on the loaded weight, distance travelled and roads travelled by some vehicles to be recorded by a certified telematic device.

At the other end of the spectrum, some vehicles may be used only occasionally, on a limited range of roads or for specific tasks. For example, a farmer may use a heavy vehicle three to four times a year as a means of transporting produce to market. In some cases, the costs of installing and maintaining a finely calibrated telematic device are likely to outweigh any efficiency benefits. It may be better to establish a compliance regime based on self-assessment of distance travelled, licensed rather than actual mass, and a reasonable estimation of the types of roads travelled (see Recommendation 62).

### Other environmental and amenity costs

Cars and trucks generate a wide range of other spillovers, such as changing the character of cities, and reducing the amenity of the urban environment. In particular, there is an emerging literature highlighting the risks of 'community severance' related to roads. This can be related to physical barriers (imposed by road infrastructure on pedestrians, cyclists and motorists), psychological barriers (including concerns about traffic noise and road safety), and social impacts (particularly on neighbourhood communities) (Department for Transport 2005).

While these have a significant impact on people's quality of life, there may be a limit to the extent they can be targeted directly through road charges. To impose a charge requires a clearly defined activity or person to tax, and evidence to determine the tax rate. Managing some spillovers can be complex and more easily achieved through planning. That said, introducing congestion pricing would help reduce many of these negative spillovers and encourage density near public transport nodes.

The following subsections discuss some of these spillover costs.

#### Greenhouse gas emissions

In addition to creating urban congestion and road-wear, road transport also imposes a significant spillover cost on the environment. In 2005, transport accounted for around 14 per cent of Australia's greenhouse gas emissions — with road transport contributing almost 90 per cent of transport emissions (Australian Government 2008, pp. 6–9). At the time, transport emissions were the second-fastest growing category of emissions.

Changes in the climate induced by an increased concentration of greenhouse gases in the atmosphere are now widely recognised as a significant spillover from the use of fossil fuels. However, unlike air pollution, which imposes localised costs that vary across regions, the impacts of greenhouse gas emissions are global in nature. An economy-wide response offers the most efficient way for Australia to contribute to global emissions reductions (see Section E2 Taxes to improve the environment).

When the proposed Carbon Pollution Reduction Scheme (CPRS), or similar scheme, comes into operation, it would be inefficient to impose taxes on transport or fuel specifically to reduce greenhouse gas emissions. The different costs of greenhouse gases associated with different fuels would be most effectively targeted using the CPRS, which would provide a relative price advantage to greener fuels.

That said, the other reforms suggested in this section may have incidental effects on greenhouse gas emissions. For example, reducing congestion would also remove the emissions associated with it. On the other hand, any reduction in fuel tax could marginally

increase fuel use. However, the environmental impact of any corresponding increase in fuel use would be more than offset by the introduction of a broad-based CPRS, which would lead to a more efficient outcome than imposing a heavier tax on transport. A further practical difficulty arises in determining the appropriate point in the application of the CPRS for the application of full adjustment to fuel taxes.

### Finding

In principle, greenhouse gas emissions are best dealt with through an economy-wide tool, such as the proposed Carbon Pollution Reduction Scheme.

### Local pollution and noise

Vehicles generate significant levels of local air pollution and noise. The health impact of air pollution from motor vehicles was estimated at between \$1.6 billion and \$3.8 billion for 2000 (BTRE 2005). However, because most pollution costs are highly localised and contingent on engine and fuel types, attempting to measure them directly for taxing or charging purposes may not be practical with current technology. Alternative policies, such as fuel and engine standards, may be a better way to target this type of pollution, recognising that these impose costs on all road users.

Similarly, problems of measuring vehicle noise – and putting a value on the harm it causes – mean that tax is unlikely to be an appropriate instrument to mitigate this spillover cost. It can, however, be mitigated through improved road design, housing insulation, movement restrictions for certain vehicles and environmental planning policies, as well as engine design and in-service maintenance standards for heavy vehicles. These approaches also have costs, and will be imperfect.

In some cases the costs of addressing spillovers using current technology would exceed the benefits from doing so. Nevertheless, where local pollution and noise costs are highly correlated with congestion, it may be possible to build these spillover costs into a congestion charge. It may also be possible to use pricing more extensively as lower cost technology becomes available.

### Finding

The spillover costs of noise and air quality are locally concentrated and difficult to measure and value. Where these costs are closely related to congestion, they might be priced into congestion charges. Otherwise, they could be addressed, at least in part, through appropriate regulations.

### Accident, policing and other regulatory costs

The risks associated with road use require substantial government regulatory and operating expenditure. While some of these costs are fixed, others vary with the use of roads. For example, police expenditure on road safety and traffic management was estimated at \$674 million in 2006–07 (Commonwealth Grants Commission 2008 p. 7), not including further costs relating to the administration of the justice system.



Road accidents are a source of further spillover costs to the Australian community. There were 1,616 road fatalities recorded in 2007 (BITRE 2009). The Bureau of Transport Economics (2000) estimated the total cost of accidents in Australia in 1996 at \$15 billion (1996 dollars). Of this, \$8.4 billion were 'human costs' such as death and injury, and the remainder were property and other costs. Many of the direct accident costs associated with road use are spread across individuals and businesses through a range of State-based legal liability rules and compulsory third party insurance (CTP) arrangements.

However, these compulsory third party charges are not specific to individual risk profiles. In this way, they are more akin to a tax on all road users to fund an insurance pool, than an actuarially determined insurance premium that rewards safer drivers. The NSW premium model does better reflect risk than the community-based premium concept adopted in other jurisdictions; however, this is not a pure individually risk-priced model and has high administration costs.

### **Finding**

Compulsory third party insurance premiums are not charged on the basis of individual risk or driving behaviour.

Existing CTP schemes provide little incentive for riskier drivers to drive less, or to drive more carefully. The introduction of distance-related pricing for driver insurance would give explicit recognition to the fact that road safety diminishes, and the likelihood of road accidents increases, with distance driven. For other insurance products, private insurance companies are seeking to remedy this misalignment of risk through the introduction of pay-as-you-drive insurance, under which drivers pay a higher insurance premium the further they drive.

One option that could be explored is linking CTP insurance to driver licensing charges. A rebate (total or partial), based on the individual's driving history, as reflected in demerit points, is feasible, reliable and has a direct link to road safety campaigns.

Recommendation 63 proposes that States improve CTP insurance to better reflect individual risks.

### **Freight allocation between road and rail on specific routes**

Like roads, the provision of rail infrastructure has strong economies of scale and lumpiness of investment; however, it is operated on a broadly commercial basis. It must charge above its short-run marginal costs to achieve cost recovery. The Productivity Commission (2006) found that, in practice, rail fails to cover its full economic costs on many routes, although it is intended to do so. Requiring trucks to meet only the short-run marginal costs of the infrastructure they use raises concerns about competitive neutrality with rail.

For most of the road network, there are no parallel railway lines and no modal competition. But for the major corridors in the national road network, the two modes are, to a varying extent, substitutes (BITRE 2009). As these roads are the most heavily trafficked non-urban roads for trucks, they are built with the strongest pavements and hence have the lowest road-wear costs.



Under the short-run marginal cost principle discussed earlier, charges for heavy vehicles generally and, in particular, for heavy vehicles travelling on these routes, would be lower than they are now. A consequence could be a major shift in mode share from rail to road. In the short term there may be increased congestion, environmental costs and accident costs. In the longer term, there may be increased need for investment in road capacity and closure of railway lines. This could be a less economically efficient outcome than the present situation.

### Findings

In Australia, different transport modes tend to complement each other rather than compete. However, on specific routes there is significant competition for freight between road and rail. Where access to rail is priced above its short-run marginal cost for cost recovery purposes, competition with road freight priced at marginal cost might lead to an inefficient allocation of freight between road and rail.

One approach would be to subsidise rail and have both modes charge at short-run marginal cost. However, subsidising rail could lead to other problems. In particular, it could reduce incentives for efficient management and operations. Another solution would be to charge heavy road vehicles above the costs of road-wear to the extent necessary to ensure a reasonably efficient modal split for freight, subject to the constraint that rail covers its full costs (see Recommendation 64).

In practice, it is extremely difficult to estimate the amounts to add on to heavy vehicle road-wear costs to achieve the most efficient modal split. The existing road pricing system, which allocates part of the fixed costs of the road system to heavy vehicles on a vehicle-kilometre basis in addition to the attributable road-wear costs, imposes charges on heavy vehicles that exceed road-wear costs. While this amount is not in any sense economically efficient, it might lead to better intermodal allocation on some routes than a pure short-run marginal cost pricing approach.

## E3–4 How should roads be financed?

### Recommendation 65:

Revenue from fuel tax imposed for general government purposes should be replaced over time with revenue from more efficient broad-based taxes. If a decision were made to recover costs of roads from road users through fuel tax, it should be linked to the cost of efficiently financing the road network, less costs that can be charged directly to road users or collected through a network access charge. Fuel tax should apply to all fuels used in road transport on the basis of energy content, and be indexed to the CPI. Heavy vehicles should be exempt from fuel tax and the network access component of registration fees if full replacement charges are introduced.

### Recommendation 66:

The revenue-raising component of State taxes on motor vehicle ownership and use should be made explicit, and over time only be used to recover those costs related to road provision. The administrative costs of providing government services should be recovered through user charges where applicable. Quantity limits on taxi licences should be phased out.

The Review has been asked to consider taxation arrangements necessary to deal with the demographic, social, economic and environmental challenges of the 21st century. The best structure of road-related taxes depends on whether roads are funded from general taxation revenue, or whether road costs should be recovered directly from road users.

The congestion and road damage charges suggested earlier in this section would not cover the costs of the entire road network, particularly if the revenue from congestion charges on existing roads is invested in public transport infrastructure, or some other form of community compensation. Because most of the road network is not congested, and the road-wear costs of cars are negligible, efficient usage charges do not generate enough revenue to finance road building.

In addition, there are substantial operating costs that cannot be attributed to heavy vehicle road-wear, including time-related pavement deterioration, routine maintenance (cutting grass, maintaining roadside furniture, clearing drains), traffic management, regulatory and policing costs, and accident-related costs that are not paid for by road users either directly or through insurance (see Box E3–6).

### Uncongested roads as public goods or cost recovery

Car travel on uncongested roads has the public good characteristic of non-rivalrous consumption — that is, an additional car has negligible impact on other road users and causes no pavement wear (see Section E1 User charging). A price for using a given road deters some people from travelling on the road. Costs of pavement wear associated with weathering are non-rivalrous to all road users, trucks as well as cars. The inefficiency of tolling something that costs nothing to use was first identified by Dupuit (1844), who observed some people going out of their way to avoid a toll-bridge across the Seine River in Paris.

Private network industries (such as electricity, gas and communications) finance the supply of infrastructure by making access to it excludable. They are funded by block tariffs or two-part tariffs (a fixed and a variable charge) set to reflect the financial costs of supply. Most Australian roads, on the other hand, are not specifically excludable, and have been funded over many decades from general tax revenue. Only a few major projects have been funded from specific tolls. The entire road system, however, is excludable, through the requirement that motor vehicles be registered.

New roads, bridges or tunnels built in urban areas are likely to become immediately congested if they are unpriced. Charging a variable congestion toll on these roads would be an efficient way to manage demand for a road, and could also make a contribution to the capital cost of the road itself. Similarly, new roads in development areas might be financed by infrastructure charges, which are discussed in Section E4 Housing affordability.

However, for large parts of the road network, the social opportunity cost of letting another car enter the road is negligible, because there is almost always significant spare capacity. The explanation for this is the nature of road investment — a road must be built or expanded at least one lane at a time, even if it is used by only one car an hour. If roads and cars were perfectly divisible, it would be more efficient to build a cheaper road that is 1/60<sup>th</sup> of a lane wide but in use almost all the time! Moreover, improvements to road quality to improve safety or travel times (such as straightening roads) also increase their redundant carrying capacity.

#### **Box E3–6: Efficient road pricing and capital costs**

Prices that lead to efficient use of roads are unlikely to lead to full capital cost recovery. Economic models suggest that revenue from congestion charges set at efficient levels would approximately cover the full costs of the roads to which they apply. However, for most of the road system there is no congestion most of the time and hence no warrant for congestion charges. This is the case for rural roads, suburban streets and major highways outside of cities. If only congestion and road-wear are priced, over large parts of the road network cars would pay nothing and trucks would be charged only for road-wear.

Much of the explanation lies in the economies of scale in road provision. With efficient investment in capacity, short-run marginal cost and long-run marginal cost become equal (or with time-variable pricing, the sum of short-run marginal costs over an entire cycle equals long-run marginal cost for the cycle). Economies of scale mean that long-run marginal cost, and hence the economically optimal price, lies below long-run average cost. If investment in capacity were restricted to the point where the short-run marginal cost price was as high as the long-run average cost, the economic benefit of increasing capacity would exceed the costs of doing so.

Costs of infrastructure along the sides of roads (shoulders, signs, guide posts, drainage ditches) are a source of economies of scale for non-urban roads. For example, a four-lane road requires the same shoulder widths as a two-lane road. Also, because of the greater passing opportunities, a four-lane road has more than twice the capacity, giving rise to economies of scale (Hau 1992).

### **Box E3–6: Efficient road pricing and capital costs (continued)**

Economies of scale are exacerbated by capacity–quality interactions. Investment to improve road standards by building a wider, smoother, straighter road with more passing opportunities is often found to be economically warranted based on the value of the time, vehicle operating cost, and crash cost savings to road users. However, these improvements also add to capacity, keeping any congestion price to practically zero (Walters 1968).

For major urban roads, economies of scale are offset by diseconomies of scale. For a network in a given area, the number of intersections increases faster than the number of lane-kilometres of roads. Intersections are land-intensive and often require traffic signals or grade separation (Hau 1992).

There are enormous economies of scale in strengthening road pavements (Harvey 1999). For flexible pavements, the rule-of-thumb is that a 10 per cent increase in pavement thickness results in a doubling of the traffic loading required to produce a given amount of wear. A compounding factor is that a large component of pavement deterioration is due to weather. It is the same regardless of vehicle usage.

Lumpiness in investment is another factor that can inhibit cost recovery with efficient prices. When capacity can be changed only in discrete jumps, long-run marginal cost cannot be finely adjusted to equal short-run marginal cost. The basic two-lane road with shoulders and drainage ditches provides ample capacity for most non-urban roads and so becomes a fixed cost (Hau 1992; Productivity Commission 2006).

In summary, short-run marginal cost pricing on congested urban roads is expected to yield sufficient revenues to cover the full costs of the roads concerned, and may generate additional revenue. However, for most of the road network, short-run marginal cost pricing will lead to major under-recovery of costs.

This means that imposing an additional toll to recover capital costs on each trip, where there is significant redundant capacity, would waste the existing resource. For these parts of the network, there are two main models to recover the capital costs of the road — cost recovery from road users, or financing from general tax revenue.

If the fixed costs are to be recovered from road users, this can be done through a tax. This can be enforced by excluding cars that do not pay, for example through motor vehicle registration charges (a fixed charge) or by imposing a tax related to distance travelled (a variable charge).

**Finding**

The road system as a whole has historically been excludable on the basis of motor vehicle registration requirements. In the future, specific roads or road systems may also be excludable using new technology.

Charges designed only to encourage the most economically efficient use of roads would not recover their full costs. If governments intend to recover the cost of building, operating and maintaining roads from road users, it would be necessary to impose a combination of additional fixed or variable charges above short-run marginal cost. The efficiency costs of specific cost recovery taxes or charges should be weighed against the efficiency cost of raising revenue from general taxation.

**Arguments for and against cost recovery for roads****Market test**

If road users do not pay the full cost of a road or network of roads, there is no direct feedback from the market about whether they are willing to pay for the infrastructure and hence whether the road or network should be provided at all. It is extremely difficult to make accurate estimates of willingness to pay because it requires knowledge of consumer demand at price levels that have not been observed.

If total revenue exceeds total costs, we can conclude that users' total valuation of the road exceeds total costs. The converse, however, is not necessarily true. In practice, a user charge cannot be designed that perfectly mirrors road users' entire willingness to pay.

Often, the important question is not whether the road should exist, but at what standard it should be maintained. Each improvement in road standard provides existing road users with savings in time, vehicle operating and crash costs, as well as generating new users.

Cost-benefit analysis techniques value these savings and compare them with the costs of building, maintaining or upgrading a road. The revenue impacts of the road upgrade, whether revenue from network access charges or from variable charges, provide little or no useful information. An upgrade to a single road would have negligible impact on revenue from network access charges and any increase in revenue from variable charges would relate to generated traffic only. It would not reflect the gains to existing users.

**Relative economic efficiency costs**

Charges above short-run marginal costs, whether access charges or variable charges, impose economic efficiency costs. The alternative of funding road infrastructure from general tax revenue also has economic efficiency costs. In principle, the two costs can be compared to determine which policy, or policy mix, is preferable in terms of efficiency.

Raising the necessary revenue from an increase in general revenue-raising taxes may have a lower efficiency cost than a variable road user charge, depending on how it operates. The economic efficiency costs of an access charging system depend on how well it discriminates between road users whose willingness to pay differs, so as to have minimal impact on people's decisions.

## Financial

In some cases, funding constraints may prevent road agencies from undertaking economically warranted investment and maintenance. In these cases, greater certainty about future funding levels could improve the capacity of road agencies to plan for the future. An allocated funding stream might overcome some of this uncertainty.

The downside of allocating revenues from road user charges to road providers is that providers face few natural incentives to control costs they can pass on to users. Processes would need to be put in place to ensure accountability. These could include transparent and consistent cost-benefit analyses and independent post-build project evaluations to ensure that road users are charged only for costs that have been efficiently incurred.

A key issue is that Australia's roads belong to many different jurisdictional owners. There is little or no link between road revenues and the road owners. The road owners do not receive the economic rewards from road investment. As a result, road investment is largely determined by the competition for the use of tax revenues rather than efficiency criteria. A key issue for future consideration is whether there would be benefits in linking road revenues to road providers, and on what basis.

Uneconomic road spending (for example, investment projects with benefit-cost ratios below one) that is undertaken for broader social purposes should be transparently funded by government through explicit community service obligations.

### Principle

Road investment and maintenance decisions that are taken for reasons of social policy, and are shown by cost-benefit analysis to be uneconomic, should be transparently identified as community service obligations and funded from general tax revenue.

## Equity

Cost recovery is consistent with the user-pays concept of equity, which aims to ensure that those who receive the benefits from a government-provided service also pay for it. However, in the case of roads it is unclear that the group receiving benefits from road use can easily be distinguished from the entire Australian population. For example, of the 7.1 million dwellings that participated in the 2006 Australian Census (ABS 2006b), only 9.5 per cent did not have a motor vehicle.

On the other hand, there may be greater differences between the population of road users and, say, income tax payers. There may also be large differences between the users of high-cost roads and general taxpayers, or differences between road users in different jurisdictions.

Given the long life of road investments, there is also a question of intergenerational equity. Current road users obtain the benefit of past investment. They may reap only a small part of the benefits of current investment in roads, while people who no longer use the roads directly may nevertheless have paid in the past for investment that benefits road users today. If the road network was a constant size and required stable ongoing investment, these factors would cancel each other out. However, if investment in road networks is directed to meet anticipated future needs, then debt, to be repaid by future generations, might be a more



equitable source of finance than charges imposed on today's users. However, there may be other macro-economic reasons for limiting desirable debt financing by governments.

The user-pays concept of equity ceases to apply where redistribution of income to particular groups is considered desirable or where there are 'merit good' considerations. Stanley and Starkie (1983) argue that the basic access characteristic of rural local roads is regarded as a 'merit good'. This goes some way to explaining why spending on some rural roads exceeds what might be justified under strict economic criteria.

The user-pays concept of equity suggests that much of the cost of local roads used for access to properties could continue to be paid for out of local government revenue from rates. Even households who do not own a car value well-maintained paved roads linking their property with the rest of the road network. Where heavy vehicles traverse local roads, their road-wear charges should be directed to the relevant local government as compensation.

### Finding

There are arguments for and against recovering the total costs of the road system from road users. The social opportunity cost of the existing network is in general not subject to charging. Existing users could be charged explicitly for operating and maintenance costs, and for network improvement and expansion. The efficiency loss from raising the required revenue from income or other taxes must be compared with the efficiency loss from the most efficient, practical system of access and variable charges. The full information required to make all these assessments is not presently available.

### Cost recovery through network access charges

Existing car registration charges can be thought of as a fixed network access fee, as the annual charge gives access to the entire road network, apart from toll roads. In 2006–07, expenditure on roads by the Australian and State and Territory governments (excluding spending by local governments) was almost \$9 billion (BITRE 2009). Excluding an estimated \$3 billion for road damage costs, which should be recovered directly through road-wear charges, these costs could be recovered by an average charge of around \$500 per vehicle per year.

While these charges have the advantage of not influencing choices about how much and where to drive a vehicle that is already registered, the existence of a fixed charge may discourage some people from owning a car. This is likely to be low-income or low-wealth people and those who travel relatively few kilometres per year.

This effect can be reduced by varying the access charges between groups of users with different willingness to pay. For example, existing car registration charges are discounted for many groups, including pensioners. In some cases, this may reflect a lower than average willingness (or ability) to pay for access to the road network. However, it is doubtful that registration charges that increase with the number of the car's cylinders are closely correlated with the car owners' willingness to pay.

The distance people travel per period of time is related to willingness to pay. People who drive few kilometres per year are more likely to be deterred from owning a car by a flat access charge than people who drive long distances. The most efficient charge for



cost-recovery purposes may be a combination of a distance-related charge and an access charge (two-part pricing).

Some variable charging might also be justified on the basis of recovering otherwise unpriced variable costs. The existing fuel tax is an example of a tax that varies with distance travelled. Subject to technology, direct charges based on distance travelled would be an alternative.

## The future of fuel tax

Consistent with the principle that transport-specific taxes should be imposed only where they improve social or market outcomes in transport markets, fuel tax as a source of general government revenue should be phased out. However, some fuel tax might be retained as a simple variable charge for variable costs of the road network that cannot be priced directly.

The tax rate would be set by reference to costs efficiently incurred. To ensure its value is not eroded by inflation, the per litre tax rate would be indexed to the consumer price index. Fuel tax credits for off-road use would be retained, to ensure that only on-road use is subject to a charge.

To be an efficient user charge, fuel tax would need to apply to all energy sources used for road transport. This means extending tax to those fuels that are effectively tax-free under current arrangements. These include liquefied petroleum gas, liquefied natural gas, compressed natural gas, biodiesel and domestically produced ethanol. If alternative energy sources for road transport were developed (such as electricity), they would also need to be taxed in their on-road applications. As the energy density of these fuels varies, it would be necessary to tax fuel on an energy-content basis as this is more closely related to vehicle distance travelled (see Recommendation 65).

Different greenhouse emission costs associated with different fuels could best be addressed by price differentials under the Carbon Pollution Reduction Scheme rather than different rates of fuel tax. Similarly, policy relating to energy security or fossil fuel depletion should be more appropriately addressed through specific targeted measures, rather than fuel tax.

Variable charging through fuel tax would not be necessary in cases where technology provides ways to measure usage more directly. For example, as road user charging mechanisms based on mass-distance-location monitoring technology becomes widespread in heavy vehicles, it would be possible to charge heavy vehicles on this basis, and provide full exemption from fuel taxes and the network access component of registration charges (see Recommendation 65).

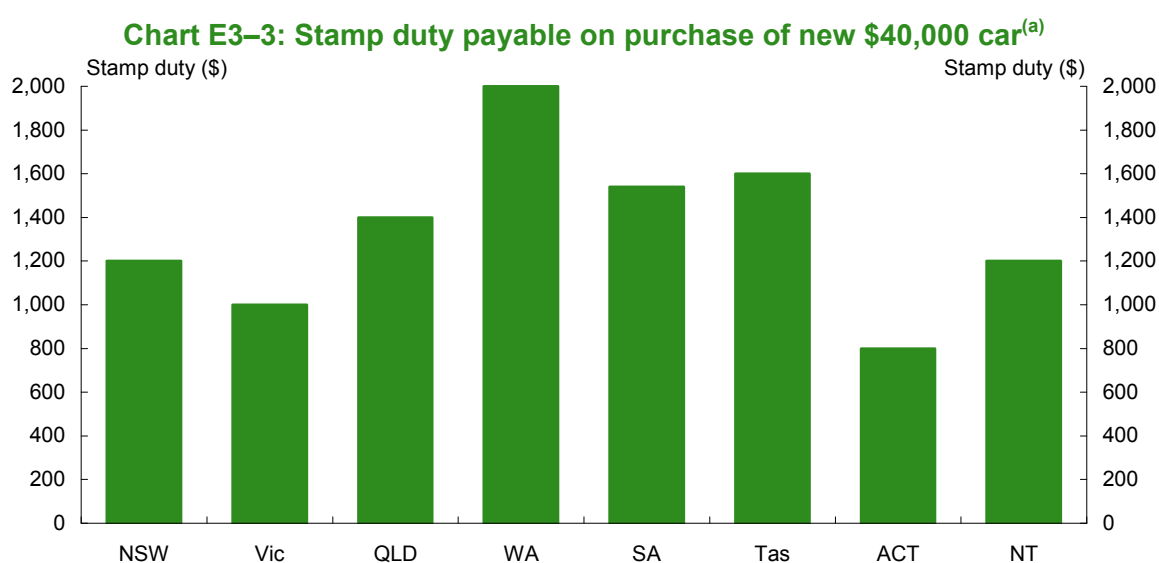
## Other road taxes and charges should be phased out

Governments in Australia impose motor vehicle registration and transfer charges. Some charges relate to the costs of providing government services. In these cases, the charges are likely to have the potential to improve efficient allocation of resources, and should be maintained. However, other taxes impose charges that are disproportionate to any costs that the government incurs in providing the service. Reliance on revenue from these taxes should be phased out, and replaced with more efficient sources of revenue (see Recommendation 66).

COAG has asked the Review to consider the merit of financial incentives for the purchase of fuel-efficient cars and assess the merits of differential stamp duty and registration regimes linked to environmental performance. The use of these taxes for environmental, rather than revenue purposes, is discussed in Section E2 Taxes to improve the environment.

### Stamp duty on cars is a highly inefficient source of revenue

State governments do not have the legal power to impose duties of excise, but do tax certain transactions related to goods. In the case of transport, State governments tax motor vehicles by imposing an additional stamp duty whenever a new car is registered, or by requiring buyers of second-hand cars to pay a registration charge on transfer between owners (see Chart E3-3). As stamp duty on housing leads to a misallocation of the housing stock (see Section C2 Land tax and conveyance stamp duty), so vehicle stamp duties impede efficient allocation of vehicles.



(a) Assumes car is V6 (QLD) and rated between 3.5–4.5 on Green Vehicle Guide (ACT).  
Source: Treasury estimates.

Rates of stamp duty vary between States, based on car value and, in some cases, vehicle size or type. Some States apply different rates to passenger and non-passenger vehicles, and some apply tax rates that rise with the value of the vehicle (Australian Government 2008b, p. 86).

These taxes mean that people purchase new vehicles and scrap old vehicles less often, and reduce the overall demand for cars.<sup>11</sup> They mean that some people will continue driving vehicles not suited to their present needs. For example, an older couple whose children have left home might delay getting a smaller car. Alternatively, a young couple may delay upgrading to larger family car when they have children, because of the additional cost.

<sup>11</sup> Tcha and Kuriyama (2003) estimate an own-price elasticity of demand for cars of -0.43, suggesting that a tax that increases the price of a car by 3 per cent could reduce demand for cars by around 1.3 per cent.

## Finding

Stamp duty on the transfer of motor vehicles is a highly inefficient revenue source.

### Restrictions on the number of taxi licences should be removed

Taxis form a small but important component of the transport system, providing flexible mobility when other forms of transport are not viable. But taxi fares are up to 25 per cent higher than they need be because of State government taxes (Productivity Commission 1999, p. 16).<sup>12</sup> These taxes are imposed in a relatively unusual way. The States limit the number of taxis then make money by selling licences.

These restrictions are beyond those necessary to maintain safety or service standards and are simply used to raise revenue. For these reasons, accounting standards and economic reasoning recognise the revenue as tax revenue. Taxi licences now sell on secondary markets for up to \$470,000.<sup>13</sup> The purchaser expects that future restrictions on the number of taxis will allow this money to be recouped from future taxi customers — with interest.

The total value of taxi licences in Australia is around \$6.5 billion (Clarke & Prentice 2009). Because of the tax, taxi services are more costly and waiting times are longer. This has a number of adverse impacts on Australian society. Businesses pay the taxi tax, or they must use alternative transport less fit for purpose, driving the cost of goods and services up for all Australians.

The taxi tax reduces the ability of Australians to effectively 'share' a motor vehicle by taking taxi trips instead of owning their own car. This means the tax falls disproportionately on those who do not drive (perhaps because of cost), should not drive (due to inebriation) or cannot drive (because of disability). The poorest 20 per cent of the community spends more than twice as much as a proportion of income on taxis as other Australians (ABS 2006c). In regional areas, taxis often replace other urban transport systems, such as rail or bus services that are not available. Taxis are therefore one important means by which people continue to participate in society. The tax impacts on some of the most vulnerable in society, either by reducing their incomes or dissuading them from taking a taxi.

Why does such a bad tax persist? Abolishing the tax would mean retaining only those restrictions on taxi licences that relate to safety and service. This would see the value of plates fall nearly to zero. Existing plate holders — who are often not the actual drivers — would lose all the value of their investment. By selling the plates for revenue up front, governments have effectively created a group of people with an interest in maintaining the asset value of taxi plates so they can recoup their investment.

Some of the financial return plate holders earn reflects the risk that current arrangements may change, so whether they should be compensated at all is an open question. There is no doubt, however, that it would be far better for society to cash plate holders out using revenue from other taxes rather than to retain the highly inefficient taxi tax.

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12 More recently, IPART (2009, p. 21) found that in NSW 'Plate lease costs contribute 13 per cent of the overall cost of providing taxi services in urban areas, and around 11 per cent of this overall cost in country areas.'

13 On the BSX Taxi Market, plate prices averaged \$430,000 in 2008–09.

**Finding**

Quantity restrictions on taxi licences are an implicit tax on taxi users, from which additional revenue flows to existing taxi plate holders and State governments.

Quantity restrictions on taxis should be phased out (see Recommendation 66). This could be done by imposing a price ceiling on the price of new taxi licence plates that reduces over time, triggering the automatic release of new plates. Alternatively, existing taxi licences could be bought back by the government. While for efficiency reasons this should be funded from general tax revenue, for equity reasons it could be done by replacing the existing implicit tax on taxi fares with an explicit levy on taxi users. This would be imposed for a limited time until the revenue needed to fund the transition has been raised.

**E3–5 Guiding investment in roads****Recommendation 67:**

Governments should continue to reform road infrastructure provision, applying economic assessment to investments comparable to that for other forms of infrastructure.

Pricing roads would generate some information for road suppliers about how and where to improve or build roads, as well as other investments that make the best use of road transport. For this to occur, the regulatory authorities setting congestion taxes would need to identify changes in demand for scarce road space and adjust prices accordingly. Similarly, they should increase location-specific prices in response to accelerating pavement deterioration and reduce them following construction of stronger pavements. High prices could help inform decisions, including:

- where to build new roads, increase the capacity of existing roads or provide alternative forms of transport;
- the standard to which new roads should be built or existing roads improved; and
- the routing of traffic to minimise adverse impacts on the environment or society.

However, as already discussed, most individual roads cannot be fully funded from efficient user charges. This means that the revenue from road pricing should not determine the level of funding of a particular road, or even for the road network in general. Decisions about spending on individual parts of the road network in general ought to be made using cost-benefit analysis for investment and cost minimisation for maintenance. These decisions determine the total cost of providing the network, which in turn determines the amount of revenue that needs to be recovered from road users. There is often no economic link from revenue back to spending decisions.

Community service obligations for road infrastructure can be defined in terms of uneconomic spending for reasons of social policy. For investments, this means spending that fails the cost-benefit analysis test. For maintenance, it means providing a standard of road above the economically warranted level.

The data collected by a pricing system can provide invaluable information on traffic flows to support demand forecasting, strategic planning and economic analysis.

Moreover, whole-of-network and economy-wide impacts of road investment must be considered. For example, investment that simply moves bottlenecks may offer very little overall benefit. Similarly, broader impacts on other transport modes should be factored in, as well as the impact on the environment. This should be done by network-wide strategic planning that incorporates forecasting, data collection, land-use planning, inter-jurisdictional issues and forward-looking asset management.

### Finding

Provided charges reflect short-run marginal costs and are responsive to changing conditions, they can provide signals and data to assist planning for future investment. However, private commercial investment criteria are not suitable for infrastructure, as many economically beneficial roads would not be financially viable under the current framework. Economic analysis is indispensable to guiding investment and maintenance decisions. Strategic planning is essential for identifying investment projects to examine in more detail and for taking into account the network effects of investment decisions.

The replacement of current road tax arrangements with a different system could alter the pattern and level of road use, and is also likely to affect road financing requirements. In economic terms, the purpose of asset provision is to satisfy future demand. Road infrastructure needs in the long term are affected by trends in the location of population and economic activity driven by climate change, migration, an ageing population, the structure of the economy, and technological and social changes. There is no reason to assume that the current network will be suitable for future use. Finance available to road owners should reflect future network needs, assessed by anticipated traffic levels.

The need to take a forward-looking view of road use creates a central role for planning and forecasting. It is important to develop an understanding of current network limitations; for example, through developing asset management plans. Traffic forecasts are needed to determine network and financing requirements. Accurate forecasting will depend on estimating the future needs of users, as well as traffic counts from the existing road network. While these estimates can be informed by revenue flows derived from efficient pricing, these revenues would reveal only the extent to which road users value the existing road network; they are not a valuation of expected future benefits.

In practice, road agencies try to maintain road standards within a given budget. This leads to important institutional questions — that is, whether the current engineering standards for roads are economically efficient, and whether road agency budgets are sufficient to maintain their networks adequately. Restricting maintenance in the short term can be self-defeating in the long term. If periodic maintenance is not performed, water can seep through cracks, weakening the pavement. The pavement becomes more susceptible to damage by heavy vehicles, which can dramatically shorten its life.

Ideally, public investment in infrastructure would be made on the basis of a rigorous assessment of the costs and benefits to society of the proposed project (see Box E3–7). The desirability of this as a decision-making and appraisal tool to assess which infrastructure projects demonstrate significant long term national benefits has been recognised by

Infrastructure Australia when conducting its national audit of Australia's infrastructure priorities in 2008.

Established in 2008 by the Australian Government as an independent advisory body to drive the development of a long-term, coordinated national approach to infrastructure planning and investment, Infrastructure Australia is committed to the use of rigorous and objective cost-benefit analysis as its primary assessment and evaluation tool.

However, cost-benefit analysis is complex and errors can occur. Analyses are often undertaken or paid for by project proponents who desire a strong positive result. Making analyses transparent and publicly available would open the methodology and assumptions to scrutiny.

### Principle

Investment in major projects should be determined by transparent, well-informed analysis of costs and benefits. Investment in pavement durability and maintenance decisions should be made with the goal of minimising overall costs to society (that is, taking into account both the costs of maintenance and the costs to the road user).

## Commercial agreements between road users and road suppliers

While efficient charges do not usually cover the cost of individual roads, there may be opportunities in some cases to build closer commercial accountabilities between road suppliers and specific road users. This might improve investment in some roads where specific additional benefits accrue to identifiable users, rather than to society as a whole.

For example, a business with particular operational needs might want to agree with a road supplier to build a new bridge capable of carrying heavier vehicles. Under current arrangements, the non-excludable nature of much of the road network means that such a bridge would not be financed privately, as competing businesses would gain access to the benefit for free.

It might be possible to overcome this constraint by allowing the bridge to be subject to an access charge for other businesses who have not contributed capital. The access charge would be subject to regulation to restrict the abuse of market power, and would only be allowed to continue long enough to allow recovery of costs with a reasonable return on capital. Such charges should be designed to encourage economic investment that may not otherwise take place. While there would still be an efficiency loss from imposing a facility-specific access charge, the outcome would be better than if the bridge had not been built at all.

Other road users might require a level of service from road suppliers over and above the general public standard. For example, an express courier service might require guaranteed travel times for a particular route at a particular time. Allowing road users and road suppliers to contract to meet a particular standard might provide a mutually beneficial outcome for both parties. Such arrangements, made possible under national competition policy, already exist in rail infrastructure.



Recommendation 67 proposes that governments should continue to reform road infrastructure provision, applying economic assessment to investments comparable to that applied to other forms of infrastructure.

### **Box E3–7: Economic analysis of road investment and maintenance decisions**

Road investment decisions should be made using cost–benefit analysis. A cost–benefit analysis compares a base case (business as usual) with one or more project options.

The main benefits from road investment projects are savings in time, vehicle operating costs and accidents. The value of savings in work time is determined with reference to average earnings. Savings in non-work time are valued at something less than earnings, based on behavioral studies. For non-urban roads, State road agencies use computer models to undertake cost–benefit analyses. The models include algorithms to estimate vehicle speeds, vehicle operating costs and accident rates for the base and project cases. Urban road and public transport projects necessitate network models to estimate how traffic redistributes itself across the network in response to the project.

The main cost is the initial construction cost of the project. There will also be ongoing maintenance and operating costs. Costs and benefits are estimated for each year of the life of the project using forecasts of traffic levels. Annual costs and benefits are then discounted to the present. Results are presented as net present values and benefit–cost ratios.

A positive net present value (benefit–cost ratio above one) implies that the project represents a net improvement in economic efficiency. Where investment spending is budget constrained, the most economically efficient investment program is determined by selecting projects in descending order of benefit–cost ratio until the budget is exhausted. In practice, funding constraints mean that many projects with benefit–cost ratios above one will not be selected. Also, governments will choose some projects with low benefit–cost ratios for social or equity reasons (community service obligations).

Economic analysis of road maintenance decisions involves life-cycle cost minimisation. The economically optimal amount of pavement durability and the timing and types of maintenance treatments to apply over the life of a pavement are those that minimise the present value of combined road user and road agency costs. A better maintained pavement will be smoother, resulting in less wear and tear on vehicles, faster travelling speeds and greater safety. However, it requires more frequent and more expensive maintenance treatments by the road agency.

Economic analysis is not costless. Detailed analysis can only be justified for large spending decisions. The level of economic analysis undertaken ought to be proportionate to the size of the project. Also, many projects are not amenable to the standard cost–benefit analysis methodologies — for example, determining the frequency of rest areas along a highway. Small decisions are best left to the judgment of local engineers and managers. Guidelines that set out appropriate standards may be of assistance, and economic analysis can be used to help determine the standards.

The Australian Transport Council has published guidelines for the economic appraisal of transport projects. Austroads has published a guide for road project appraisal that includes standard unit values to use on cost–benefit analyses such as values of time and accident costs.



## E3–6 Institutions to support efficient use and supply of roads

### Recommendation 68:

COAG should develop a National Road Transport Agreement to establish objectives, outcomes, outputs and incentives to guide governments in the use and supply of road infrastructure. COAG should nominate a single institution to lead road tax reform, and ensure implementation of this agreement.

Historically, roads have been provided by government departments and local governments, funded from general tax revenue. The main challenge has been to connect sparsely populated regions. Roads have been mostly local public goods – that is, any car or truck can drive on the road and, given low patronage levels, cause negligible inconvenience to others. Given the state of technology, road pricing has been both impractical and inefficient.

These institutional structures may no longer be suitable to meet 21st century challenges. The current system has resulted in large congestion costs, concentrated in Australian capital cities, and has not consistently delivered economically efficient infrastructure to meet future demand.

Other bodies have considered institutional arrangements for road transport, to ensure that demand is met with supply – particularly through ensuring adequate finance. For example, the Productivity Commission (2006) considered a range of institutional structures, ranging from a departmental model based on hypothecated (that is, earmarked) taxes, dedicated road funds, a ‘public utility’ and privatised models of road infrastructure provision. The Australian Transport Council is currently considering alternative institutional arrangements for road provision.

The reform of road pricing has been slow, as it depends on availability of information upon which to base prices, effective regulation to prevent over-charging, the availability of suitable technology, and community acceptance. Outmoded institutions and a lack of coordination in the construction and maintenance of the road network has meant that different road agencies have had limited incentives to improve the national road network as a whole. Current arrangements give limited scope to finance additional road capacity in the face of congestion, or to build roads more resilient to heavy vehicles.

### Information and regulation

The introduction of efficient pricing requires comprehensive information on actual costs. Road prices that aim to reflect social cost would need to be carefully regulated to ensure that they deliver the greatest net benefit for society, rather than generating profit for the road agency. For example, while pricing road-wear is easy in principle, determining the actual cost of different vehicle weights and loads on different types of roads is an empirical question. A road damage charge that exceeds actual costs could be just as harmful to economic efficiency as no charge at all.

Efficient pricing and regulation must be underpinned by empirical data – including information on the condition of existing assets and reliable estimates of marginal costs under different conditions – as well as agreement on the allocation of revenue, attribution

methods and assumptions underlying the system. Theoretically sound pricing models may need to be adapted to recognise administrative and compliance costs in the real world.

### Finding

Institutions are not currently set up to support efficient road pricing, nor efficient investment and operation of roads. Regulation will be necessary to ensure that road agencies do not exploit their market power in setting prices, and to ensure that prices reflect marginal social costs. Institutions will need to be vigilant to adjust prices in response to changing conditions.

## Road charging revenues

The road pricing reforms outlined in this section propose that revenue from congestion charges be returned – in the first instance to fund additional investment in transport alternatives – to those affected by the charge. This section also recommends that charges on heavy vehicles for road-wear be allocated to the owners of the roads they drive on. This will only be possible when appropriate reforms have been delivered to the institutional and reporting arrangements applying to road owners, as costs of road-wear vary.

These revenues and their proposed uses form part of a much larger structure of revenues that are spent on roads, including new investments. Some of these other revenues derive from economic charges (such as developer charges or certain investment-related truck charges) and some derive from general government budgets, whether funded from general revenues or from road-related revenues. In turn, the basis of intergovernmental payments for roads also reflects a mixture of economic and non-economic assessments.

A range of difficulties arise in the practical management of these funds. At present, the allocation of road funds is subject to:

- decision-making on spending and investments by State and local governments;
- decision-making on specific grant funding and major investment by the Australian government (advised by Infrastructure Australia); and
- effective re-allocation of grants and other revenues between governments as determined by assessments of relative road revenue and expenditure needs by grants commissions using horizontal fiscal equalisation methods.<sup>14</sup>

The present combination of these arrangements, some using economic criteria and others using broader fiscal needs analysis, raises issues about equity and incentive effects for jurisdictional decision-making. A considerable amount of further work needs to be done to identify mechanisms that can deliver an appropriate integration of pricing revenues and investments. The outcome will depend on the particular structure that develops for future arrangements.

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<sup>14</sup> The Commonwealth Grants Commission for the States and local government grants commissions for local government grant funding.

To the extent that all or most pricing and funding ultimately follows economic criteria, and that those economic criteria reliably allocate funds and investments across national as well as local marketplaces, in future it may be preferable to shift road infrastructure delivery into the public trading enterprise sector rather than the budget-funded general government sector. In this case, funding and spending would no longer be subject to fiscal equalisation.

In the intervening years, when mixed arrangements will continue to apply, governments will need to give ongoing consideration to the most appropriate pathways for developing institutional and funding arrangements that make best use of increasingly efficient pricing mechanisms.

### The need for national cooperation

The transport network in Australia spans State boundaries and involves all levels of government. The gains from congestion charging in State capitals, and better pricing for heavy vehicles, would deliver a national productivity dividend. This is a national goal for road reform that should be agreed through COAG.

A National Road Transport Agreement should include:

- (i) an agreed model for financing the road network, including the appropriate assignment of revenue from taxes and charges, a reduction of Australian government fuel tax as efficient road pricing is introduced, and adjustments to other taxes and transfers necessary to maintain equity in the overall tax system;
- (ii) a regulatory framework to ensure that road infrastructure providers' incentives are aligned with those of road users, particularly to prevent over-charging or supply restrictions;
- (iii) a methodology for identifying and valuing the social purpose components of road funding, to form the basis of an explicit treatment of community service obligations, as well as a consistent methodology for assessing environmental impacts;
- (iv) nationally consistent arrangements for asset management, including formal asset management plans, down to the local government level, as a condition for receiving revenue from road-specific taxes or charges;
- (v) a framework to support commercial agreements between road users and road infrastructure providers, including agreements for the provision and finance of infrastructure to meet specific needs, and for the delivery of guaranteed service standards;
- (vi) a protocol for the collection, handling and exchange of information from road pricing, as well as ensuring personal privacy and interoperability of technical standards;
- (vii) arrangements to evaluate the efficiency of infrastructure spending by ensuring that major infrastructure projects are subject to post-build evaluations; and
- (viii) consideration of the broader impacts of road pricing reforms on other transport modes, particularly on public transport (in relation to congestion pricing) and freight rail (in relation to heavy vehicles charges).

Given the scale and complexity of the proposed reforms, a single agency may be required to develop and monitor their implementation. This would involve reporting on road reform strategies and developments, commissioning and evaluating research, funding and evaluating pilot programs, monitoring State entitlements to agreed funding for transport reform, and reporting to governments on whether specific commitments have been met (see Recommendation 68).

There is also a strong argument for leadership from the Australian government, and for it to provide incentives to the States to facilitate road reform. For example, the Australian government could make any funding of state infrastructure contingent on the adoption of pricing policies for roads that are consistent with this Report. It could ensure that economic appraisals of investment projects are made transparent and that the community service obligation component of road spending is identified and funded as such.

Moreover, responsibility for the largest road tax (fuel tax) rests with the Australian government, while responsibility for direct pricing reform will rest predominantly with the State and local governments who actually own the roads. The transition from taxes on roads primarily designed to raise revenue to taxes on roads primarily designed to improve infrastructure use therefore entails a shift from Australian government to State-level taxes in this area. This will require coordination on a clearly defined timetable.

## E4. Housing affordability

### Key points

Access to affordable housing is a key policy issue for the Australian community that is only likely to grow in importance. Policies of Australian governments have traditionally treated owner-occupied housing as the preferred housing tenure. This approach reflects the desire of most Australians to own their home. It also recognises the benefits ownership can bring both the community and homeowners, such as greater security in retirement. The approach in this Report is consistent with this policy goal, while recognising that home ownership will not be realistically available, or the right solution, for all households.

Measures of housing affordability emphasise different aspects of the issue, but all reflect the cost of housing and people's ability to pay for it. For renters, reforms to housing assistance would improve the ability of low-income earners to afford rental housing. For purchasers, affordability is constrained by prices that remain high relative to average income levels. While high prices or rents may result from increases in housing demand, they can only be sustained at high levels when supply is not responsive. Evidence suggests that the current supply of housing is insufficient, placing ongoing pressure on house prices.

Reforms to stamp duties and land tax would reduce current impediments to housing supply generated by the tax system. However, as taxation is not the major source of supply constraints in the Australian housing market, housing affordability would be best promoted through wider reforms that facilitate housing supply.

Housing supply can be restricted through a range of policies, such as planning and zoning regulations, as well as the approvals processes that govern them. However, such policies are designed to achieve a range of policy objectives, against which their impact on the price of housing should be assessed. The use of infrastructure charges has the potential to improve the allocation of infrastructure. However, where they are not set appropriately, infrastructure charges can reduce the supply of new housing, which can increase overall house prices.

This is not a straightforward area of policy because while reforms to increase supply may promote housing affordability, they can also reduce existing home values and change the shape of Australian cities in ways that many existing residents do not desire. This suggests a serious community dialogue is needed on the distribution and quality of housing across Australia. As a first step, the Council of Australian Governments should review building and land use policies and infrastructure charges to ensure they do not unnecessarily restrict the supply of housing.

## E4–1 The role of housing in Australia

In its myriad forms, housing provides shelter, security and a savings vehicle to millions of Australians. Adequate shelter is fundamental not only in meeting basic human needs, but also in providing a base from which to develop individual capabilities, to raise a family and to participate in the community and the workforce.

The value of housing derives from more than the day-to-day shelter it provides. More than two-thirds of Australians enjoy the benefits of owning their own home. Whether they are a first homeowner with little equity or a retiree whose mortgage has been paid off, the security of tenure associated with home ownership provides an additional benefit over and above physical shelter. In many areas, a stable base of home ownership underpins social integration. Home ownership can benefit not only homeowners, but their communities too.

As well as providing vital services to individuals and communities, housing also forms a large share of Australia's savings. Houses are built to last — many people work hard to pay off their house during middle age, in order to ensure they have access to accommodation with no cash payment obligations when they are old. As a form of savings, housing has additional benefits over other savings vehicles because it not only acts as a store of value, but also reduces exposure to fluctuations in rental costs. In particular, those on fixed incomes are insulated from housing cost fluctuations, ensuring that other necessities like food or energy are affordable and they are protected from the risk of poverty.

Australia currently has one of the highest rates of home ownership in the OECD. In total, 68 per cent of Australians own or are buying the home they live in, compared to an OECD weighted average of 63 per cent. For those aged over 65 years old, the rate is 82 per cent, which is among the highest in developed countries (Bradbury 2008). These high levels of home ownership often reflect strong personal preferences for home ownership over other forms of housing tenure, as well as deliberate government policies to enable owner-occupied housing.

The Review's recommendations are intended to support this policy goal. There is a strong case for continuing Australia's approach of ensuring that owning their own home is within the reach of ordinary families. The role of owner-occupied housing as the key source of voluntary retirement savings is a major reason for continuing to exempt it from income taxation (see Section A1 Personal income tax). Further, owner-occupied housing plays a particularly important role in providing financial security for the large majority of Age Pension recipients who own their own home. Continuing the means test exemption for owner-occupied housing, up to an indexed threshold to ensure fairness of the test, will support this objective (see Section F2 Means testing).

However, home ownership will not be realistically available, or the right solution, for all households at all times. Ensuring access to appropriate rental housing is an integral part of Australia's transfer system. The reforms to housing assistance recommended in this report would mean that the transfer system is better placed to address housing affordability by ensuring access to affordable housing at the rents available in the market (see Section F5 Housing assistance).

In framing its terms of reference, the Australian Government requested that the Review pay particular attention to Australians' access to affordable housing. The affordability of housing,



in light of high housing price rises and increasing rents, is a fundamental challenge facing all Australian governments.

## E4–2 What is housing affordability?

At its most basic level, housing affordability means ensuring that low-income households can access an adequate standard of housing without unduly compromising their other spending needs. Concern over housing affordability extends beyond this to whether people across a range of incomes can purchase housing without facing undue financial stress.

Studies of housing affordability do not settle on a single definition or way of measuring housing affordability (for example, Robinson et al. 2006; Gabriel et al. 2005). Different measures often reflect different conceptions of what is the most important aspect of housing affordability. Concern may focus on low-income earners' access to housing (often as renters), the degree of home purchase capability enjoyed by moderate-income or first home buyers, or the ongoing cost of sustaining a mortgage for those on average incomes (see Box E4-1). However, what is common through all of these benchmarks is a measure of the price of housing and a household's means to pay for it.

### Box E4–1: Different measures of housing affordability

Several measures of housing affordability focus on low-income earners.

'Residual' measures of affordability record the remaining income available to households after deducting the cost of a level of housing (for example, see Harding & Szukalska 2000; Burke & Ralston 2003). This approach can indicate whether households enter housing poverty through rising housing costs or falling income.

'Ratio' measures of affordability compare the costs of housing to household income (for example, see ABS 2002; Harding, Phillips & Kelly 2004). Under this approach, housing is agreed to be unaffordable when housing costs exceed 30 per cent of income for households with incomes in the bottom 40 per cent of the income distribution (for example, see the National Housing Strategy 1991).

The affordability of housing for wider groups in society can be measured in other ways.

A simple measure that reflects the cost of purchasing a dwelling is the ratio of median house prices to average household income.

Several measures assess the ongoing costs of home purchase of a dwelling through a mortgage. The Reserve Bank of Australia compares the cost of repaying a mortgage – based on 80 per cent of the prevailing median house price at the prevailing variable mortgage rate – with average household income (see Richards 2008).

HIA-Commonwealth Bank applies a similar approach to the median house purchase price for first-home buyers (see HIA 2009). While there is no single view of when housing is affordable using such measures, affordability is often interpreted as being at low levels when repayments exceed 30 per cent of income.



### **Box E4–1: Different measures of housing affordability (continued)**

Other measures of purchase affordability reflect the up-front cash required for a deposit on a mortgage and are often used to describe the degree of first home buyers' access to the market. For example, the 'deposit gap' records the difference between typical house prices and the maximum mortgage available on a typical household income (Yates and Milligan 2007).

## **Developments in housing affordability in Australia**

Current measures of housing affordability indicate that Australia faces significant challenges in providing sufficient affordable housing.

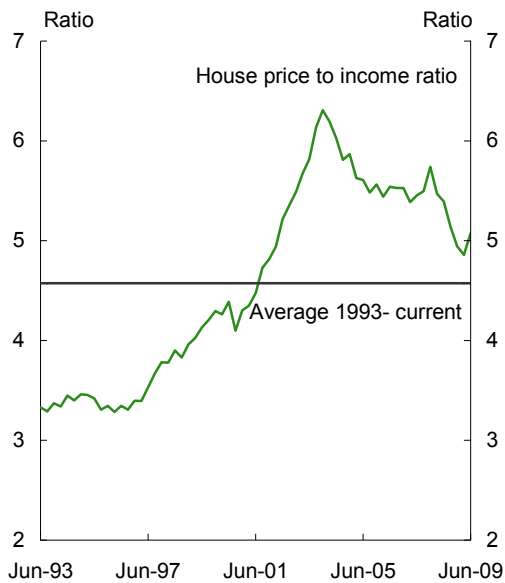
Median house prices have risen from around three times average household earnings in the early 1990s to around five times today (see Chart E4–1 Panel A). Higher prices affect access to housing in a range of ways. Under the Reserve Bank of Australia's measure, loan repayments are only just under 30 per cent of income (see Chart E4–1 Panel B). Houses are more affordable now than during 2007, but the recent improvement reflects interest rates falling to 'emergency lows' to combat the global financial crisis. These low rates are likely to be unwound as the economy recovers. Higher housing prices also meant that the deposit needed by first home buyers reached record highs during 2007 (Richards 2008). Higher house prices may also delay access to home ownership by younger Australians. The proportion of Australians under 35 who own their own home declined from 44 per cent in 2001 to 38 per cent in 2008. Similarly, higher house prices may mean fewer people own properties outright. The proportion of Australians aged 55 to 64 with mortgages has increased from 13 per cent in 1996–97 to 30 per cent in 2007–08. The National Housing Supply Council (2009) also noted that there is a spatial dimension to the affordability of dwellings; 27 per cent of dwellings in different population centres were found to be 'unaffordable' in 2006, while none were in 2001.<sup>15</sup>

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15 This is based on the UDIA/Matusik Affordability Measure (2008), which characterised an area as 'unaffordable' when a household spending 30 per cent of the average income in that region on repayments (and with a 10 per cent deposit) could purchase less than 15 per cent of the houses in the region.

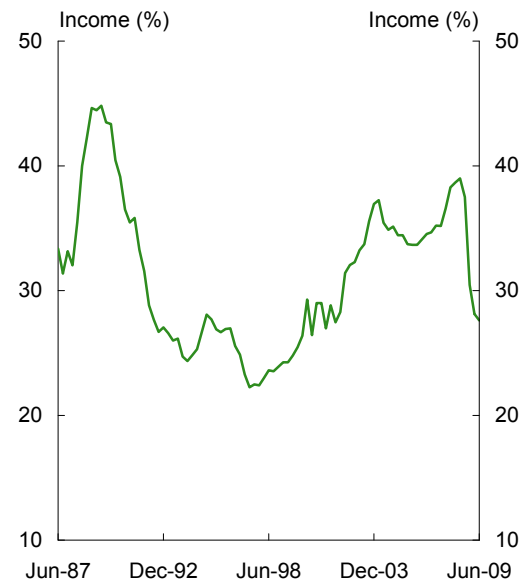
**Chart E4–1: Housing affordability for owners**

Panel A: Median house price to disposable household income



Source: REIA 2009, ABS (2009a) and Treasury estimates.

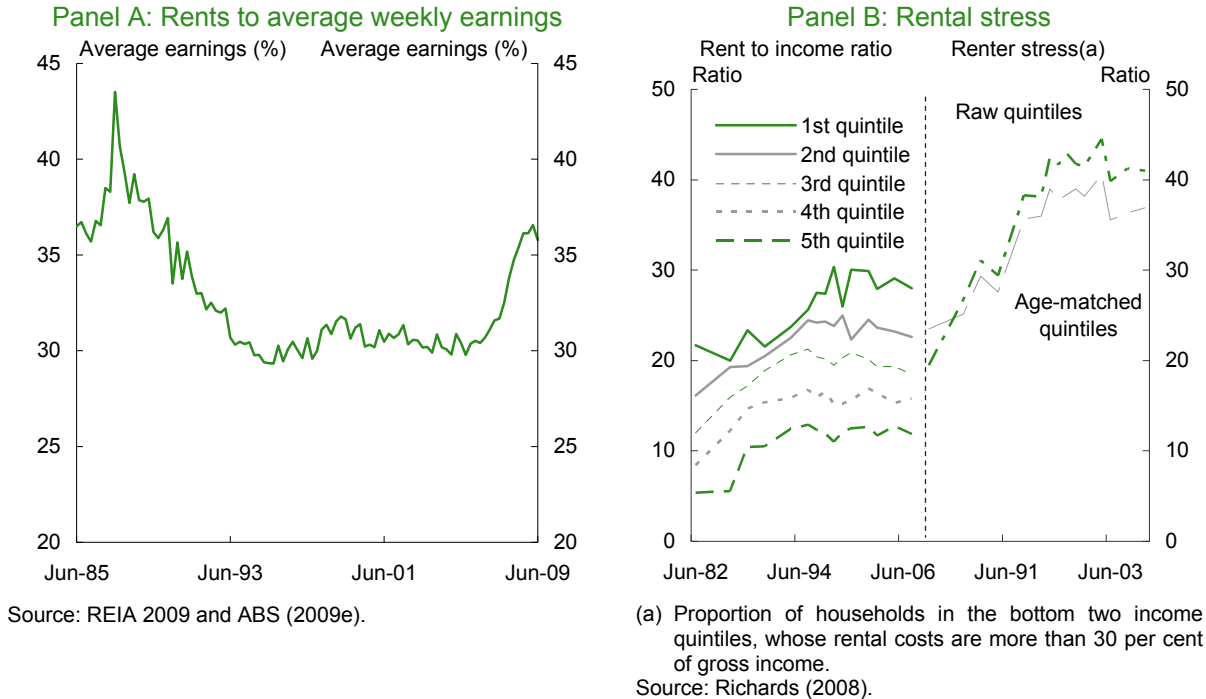
Panel B: Housing Loan Repayments



Source: RBA unpublished.

Importantly for many low-income earners, or transfer recipients, higher house prices reduce rental affordability, as rents need to increase if investors are to maintain their rental yield. The ratio of rents to average weekly earnings has risen to its highest level since the late 1980s (see Chart E4–2 Panel A). As at 5 June 2009 there were 418,000 individuals and families paying more than 30 per cent of their income in rent even after receiving Rent Assistance; 129,000 of these were paying more than 50 per cent of their income. Many of these people, especially age pensioners and disability support pensioners (who make up around one-quarter of Rent Assistance recipients) are likely to have limited capacity to increase their incomes. The number of Rent Assistance households paying more than 30 per cent of their income in rent is at its highest level since 2000.

### Chart E4–2: Housing affordability for renters



The price level of any market good or service is set by its demand and supply. The Productivity Commission (2004) and Reserve Bank of Australia (2003) attribute the increase in house prices around the start of the decade primarily to strong growth in demand. This demand reflected a range of factors, including growth in average household incomes, increased credit availability and relatively low interest rates. In the short term, when housing supply is relatively fixed, price increases are an inevitable response to strong demand.

A persistent gap between housing supply and underlying demand (or the ‘need’ for housing based on population growth and trends in household formation) indicates that there are problems on the supply side of the housing market. Strong population growth in recent years has led to relatively strong underlying demand for housing. However, the supply response has not been able to keep pace. Over the past five years, the population grew on average 1.7 per cent a year, while housing completions fell on average 2.0 per cent a year.

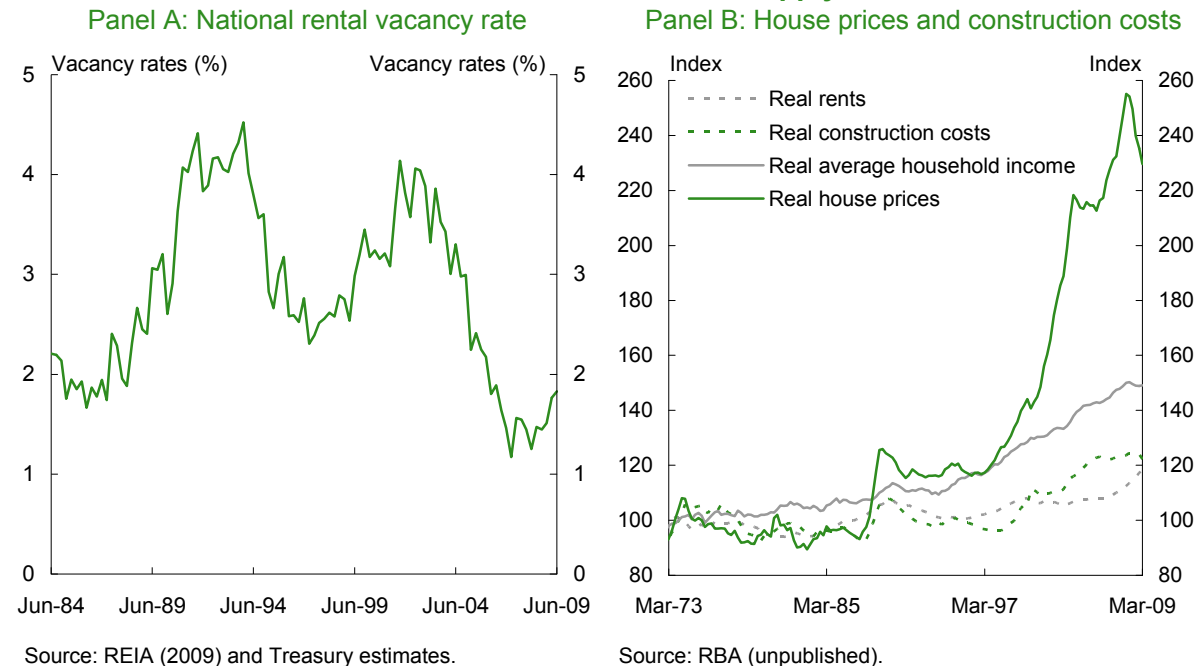
Thus sustained high levels and strong growth of housing prices are only possible when housing supply cannot increase to meet movements in demand.

There are a range of indicators of tight supply in the current housing market. Rental vacancy rates are currently around the record lows experienced during 2008 (see Chart E4–3). The National Housing Supply Council estimated that there is a substantial shortage of housing in Australia, with an unmet need of 85,000 dwellings in 2008, and construction levels falling short by around 20,000 to 30,000 a year. If the Council’s medium growth estimate of underlying demand and medium supply projection were met, there would be a cumulative gap by 2028 of 431,000 dwellings. Annually, the gap would increase by around 23,000 dwellings until 2016, when the annual shortfall would decrease consistent with an ageing population.

Of course, in markets demand always equals supply so long as prices can adjust. The Council's projections should be seen as an indication of the degree of likely price pressures and the subsequent challenges facing the community.

The growth in house prices largely reflects increasing prices of existing houses, rather than growing costs of construction (see Chart E4-3 Panel B). Land has made up a growing share of house prices, increasing from 53 per cent to 61 per cent in the 15 years to 30 June 2009.

**Chart E4-3: Constrained supply**



The responsiveness of housing supply is influenced by a range of factors. Even in ideal conditions, dwellings take a long time to plan and construct, which will mean that the supply of housing is unlikely to be as responsive as supply in other markets. Currently, difficulties in securing finance for the development of multi-unit developments are a consequence of lending practices changing in response to the global financial crisis. There are, however, many public policy choices that can have a long-term impact on housing supply and housing affordability. As well as tax settings, housing supply and prices are influenced by planning and zoning laws, building regulations, environmental regulations, infrastructure provision and pricing, the availability of skilled labour in residential construction, and even transport policy. As a consequence of achieving other public policy objectives, these policies may affect housing prices.

### E4-3 The effect of the tax system on housing affordability

Many taxes influence the housing market. The personal tax system affects the affordability of rental housing through the assessment of income from investment in residential rental properties, offsetting expenses (such as interest costs) and capital gains. The housing market is also affected by the exemption of owner-occupied housing from the personal income tax and the capital gains tax system, stamp duties on housing transactions, GST on the price of supplying new housing, council rates and land taxes.

Prices send a signal to direct resources within an economy. Resources are directed to where they are most valuable when price signals reflect real preferences and resource constraints rather than tax policy settings, which of themselves contain no information about the type or location of dwellings Australians want to live in. Where taxes add to the volatility of demand or restrict the supply of housing, they reduce the efficient operation of the housing market. The general efficiency principle of tax policy, involves minimising its impact on economic activity. Similarly, when the tax system affects housing prices it can also affect fairness, for example, if the tax system makes it difficult for disadvantaged groups to afford housing.

However, other public policy objectives are of relevance for the taxation of housing. The role of housing as a lifetime savings vehicle that provides security in retirement means the income from owner-occupied housing should not be taxed. However, the Review is proposing to tax rental properties in a way that is more consistent with other forms of investment, reducing biases in housing investment and savings portfolios. As a result, these different tax treatments will affect the cost of housing for renters compared to homeowners.

## Effect of proposed reforms on supply and demand for housing

Outlined below are a number of proposed reforms to the tax system that would reduce the impact of the tax system on house prices. These reforms are described in more detail in Sections C2 (Land tax and conveyance stamp duty) and A1 (Personal income tax). In concert with other reforms to improve housing supply, they should improve housing affordability by making housing supply more responsive to demand.

### Removing stamp duty

Removing stamp duties would improve the supply of housing, as well as reducing a range of other adverse impacts on the housing market.

By suppressing the number of transactions undertaken in the housing market, stamp duties reduce the effective supply of housing.<sup>16</sup> More transactions means a better matching of people to housing, which in turn means a given housing stock can effectively house more people. By adding to the cost of moving to a larger house, stamp duty encourages people to renovate rather than re-locate. This means that more investment is channelled into making existing housing larger than into more affordable and newer housing. These impacts on the supply of housing are on top of the personal costs of stamp duty, which arise when people live in houses that are ill-suited to their needs.

As a turnover tax, stamp duties can also discourage the development of new housing stock. Stamp duties are paid twice in the supply chain of new housing construction: when the developer buys the property from its initial owners and when the final owner buys the land. Stamp duties impose their highest effective tax rate when a property is held for a short period (see Section C2 Land tax and conveyance stamp duty). As a result, they fall heavily on people who hold property over short time periods while it is developed (or redeveloped) into housing. As the liability from a land tax is independent of holding periods, replacing stamp duty would support new housing supply.

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<sup>16</sup> For example, Leigh (2009) estimates that a 10 per cent increase in stamp duty costs reduces the total number of transactions by 4 to 5 per cent if the increase is sustained over a three year period.

As well as taxing turnover, stamp duties are also a tax on the buildings (or improved value) including in housing. Compared to a tax on land only, stamp duties discourage the construction of new dwellings, which is likely to reduce supply and increase cost of housing.

### Land tax

Using the size of holdings and the use of land to determine land tax liabilities has adverse impacts on the housing market. Reforms to levy land tax on all land, based on its value, should reduce these effects.

Apart from the ACT, all States that levy land tax calculate it on the basis of aggregate land holdings. In combination with progressive rate scales, this approach creates a significant bias against large-scale land holdings. In combination with the negative gearing tax advantage available to individual investors, this is a major reason for the residential property market being dominated by small-scale investors.

Policies that discourage large-scale investors from participating in the housing market are likely to have adverse effects on the supply of rental housing and its affordability for tenants. By favouring small investors, housing investment forgoes the potential for lower costs from economies of scale in housing supply. For example, small landlords effectively share the services of tenancy management by purchasing them from property agents. Large scale housing investors may be able to bring the supervision of tenancy arrangements 'in house', reducing their cost and the cost of housing overall. Further, large-scale investors are more likely to invest over longer time horizons, as they are less likely to face cash-flow problems or the need for portfolio diversification that can force sales by small-scale investors. For long-term investors, longer leases would also reduce negotiation costs and provide certainty of income. Such arrangements would be particularly beneficial to some tenants who currently face high costs from insecure tenure, such as many elderly people and low-income families. The security of tenure provided by longer leases would have positive effects for tenants' social integration and for high levels of social capital within communities.

Improvements to housing investment arising from the removal of the aggregation basis for land tax would likely develop over a reasonably long time period in light of the range of other factors affecting housing supply.

The current exemptions from land tax mean that the tax is unlikely to be fully capitalised into land values (see Section C2 Land tax and conveyance stamp duty). This results in the burden of the tax falling on the users of land, greatly reducing the efficiency of the tax. This is particularly relevant for the housing market. When developers purchase land that was exempt because it was used in primary production and will become exempt in the future (as owner-occupied property), little of the tax will be reflected in lower land values. The exemption is likely to add to holding costs of supplying new housing. Similarly, the burden of the current land tax on investment property is likely to fall predominantly on renters through higher rent. Broadening the land tax would therefore improve housing affordability.

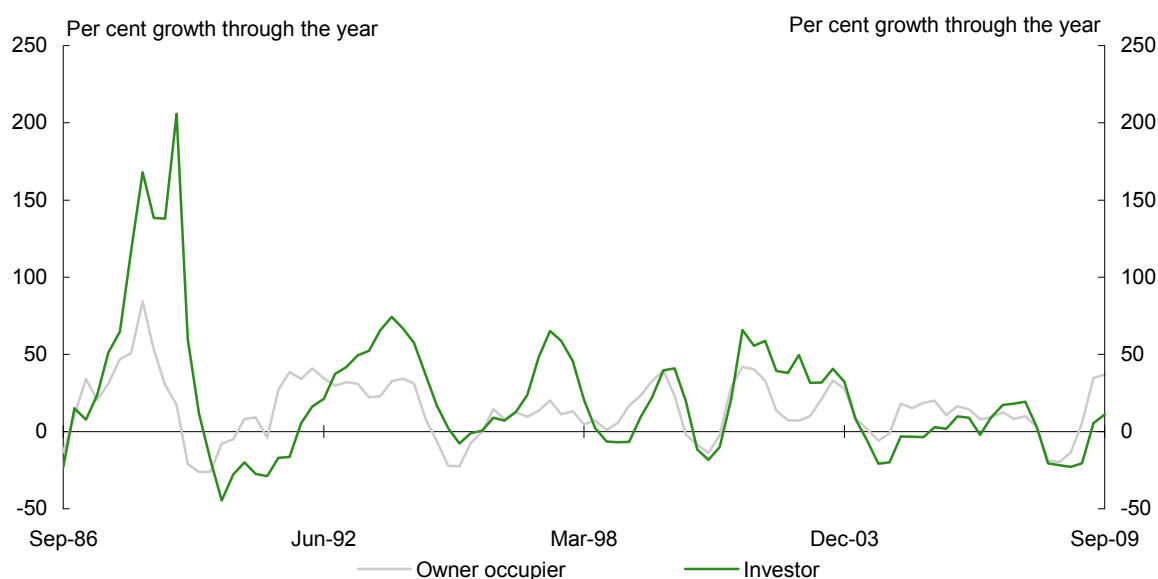
### Changes to the taxation of investment properties

The current personal income tax system favourably treats capital gains and amplifies this benefit when investments are geared. By discounting net rental income at the same rate as capital gains, the tax treatment of investor housing will be less responsive to gearing levels

and capital gains, creating a more neutral treatment of different forms of savings (see A1 Personal income tax).

The proposed reforms would reduce the bias in favour of the capital gain generated in rental properties by treating it more neutrally compared to rental yield. Over the long term, this is likely to change investor demand toward housing with higher rental yields and longer investment horizons. This may also result in a more stable housing market, as the current incentive for investors to chase large capital gains in housing would be reduced. Finance for investment in rental property appears to be more volatile than that for owner-occupiers (see Chart E4-4). The Productivity Commission (2004) and Reserve Bank of Australia (2003) have suggested that favourable taxation settings can contribute to volatility of the housing market.

**Chart E4-4: Volatility of housing finance from investors and owner-occupiers**



Source: ABS(2009j).

However, changing the taxation of investment properties could have an adverse impact in the short to medium term on the housing market. Investment returns in the Australian residential housing market are likely driven by capital gains rather than by rental yield. As such, reducing net rental losses and capital gains tax concessions may in the short term reduce residential property investment. In a market facing supply constraints, these reforms could place further pressure on the availability of affordable rental accommodation within the private rental market. These reforms therefore should only be adopted following reforms to the supply of housing and reforms to housing assistance (see Section F5 Housing assistance). The design of these reforms differs from the previous amendment to taxation of rental properties, see Box E4-2.



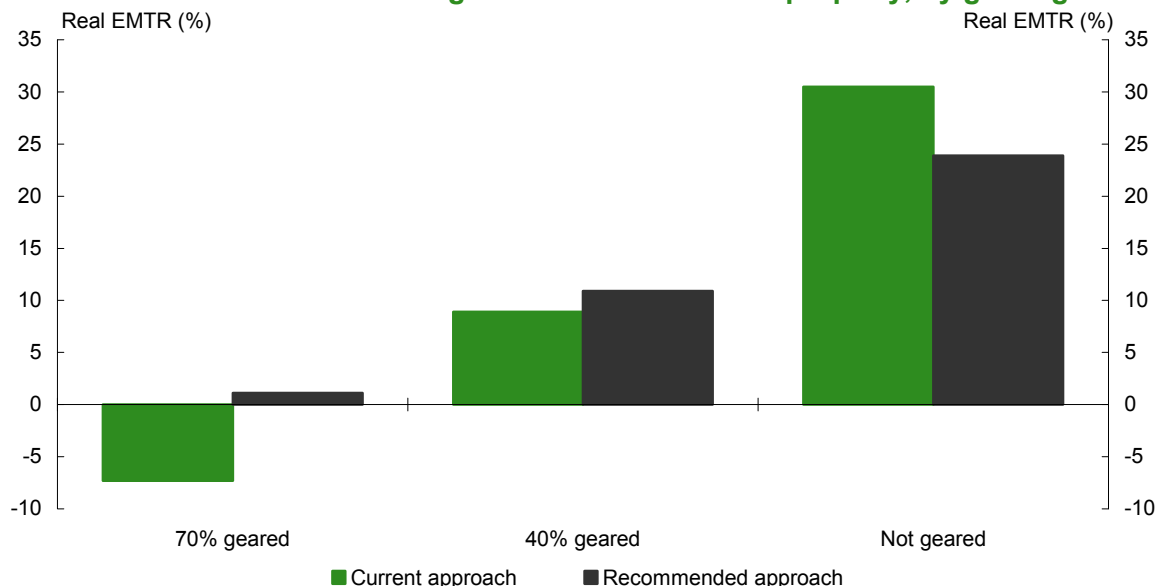
**Box E4–1: Changes to tax treatment of negative gearing, 1985 and recommended**

The effect of applying the recommended savings income discount to net rental income would be that a negatively geared investor would still be able to offset net rental losses against other income, including labour income. While the extent of the offset would be reduced, negatively geared investors would continue to access ongoing deductions that they might value for cash flow reasons.

Under the savings income discount, there would also be a generally better outcome for rental property investors that finance out of equity. The more neutral treatment would reduce the crowding out of other potential investors in rental housing by those undertaking negative gearing, and improve the long-term stability of the housing market.

Accordingly, this is quite a different approach to that adopted in 1985 (and reversed in 1987). In 1985 the tax benefits of negative gearing became restricted through the introduction of quarantining measures for excess deductions. As such, negatively geared investors could not access the entire net rental loss in the income year it was incurred, rather, excess interest in any year was carried forward and offset against future rental income or any gains taxable under capital gains tax from the sale of such investments.

In terms of rent setting, a more neutral taxation of investment housing would reduce the tax on some investors, while increase it for highly geared investors (see Chart E4–5). The long-term impact on rents would depend on how these different investors respond and their relative prominence in the rental housing market. Currently, investors with no or low levels of gearing form the minority of the market, so the current tax advantages available to highly geared investment can operate as a subsidy to renters by placing downward pressure on rents.

**Chart E4–5: Real effective marginal tax rates on rental property, by gearing ratio**

Assumptions: Individual on 31.5 per cent marginal tax rate. 6 per cent nominal return, 2.5 per cent inflation. For rental property, 50 per cent of the return is attributable to capital gain, 50 per cent attributable to rental income and the rental property is held for seven years then sold. Tax on debt provider disregarded.

Source: Treasury estimates.

This implicit subsidy is sometimes cited as a reason to sustain a non-neutral tax treatment. However, while some benefit may accrue to renters through lower rents, the tax advantage is neither transparent nor well-targeted to improve affordability for low-income renters. Further, providing assistance through subsidised geared investment can have other impacts on the availability of rental housing that may not be in the best interests of tenants. Recent work by Wood and Ong (2009) found that negatively geared investors were around half as likely to hold their property after five years as investors who were not negatively geared. For tenants, having landlords who are more likely to sell reduces the security of their tenure. In contrast to negative gearing, the proposed reforms to housing assistance are targeted to those who need assistance, making them a more effective and equitable means of subsidising low-income renters.

### Overall impact on the housing market

While these reforms will address significant biases that the tax system introduces into the housing market, the overall impact on housing affordability depends on other factors, such as interest rates and land release policies. A range of other policies are likely to have a more significant impact on housing supply than tax settings.

The tax system is unlikely to be an effective instrument to move housing prices toward a particular desired level and the tax system is not the appropriate tool for addressing the impact of other policies on housing affordability.

#### Finding

Though the Review's proposed reforms to taxes, in particular stamp duty and land tax, could play significant roles in addressing housing affordability, other policies are likely to have a more pronounced impact on the responsiveness of housing supply.

## E4–4 The effect of non-tax policies on housing supply

A range of policies restrict the supply of new housing, whether in new 'greenfield' areas or in infill projects.

### Planning and zoning, approvals and building regulations

Features of the planning system intend to enhance the efficiency of land use in two ways: by managing or preventing perceived negative spillovers from development activities that may extend beyond the site of the development itself; and by facilitating positive spillovers through the provision of public goods (National Housing Supply Council 2009). However, planning can also add costs, such as where the regulations are not well-targeted and lengthy development assessment processes are involved. The key question is whether the benefits outweigh the costs.

The zoning process is one aspect of the planning system that controls the manner in which land can be used and regulates the supply of land for new housing. Zoning can have many rationales. It can be used to manage land use to protect the property rights of neighbouring land owners. Zoning can reduce spillover costs by congregating spillovers (such as noise pollution) in common areas (such as industrial zones). Some forms of infrastructure may also be provided at lower cost if they are specific to some forms of land use. Zoning is therefore

one mechanism for coordinating different uses of land and reducing spillover costs between owners.

Zoning and planning also can reflect other public policy objectives. A number of Australian cities employ boundaries or growth corridors that aim to limit the expansion of urban land. Limiting the expansion of cities can reduce the need for additional infrastructure, which tends to be more costly to deliver further from urban centres. These limits can be used to contain urban sprawl. The desire to contain sprawl can be motivated by cost considerations, such as reducing costs caused by congestion that results from longer commuting times. Objections to urban sprawl often reflect a range of values, such as a preference for non-urban land to be preserved or a concern that more distant communities may be socially isolated, particularly if the communities do not have access to public transport.

The use of zoning and local interpretation of zoning settings, however, restricts the supply of land for housing and necessarily increases its price. While land values for different types of rural land can be in the range of \$50 to \$5000 per hectare, the value of land on urban fringes can be substantially higher. For example, the value of land can increase by \$300,000 to \$400,000 per hectare when zoned for residential purposes (Department of Sustainability Victoria 2005). Such a significant increase will largely reflect the value that results from restricting supply.

Land already zoned for residential use is still subject to a range of constraints on its use. This may include preventing the construction of higher-density dwellings (such as dual occupancy or multi-story dwellings) in certain parts of a city. These restrictions may be motivated by similar reasons to those that underlie zoning itself. For example, a new higher-density residential development may impose social costs on existing residents by lowering the amenity of an area or congesting infrastructure. Another type of spillover is a 'pecuniary' spillover where increasing supply reduces the value of existing homes. Existing owners may therefore oppose the removal of restrictions on the supply of housing that maintain house prices at high levels. Limitations on higher density in existing urban areas may harm housing affordability more than restrictions at the fringe. This is because it would be cheaper to house people in areas close to services, transport, workplaces or places of natural beauty. The higher land and house values in inner-urban areas also reflects the fact that these areas are where more people want to live.

The removal of such building restrictions is not justified simply because it would reduce housing prices. Concerns for housing affordability need to be balanced against other policy objectives. Further, potential exists for some of these objectives to be addressed more effectively through price mechanisms. For example, moves toward more effective road pricing and congestion charging would reduce the need to use a growth boundary as an indirect way of reducing congestion costs. For many of the other policy motivations, however, there are clear trade-offs that need to balance concerns of competing groups who can benefit or be harmed by the maintenance of housing restrictions.

One such trade-off is reflected in the governance issues that affect development. In general, State governments are responsible for determining the plans for a city, as these require coordination across a number of local councils and the provision of large-scale infrastructure, for which they are responsible. Local governments often control the zoning or approvals that put broader plans into effect, such as by allowing higher-density housing in the areas designated by the plan. This can result in tension between the wider objectives, which can

often include objectives for higher-density housing, and the decisions of local government, which reflect the concerns of their citizens who are most strongly affected by change. It can therefore be difficult for State governments to implement urban infill strategies. There appears to be scope for reforms to planning governance to achieve greater clarity in the roles of institutional policy-setting and decision-making between levels of government (National Housing Supply Council 2009).

Regulations on the use of land need to be governed by approval processes to ensure they are enacted in a transparent and fair manner. These processes require consultation with affected stakeholders and assessment against a range of criteria, such as environmental requirements managed by Australian government legislation. Where these processes are slow, they add to costs of house building and the risk of developing land, thereby reducing the supply of housing. There is some evidence that delays have increased and that approval times can be 50 per cent longer in inner-urban areas than at the fringe (Productivity Commission 2004). Where approval processes are streamlined, they are likely to result in supply being more responsive to changing conditions.

While much of the recent increase in house prices reflects increasing costs of land, higher building costs can also affect housing affordability. National building codes mandate a minimum quality standard of construction. These standards ensure a minimum quality standard to ensure safety, promote environmental outcomes or improve the energy efficiency of buildings. Standards may be imposed to correct perceived market failures, particularly information asymmetry between home buyers and builders and spillover costs to the community that parties to the transaction may ignore. Improving the quality of housing raises its cost. These higher costs need to be balanced against the social and private benefits they deliver.

### Findings

Higher house prices are likely to result from restrictions on the supply of housing that result from zoning, lengthy approvals processes and building code and other standards imposed on building quality. Housing affordability needs to be considered against the other policy objectives that motivate these regulations.

### Scope for reform

#### Recommendation 69:

COAG should place priority on a review of institutional arrangements (including administration) to ensure zoning and planning do not unnecessarily inhibit housing supply and housing affordability.

Australia is likely to benefit from greater emphasis on housing supply in a range of policy areas. In particular, there appears to be scope for reforms to planning and approvals processes to enable more responsive supply of housing in greenfield and infill developments. However, the Review has not considered these mechanisms and is not in a position to identify those regulations that may prevent or delay viable developments.

Reforms that could promote the more responsive supply of housing will present serious choices for both the Australian people and their governments. Most starkly, 'improving'

housing affordability for purchasers involves policies that cause house prices to be lower or grow more slowly than the community would otherwise expect. While this will benefit those who gain access to housing, it will affect the wealth of the majority of home owning Australians.

Increased housing supply may also change the shape of Australian cities and towns in ways that many existing residents may not desire. How different tiers of government balance their concerns against those of potential new residents is an important question of governance. This suggests that a serious community dialogue is needed on the distribution and quality of housing across Australia. As a first step, the COAG should review the administration of land use policies by local councils and planning authorities, with a view to facilitating greenfield and infill developments.

## E4–5 Infrastructure charges

Infrastructure charges (sometimes called ‘developer charges’ or ‘developer contributions’) are fees levied on developers to compensate governments for providing facilities necessary for land development. The charges are often associated with basic infrastructure (such as local roads and water mains), but more recently this has sometimes been extended to include major headworks (arterial roads and pumping stations) and social infrastructure (parks and libraries).

Infrastructure charges are widely used by local government as well as some State governments, and are increasingly prevalent in other developed countries. There is limited information and few aggregate statistics relating to infrastructure charges in Australia. Chan et al. (2009) reported that in 2005–06, New South Wales councils collected \$232 million and Victorian councils collected \$454 million in charges.

### What is the potential role for infrastructure charges?

In Australia, the practice of governments charging for infrastructure has been becoming more prevalent since the 1980s. This reflects increasing demand for infrastructure and fiscal constraints on local governments, but also a policy shift towards using economic instruments to allocate infrastructure and influence development decisions (Chan et al. 2009).

In principle, efficient provision of infrastructure would be encouraged where its users pay for the construction of infrastructure that would be avoidable (that is, not needed) if the development did not proceed. By levying infrastructure charges that reflect these costs, State and local governments provide signals to develop housing in ways and places of greatest value. The cost of infrastructure increases directly with distance from essential headworks and inversely with the density of development (Slack 2002). To the extent that a developer can respond to these costs, for example, by choosing to build closer to an existing development or by increasing the density of housing, charging the developer can improve housing supply.

Indeed, in the absence of pricing, developers build without regard to such costs, and governments are more likely to rely on other policy instruments, such as planning regulations, to limit the budget costs of infrastructure associated with housing

developments. The absence of effective infrastructure pricing increases the need for development regulations.

### There are problems with infrastructure charges in practice

In practice, infrastructure charges have a number of problems.

First, infrastructure charges can sometimes be used to raise tax revenue, rather than focusing on providing efficient user charging. Where the charge exceeds the cost of providing infrastructure, it acts like a tax and can discourage development. This is more likely to occur where the size of the charge is not set relative to the cost of infrastructure but the developer's capacity to pay. In these cases, the charges may attempt to capture part of the increase in value resulting from the provision of infrastructure or from changes in zoning, that is, to impose a betterment tax (see Box E4-2). However, the benefit to the developer is difficult to determine, and attempting to set charges on this basis can lead to negotiations that are protracted and non-transparent. This can slow down development processes and result in payments that are not effective as prices for infrastructure. In general, infrastructure charges will operate more effectively if they are set to reflect the cost of infrastructure, not to tax the profit of development.

#### Box E4-2: Betterment taxes

A particular form of tax used when land is re-zoned for alternative use is a 'betterment tax' which attempts to capture some of the increase in land value. Betterment taxes are not infrastructure charges since the objective is to tax economic rent, although sometimes the revenues are hypothecated (that is, earmarked) to infrastructure provision.

In concept, betterment taxes are attractive since they aim to tax the economic rent from land rezoning that would otherwise accrue to the landowner. However, in practice, betterment taxes can increase the uncertainty associated with land development. To operate effectively, betterment taxes need to isolate the increase in value attributable to the zoning decision or the building of infrastructure from general land price increases at the local level. This is often difficult since the value of land will move in anticipation of a change in re-zoning. Sometimes this can occur many years before the re-zoning.

Betterment taxes may be applied on an ad hoc basis and the rate of the betterment tax is sometimes left to discussions between developers and government as part of the planning approval processes, rather than being set in a transparent manner. Betterment taxation can involve lengthy disputes as, by setting the tax conditions, the dispute is really about how to share the economic rent.

Additionally, having a betterment tax in place may encourage governments to create economic rent through additional zoning restrictions or delays in land release, in order to raise more revenue. Where zoning is used in such a manner, it is likely to stop land being devoted to its most productive use — at least in the short run. A land tax applied to all types of land (see Section C2 Land tax and conveyance stamp duty), is likely to encourage governments to allow land to be used for its most productive use as this will increase the value of the land (and hence increase the revenue raised from land tax).

Second, infrastructure charges can be complex and costly to levy. Ideally, each individual development would be assessed for the avoidable costs of infrastructure, which can be



different for a similar item in different developments (McNeill & Dollery 2003). There is therefore a trade-off between the accuracy of user charging and its administrative feasibility.

Some infrastructure items nearly always have benefits that are limited to those residing in the development, including local roads, drainage, stormwater, utilities provision, and land for local open space. Charges should generally be imposed for this type of infrastructure since it directly connects new properties to wider networks and would serve little purpose in the absence of the development.

However, it is much less clear whether charges should be imposed for other forms of infrastructure, including community facilities such as schools, libraries and child care, regional improvements such as parks, open space and capital repairs, public transport capital improvements, regional road improvements and conservation of natural resources. When used in such circumstances, the charges should reflect only the additional costs that the development imposes on society, not the total cost. In many cases, governments would need to expand infrastructure, such as libraries, whether or not it is located in a new development. In such cases there should be no charge to the developer. Similarly, some forms of infrastructure that have network effects, such as electricity generation, should be paid for by all users. The higher prices necessary to recover capital costs serve a useful function in rationing such services to the highest value users (whether in a new development or not).

The scope of infrastructure charges varies significantly between States and internationally (see Table E4-2).

**Table E4-2: Public infrastructure eligible for mandatory contributions (excluding basic infrastructure)**

	NSW(a)	Vic	Qld	WA	SA	Tas	ACT(b)	NT
Parks	✓ (c)	✓ (c)	✓ (c)	✓ (c)	✓ (c)	✓	✓	✗
Education	✓ (c)	✗	✗	✓ (c)	✗	✗	✓	✗
Trunk roads	✓ (d)	✓ (d)	✓ (d)	✓ (d)	✓ (d)	✓	✓	✓
Public transport	✓ (c)	✓	✗	✗	✗	✗	✓	✗
Child care centres	✓ (e)	✓ (f)	✗	✗	✗	✗	✓	✗
Libraries	✓ (e)	✓ (f)	✗	✗	✗	✗	✓	✗
Community centres	✓ (e)	✓ (f)	✗	✗	✗	✗	✓	✗
Recreation facilities	✓ (e)	✓ (f)	✗	✗	✗	✗	✓	✗
Sports grounds	✓ (e)	✓ (f)	✗	✗	✗	✗	✓	✗
Protection	✗	✗	✗	✗	✗	✗	✓	✗
Housing	✓	✗	✗	✗	✗	✗	✓	✗

(a) Relates to infrastructure eligible for local infrastructure contributions mandated under s.94 to s.94EH of the *NSW Environmental Planning and Assessment Act 1979* and includes proposed changes announced by the NSW Premier on 12 October 2007. Under these reforms, mandatory contributions will be limited to the infrastructure and land directly required to support land developments.

(b) Contributions generated by the ACT change of use charge flow into consolidated revenue and can be used to finance any government objective.

(c) Dedication of land only.

(d) Within the sub-division.

(e) Restricted to infrastructure that services the development site or precinct.

(f) In Victoria, contributions for community infrastructure are capped at \$900.

Source: Adapted from Chan et al. 2009.



## Impact on housing affordability and supply

There is some community concern about the impact that infrastructure charges may have on the affordability of housing. Several submissions to the Review have proposed using tax financing for new infrastructure to improve the affordability of housing. Deliberately charging below cost for new infrastructure would effectively involve ratepayers providing a subsidy for the provision of new housing.

Subsidised infrastructure is a high-cost way to lower house prices because it encourages the delivery of infrastructure to areas where it is of relatively low value. Further, developers have less incentive to build housing that uses infrastructure efficiently (for example, by building more high-density housing).

More importantly, in the face of restricted land supply, an infrastructure subsidy is unlikely to achieve the intended goal of lower house prices. Instead, the infrastructure subsidy is likely to be capitalised into higher land prices for sellers (see Chart E4-6 Panel B). Where new developments are restricted in supply, their prices will be set by the availability of nearby existing dwellings.<sup>17</sup> Sellers are likely capture most of the subsidy as they face high demand for their land. Similarly, if the subsidy is removed, sellers would be unlikely to convince buyers to purchase fringe dwellings at prices exceeding those in neighbouring established areas. When land supply is already restricted, developer charges are borne by the original land holder by reducing the above-normal return (economic rent) they would otherwise receive when selling their land. This is currently more likely to be the case in Australia, suggesting that infrastructure charges are unlikely to affect housing affordability substantially (Productivity Commission 2004).

However, where infrastructure charges are implemented poorly or are designed to operate as taxes, they can discourage housing supply and contribute to higher house prices.

Difficulties in administering infrastructure charges can increase uncertainty, potentially deterring investment. For example, charges on proposed developments are sometimes used to offset local objections, such as community concerns about traffic congestion or overcrowding of public transport. In some cases, councils or State governments have responded to these concerns by imposing additional charges on proposed infill development to upgrade local infrastructure, such as railway stations and pedestrian bridges. When development approval is contingent on development charges of uncertain size, this can also add risk to projects and affect their viability.

Applying infrastructure charges through use of simple flat prices that do not well approximate actual avoidable costs can sometimes reduce housing supply. For example, where charges are levied at a flat rate per dwelling, high-density developments are likely to face higher prices for the infrastructure they require, compared to lower density developments.

Where developer charges are set in an ad hoc fashion or are subject to unexpected changes, they can create uncertainty around new developments. If infrastructure charges are

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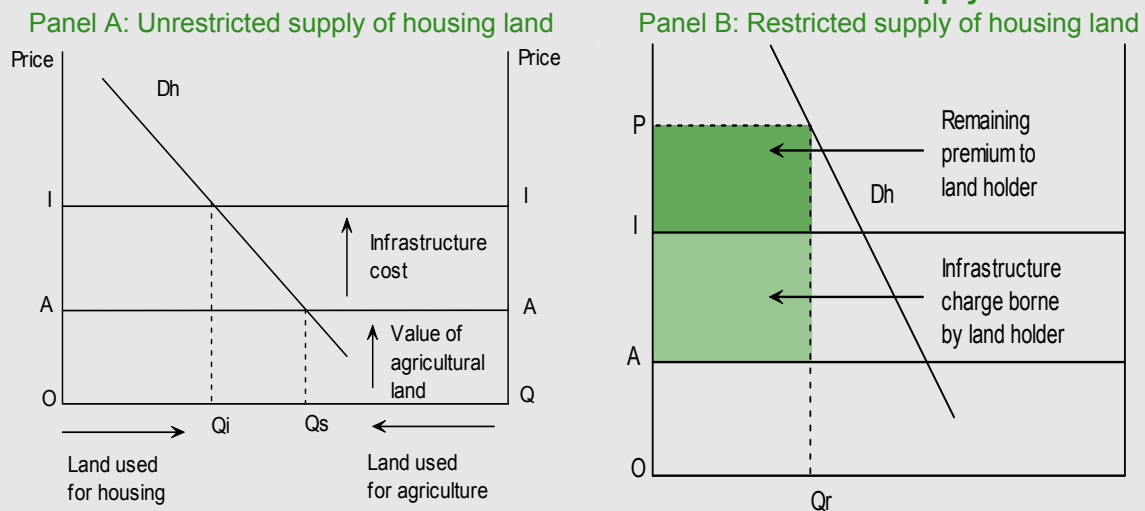
<sup>17</sup> In contrast, where land supply is deregulated, subsidised infrastructure is likely to reduce the price of housing in fringe areas, as the price of land can be reduced through competition among buyers (see Chart E4-6: Panel A in Box E4-3). However, this reduction in the price of housing occurs because infrastructure is being supplied in areas where it is of low value.

increased after a developer has bought land from its original owner, they cannot be factored in to the price previously paid for the raw land. In this case, the charge would lower the expected return from the development. In addition, general uncertainty about charging is likely to discourage development activity, which could reduce the overall supply of housing and increase the price of housing.

### Box E4–3: Who pays infrastructure charges?

Who bears the burden of developer charges depends on the relative elasticity of the demand and supply of land (Neutze 1997). Following Wood et al. (forthcoming), Chart E4-6 illustrates the impact of infrastructure charges on the price and allocation of land, depending on whether land for housing is freely available or restricted.

**Chart E4–6: Incidence of infrastructure and land supply**



The amount of total land (OQ) is divided between demand for housing land (Dh) and agriculture, which is valued at a fixed price (OA). To make land useable for housing, infrastructure worth AI must be added to the land.

If there are no restrictions on the use of land for housing at the fringe of a city and infrastructure is provided free, Qs land is used for housing (Panel A). With infrastructure for new housing effectively subsidised, the price of land for housing is equal to the value of agriculture (OA). Where there is a charge imposed for the infrastructure, the amount of land used for housing will fall to Qi. The cost of land used for housing at the fringe increases to OI, so that it equals the cost of agriculture plus the value of infrastructure. In this example, subsidised infrastructure can reduce the cost of housing because additional land can be acquired and converted to residential use at a price OA. However, this is not a good outcome from the viewpoint of efficient resource allocation: if the full social cost of housing is reflected in appropriate infrastructure charges demand for housing is Qi.

### Box E4–3: Who pays infrastructure charges? (continued)

In contrast, if the supply of land available at the fringe is limited to the amount  $Q_r$  due to zoning or planning restrictions (as in Panel B), free infrastructure has no impact on housing supply. The restriction in land supply means that prices at the fringe ( $OP$ ) are higher than the value a marginal agricultural user would be willing to pay. Landholders receive an 'economic rent' ( $AP$ ) when developing their land for housing. The price is determined by the demand for land in relation to the constrained supply. An infrastructure charge ( $IA$ ) levied on land holders who are developing their land for housing reduces the size of this rent (from  $AP$  to  $IP$ ), without affecting the price of housing. Only if the infrastructure charge exceeded  $AP$  would it raise house prices.

This is a stylistic comparison of two extreme cases, where land for housing is either fully elastic or fully inelastic. The real situation is likely to fall somewhere between these two extremes. That said, the value of agricultural land at the fringe of cities generally exceeds its opportunity cost in agricultural production, reflecting restrictions on the supply of land for housing.

### Findings

Infrastructure charges can be an effective way of encouraging the efficient provision of infrastructure to areas where it is of greatest value and of improving housing supply. Charging for infrastructure may be a more effective means of allocating resources than regulating land release.

Where land supply is constrained, well-designed infrastructure charges are more likely to be factored in to the price that developers pay for raw land, than to increase the price of housing in the development where the charge is levied. However, where infrastructure charges are poorly administered — particularly where they are complex, non-transparent or set too high — they can discourage investment in housing, which can lower the overall supply of housing and raise its price.

## Reform directions

### Recommendation 70:

COAG should review infrastructure charges (sometimes called developer charges) to ensure they appropriately price infrastructure provided in housing developments. In particular, the review should establish practical means to ensure that these charges are set appropriately to reflect the avoidable costs of development, necessary steps to improve the transparency of charging and any consequential reductions in regulations.

In general, improving the use of infrastructure charges and relying on general land taxation (rather than betterment taxes) is likely to reduce the need for regulations and planning, which can restrict housing supply.

For infrastructure charges, the Review is not in a position to be definitive about which costs should be met by developers, and which costs should be met by governments. However,

there is a trade-off between relying too much on a high-level principle and difficulties of applying it in practice. One way of resolving which charges should be borne by developers and which charges should be borne by governments would be to establish principles that set out the funding responsibility for each type of infrastructure. However, the Review has not recommended specific pricing guidelines for future infrastructure charges. This is an issue that requires extensive consultation.

Further, making the charges and the process for setting them public should help ensure they are set close to the right level.

Where charges are transparent they are likely to encourage more efficient provision of infrastructure. If developers understand how charges are determined, they will respond by minimising the costs they face, which is the desired outcome. Setting charges publicly and in advance enables developers to make more effective plans about where to develop and can provide greater certainty to the process. Non-transparent and inscrutable infrastructure charging processes increase risk to developers and reduce valuable infrastructure investment.

Transparency also serves an important accountability role. The Review has received several submissions from housing industry organisations concerned with the lack of transparency in price setting. Because only a small number of taxpayers pay such charges there may be an incentive for governments to rely on infrastructure charges to fund services beyond infrastructure where general taxation would be a more efficient means of raising revenue. Public disclosure may encourage more consistent principles and their application in practice and reduce the chances of under- or over cost-recovery.



## E5. Alcohol taxation

### Key points

Taxes on alcohol should be set to address the spillover costs imposed on the community of alcohol abuse, when this delivers a net gain to the community's wellbeing and is more effective than alternative policies. Raising revenue is a by-product, not the goal, of taxing alcohol. The tax rate should be based on evidence of spillover costs, and levied on a common volumetric basis across all forms of alcohol, regardless of place, method or scale of production.

While the abuse of alcohol imposes significant costs on society, these are not effectively targeted by current tax and subsidy arrangements for alcohol, which are complex and have conflicting policy rationales. In particular, the wine equalisation tax, as a value-based revenue-raising tax, is not well suited to reducing social harm.

A common volumetric tax on alcohol would better address social harm through closer targeting of social costs. A rate based on evidence of net social costs would help balance the benefits from alcohol consumption with its social costs. Moreover, by removing the distinction between different manufacturing processes, the compliance and administration cost of the existing excise system would be reduced.

In the short term, several specific changes should be made to address the more pressing social costs of alcohol consumption, and to remove structural anomalies in the system of alcohol taxes. The transition to a common alcohol tax should be phased in over a longer term, to ensure that producers and consumers have time to adjust to the changes.

### E5–1 The rationale for taxing alcohol

Since Governor Hunter first taxed beer, wine and spirits in the colony of New South Wales, alcohol taxation has provided governments in Australia with an administratively simple tax base. This revenue was once a vital share of government finances. However, government today can raise much larger sums of money from broad-based taxes on income, resources and consumption. These provide a fairer and more efficient way to raise revenue than specific commodity taxes. Narrow-based taxes should be designed primarily to correct particular market failures, not for general revenue-raising (see Section E Enhancing social and market outcomes).

While alcohol excise is administratively simpler than other taxes, its simplicity has eroded over time. Today, commercially produced beer is taxed at eight different rates – depending on alcohol volume, the type of packaging, and whether it is produced for commercial or non-commercial purposes. Brandy is taxed at a lower rate than the domestic spirits rate (which is based on alcohol content), and some imported spirits are subject to an additional duty based on value, on top of the domestic excise rate. Wine is taxed through a separate wholesale tax, based on its value, not its alcohol content.

To enforce the distinction between beer, wine and spirits, a sophisticated system of licensing and bonded warehouses has been devised. This ensures that alcohol produced using one process is not passed off as a lower-tax product. In addition, technological advances mean that alcohol produced using one process can be altered to mimic other beverage types. This has introduced additional complexity – for example, the definition of beer now requires a minimum threshold of ‘international bitterness units’ and a maximum threshold for sugar. Just to determine the appropriate rate of excise, the Australian Taxation Office (ATO) needs to provide advice on recipes.

While taxes on alcohol should not be used for general revenue-raising, they may have a role in addressing the significant spillover costs on the community associated with alcohol abuse, by changing the price of alcohol faced by consumers. This is a blunt instrument for controlling the spillover costs of abusive consumption, and must be weighed against the wellbeing loss of taxing non-abusive consumers. However, in the absence of more cost effective or better targeted instruments to address abusive alcohol consumption, a tax on the consumption of alcohol can still improve welfare.

### **Alcohol tax reduces overall consumption, but is not targeted**

Economic studies of alcohol consumption around the world consistently find that higher prices do reduce overall consumption of alcohol products. However, in most cases a 1 per cent price rise in the price of alcohol results in less than a 1 per cent decline in consumption (Fogarty 2008). Moreover, not all individuals reduce consumption to the same degree – evidence suggests that heavier drinkers may be less responsive to the price of alcohol than the general population (Ayyagari 2009).

In theory, if alcohol tax could be targeted at an individual’s abusive consumption, it would be imposed on a per-drink basis, at a rate set according to the risk of harm for individual consumers. Drinks more likely to give rise to high spillover costs would be taxed prohibitively, while consumption with no risk of spillover costs would not be taxed. In this ideal world, the price of every glass of alcohol would include the risk of harm associated with its consumption.

In the real world, however, such a tax is technologically and administratively infeasible, and would be unnecessarily intrusive. Accordingly, alcohol taxes are levied equally on all products of a particular class or type. The effect of this is to raise the cost of drinking, but with the cost averaged across all drinkers, not targeted only at those most likely to cause social harm.

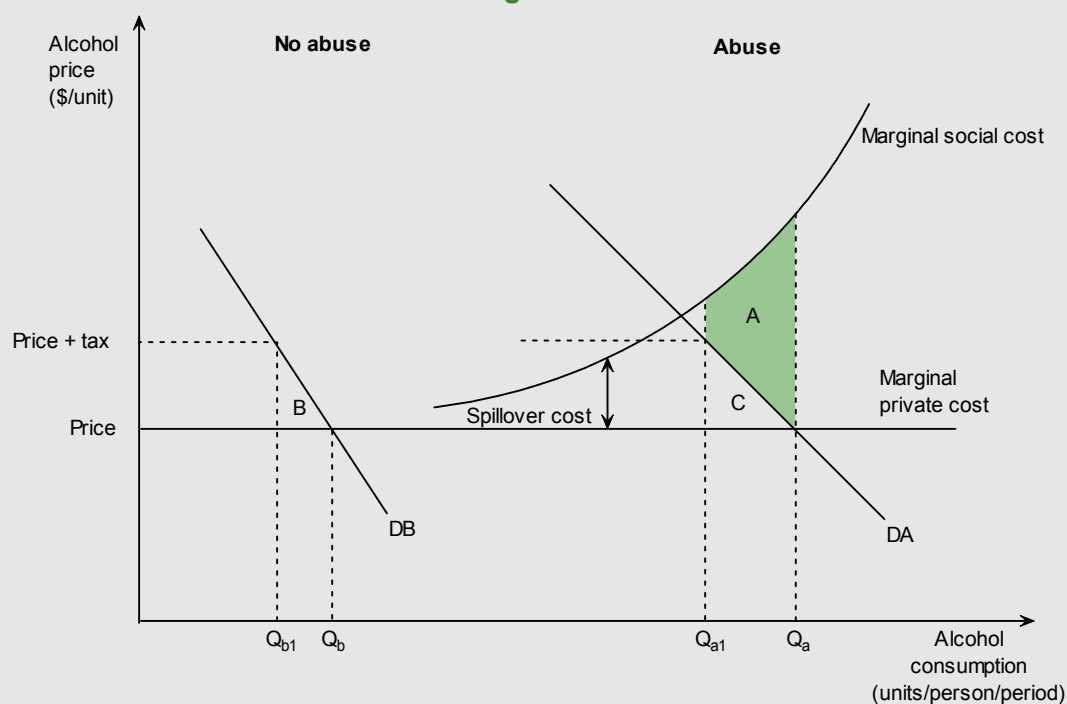
This makes excise a blunt instrument for reducing the spillover costs of alcohol use. It means that consumers who enjoy alcohol responsibly face an unnecessarily high price (and pay too much tax). In other words, even though alcohol tax raises revenue for the government, it is not a costless way of addressing alcohol abuse. As with all policy interventions, the benefits of taxation should be weighed against the costs (see Box E5-1).



### Box E5–1: Costs and benefits of taxation

Taxes to reduce social harm can be costly when not all units of consumption give rise to the same spillover cost. Chart E5–1 presents a stylised welfare-economics framework, which splits consumers into two groups – one whose consumption has ‘no abuse’ (left) and one whose consumption has risks of ‘abuse’ (right). Consumption with no abuse gives rise to no spillover costs, while consumption with abuse gives rise to spillover costs that increase with the quantity of alcohol consumed in a single period.

Chart E5–1: Taxing to control social costs



Source: Adapted from Pogue and Sgontz (1989).

A tax – levied across both groups – reduces the consumption of both groups. An increase in price reduces consumption by the abuse group (from  $Q_a$  to  $Q_{a1}$ ). While this may result in a loss of immediate satisfaction (area C) to the individual, on balance society as a whole benefits from a reduction in spillover costs (area A).

However, this gain needs to be balanced from the wellbeing loss of consumers with no abuse. They too reduce their consumption (from  $Q_b$  to  $Q_{b1}$ ), resulting in a welfare loss (area B) that is not offset by any reduction in spillover cost.

Taxes on alcohol should not be increased beyond the point where the marginal reduction in spillover cost exceeds the marginal reduction in the wellbeing of responsible drinkers. One corollary of this is that while a tax on alcohol might be used to reduce social harm, it is not an appropriate tool to eliminate it.

### Tax compared to targeted policy intervention

Collins and Lapsley (2008) evaluate a number of policy interventions for reducing the spillover costs of alcohol abuse. They find that higher alcohol taxes would reduce overall spillover costs, but also that individual-based interventions (usually by doctors) are an

effective way to reduce hazardous alcohol consumption. Stricter enforcement of random breath testing, and reducing the allowed blood alcohol concentration level for drivers would be effective ways of reducing the costs of drink driving. Complete or partial controls on the advertising and marketing of alcohol would also reduce costs.

As with the use of tax to control the spillover costs of alcohol, the costs and benefits of non-tax programs need to be considered. The advantage of these interventions is that they could be closely targeted at actual spillover costs, unlike an excise that is necessarily averaged over all units of production.

The point of production or importation is not the only point at which it is possible to introduce prices that reflect spillover costs. For example, data on police attendance at alcohol-related incidents in New South Wales suggests that more than half of incidents are related to only 10 per cent of licensed premises (Moore 2009).

To improve the targeting of the price signal, State governments might relate the licence fee for an establishment to the number and severity of violent incidents connected with it. In this way, licence fees would act as a more targeted tax than excise. They would provide operators with a stronger incentive to refuse service to high-risk patrons. Establishments that are sustained sources of violence would pass these costs on to their patrons in higher prices — while consumers who drink in a low-risk setting would not pay the additional cost.

### Principle

Taxes on alcohol should be set to address the spillover costs of consumption, when this delivers a net gain to wellbeing and is more effective than alternative policies.

## Taxes to reduce spillover costs should target alcohol content

A World Health Organisation (WHO 2007) expert committee concluded that policies that increase alcohol prices have been shown to 'reduce the proportion of young people who are heavy drinkers, to reduce underage drinking, and to reduce per occasion 'binge' drinking'. In addition, the WHO found that '[h]igher prices also delay intentions among younger teenagers to start drinking and slow progression towards drinking larger amounts'.

To the extent that people want to be inebriated — and that this is associated with social harm — it is the alcohol rather than the form in which it is delivered that drives demand. For this reason, it is the alcohol consumed by an individual in a set period, not its value, packaging or the method or place of production, that is most closely related to social harm. Any tax on alcohol designed to address spillover costs should therefore be levied on a volumetric basis.

### Principle

Alcohol tax should be levied on a common volumetric basis across all forms of alcohol, regardless of place, method or scale of production.

## Rates of alcohol tax should be based on evidence

Spillover costs of alcohol abuse include foetal damage and child abuse, domestic violence, road accidents, crime and violence, increased mortality and a range of diseases and medical conditions.<sup>18</sup> These costs can arise directly (for example, in the form of costs on victims of alcohol-related violence) and indirectly (for example, in the form of the cost to the community of additional demand on a publicly-funded health care system).

There are additional characteristics that may be related to social harm in specific cases. Policy intervention to reduce social harm might also consider the alcohol strength, the environment in which the alcohol is consumed, who is drinking (those more prone to violence) and how (binge drinking). Whether these factors can be taken into account in designing a tax on alcohol production depends on the extent to which particular identifiable classes of beverage can be causally associated with greater or less risk of social harm.

For example, many submissions have argued that 'alcopops' have higher spillover costs than other forms of alcohol, at least for certain groups. Similarly, an expensive single malt Scotch whisky may be associated with lower spillover costs than cheap vodka. Relating classes of drink to risks of harm requires detailed information about the relationship between alcohol products and spillover costs. This relationship may also change over time as producers and consumers adjust their behaviour in response to taxation.

In some cases, the welfare gains from taxing products differently may outweigh the complexity costs, provided that a product can be clearly defined and the net gains identified. However, in the absence of specific information, a uniform rate of tax across all beverages is the least complex and most efficient way of imposing an alcohol tax.

Having different tax rates on beer, wine and spirits is a common feature of alcohol taxes around the world. However, these often reflect the pattern of domestic production, rather than spillover costs. For example, major wine producing countries tend to charge little or no tax on alcohol in wine. Over time, this influences consumer preferences and reinforces demand for particular products.

Departure from uniform taxation also encourages producers to innovate simply to avoid tax. Some Australian firms produce grape-based alcohol products (such as Father O'Leary's) that are very similar to spirit-based products (such as Bailey's Irish Cream). Different tax rates also encourage consumers to change from their preferred drink, without necessarily reducing the risks associated with their drinking.

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18 These costs are more limited in scope than those used in the cost of illness methodologies that have been developed in the public health literature (for example, Collins & Lapsley 2008), which also include many of the costs that individuals bear themselves. To estimate spillover costs relevant for setting rates of tax, it is necessary to exclude private intangible costs (such as pain and suffering), and the loss of household production from premature death or sickness. That said, the distinction between private costs and spillover costs is not always clear. For example, if a family utility and decision making model is used, alcohol-related violence against family members and the loss of family disposable income are private costs; but, if an individual utility and decision making model is used, costs borne by other family members are spillovers.

## Low-alcohol beverages

While there should be no discrimination between different types of production, submissions from both public health advocates and producers have generally supported lower rates of tax on lower strength products. This can be justified on the basis that alcohol concentration can be readily measured and is correlated with the level of social harm (see Box E5-2).

Indeed, low-alcohol products can be considered as having a social benefit to the extent that they substitute for higher strength alcohol products that impose greater spillover costs on the community.

### Box E5-2: Extremely low-alcohol products are mostly harmless

The body can process about one litre of water an hour (more and life is at risk) and about one standard drink (12.7 mL of alcohol) an hour (more and alcohol starts to accumulate). This implies that consuming a product at 1.27 per cent alcohol content or less should have negligible social harm from alcohol as the water would kill the drinker first.

### Principle

The rate of tax on alcohol should be based on evidence of marginal social cost.

## E5-2 Current taxes on beer, wine and spirits are incoherent

Many Australians enjoy drinking alcohol — around five in six adults drink alcohol each year, though not all drink on a regular basis. In 2007–08, Australians consumed around \$12.6 billion worth of alcohol products (ABS 2009b), containing 170 million litres of alcohol (ABS 2009c). Of this, alcohol in beer accounted for 46 per cent of consumption, followed by wine (31 per cent), spirits (12 per cent) and ready-to-drink beverages (11 per cent) (ABS 2009c).

Cnossen (2009) estimated that the costs relevant for calculating alcohol tax rates amounted to around \$46 per litre of alcohol when averaged across all alcohol consumed.<sup>19</sup> However, effective rates of tax per litre payable on beer and less-expensive wine are significantly lower than this. Premium wines and spirits-based products are taxed more heavily than this benchmark rate.

The current system does not reflect the risks of consuming different products. Chart E5-2 illustrates the variation in taxation for different products, at different levels of alcohol content. Some products are not taxed at all. The wine producer rebate means that wine produced by a small winery pays no net tax. Similarly, inbound duty-free concessions allow adults to bring 2.25 litres of alcoholic beverage into Australia duty free.

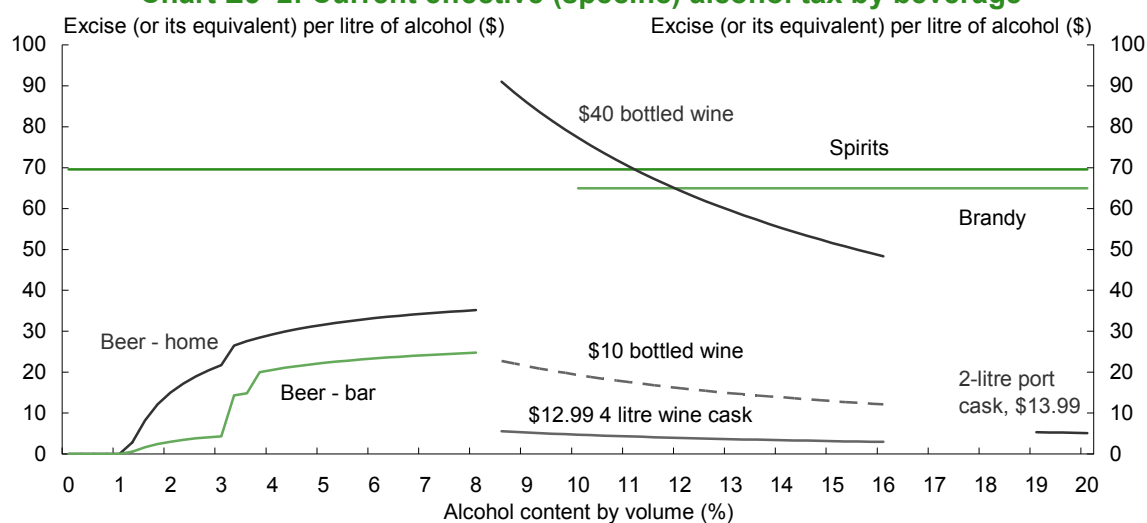
Taken together, current alcohol taxes reflect contradictory policies. They encourage people to drink cheap wine over expensive wine, wine from small rather than large producers, beer in pubs rather than at home, and brandy rather than spirits, and to purchase alcohol at airport

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19 These calculations are based on data from 1998–99, and represent a lower-bound estimate of average external costs per adult.

duty-free stores (see Box E5-3). As a consequence, consumers tend to be worse off to the extent that these types of decisions to purchase and consume, which may have no spillover cost implications, are partly determined by tax.

**Chart E5-2: Current effective (specific) alcohol tax by beverage**



Note: WET calculated using half-retail method.  
Source: Adapted from Ryan (2009), Treasury Estimates.

### Current wine tax arrangements distort production

Wine is taxed on its wholesale value through the wine equalisation tax (WET). This tax was introduced, in conjunction with the GST, to maintain a tax treatment for wine roughly consistent with the previous wholesale sales tax regime.

Because wine is taxed on a value basis, wines with the same alcohol content are subject to different levels of taxation. The cheaper the wine, the less it is taxed. As such, current tax arrangements are inconsistent with targeting spillover costs.

#### Box E5-3: Wine, beer and spirits in the Northern Territory

In Alice Springs, a 2-litre wine cask costs \$10.99, which includes roughly \$1.59 of wine equalisation tax. An equivalent volume of alcohol in full-strength beer would attract \$7.48 in excise, and in spirits \$16.45.

Source: Alice Springs supermarket, as at 17–18 August 2009. WET calculated at 29% using half-retail price method, assumes 240 ml of pure alcohol from 12% a.b.v. wine. Equivalent excise rates calculated at 5% alcohol by volume for beer, at \$41.06 per litre of alcohol (including 1.15% low alcohol threshold); 40% alcohol by volume for spirits at \$68.54 per litre of alcohol.

Moreover, the WET affects the type of products being sold into domestic and export markets. A value-based tax favours cheaper wines that tend to have lower profit margins and are often made by large producers.

The wine producer rebate introduced on 1 October 2004 sought to address this bias in favour of larger producers by shielding the first \$1.7 million (approximately) of domestic wholesale wine sales per producer (or group) from WET. The rebate is up to \$500,000 per year.

The rebate has created risks for tax avoidance, through 'double dipping' and attempts by small producers to transfer the value of the rebate to larger operators in the supply chain.

The rebate also creates biases between smaller and larger producers. Small producers effectively pay no net WET, but the rebate reduces only a proportion of the WET paid by larger producers. Consequently, an expensive wine made by large producers is subject to higher tax per standard drink than a similar wine made by a small producer. While this provides assistance to small producers, it is inconsistent with targeting spillover costs.

The assistance provided by the WET rebate is poorly targeted. It benefits wine produced outside rural and regional Australia, including wine produced overseas. For example, from 1 July 2005 the rebate was extended to New Zealand wine producers, at an expected annual cost of \$9 million for 2008–09 (Australian Government 2005, p. 37). Spending targeted at rural assistance is likely to deliver significantly better value for money to the community.

The wine producer rebate fosters small-scale production and supports some small, otherwise uneconomic wineries. The industry currently reports a widespread grape oversupply and that around half of all wine producers are currently unprofitable. This suggests that resources such as land, water and capital are not being used efficiently. Moreover, the rebate may be acting to prevent an appropriate market response to these circumstances by discouraging mergers within the industry. By supporting uneconomic wineries, the current arrangements are likely to increase the costs of inputs to other wineries that would otherwise be more successful.

### Findings

Alcohol is widely enjoyed in Australian society, but some alcohol consumption imposes significant spillover costs. Current tax and subsidy arrangements for alcohol are complex, and distort production and consumption decisions with no coherent policy justification. In particular, the wine equalisation tax, currently designed as a value-based revenue-raising tax, is not well suited to reducing social harm.

Effective rates of tax per litre of alcohol on beer and cheap wine are significantly lower than estimates of average spillover costs, while effective tax rates on premium wines and spirits are significantly higher than these estimates.

## E5–3 A common alcohol tax would better address social harm

If alcohol taxes are to be effective in reducing social harm, the taxation of beer, wine and spirits needs to be reformed. The ideal tax structure would be a volumetric tax on all alcoholic beverages, set to balance the reduction in spillover costs<sup>20</sup> of alcohol abuse with the cost of taxation on non-abusive consumers, and recognise social benefits of lower-strength products (see Box E5–4).

Policies that are unrelated to social harm, including industry assistance, regional development, and the promotion of small business, undermine the capacity of alcohol tax to

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<sup>20</sup> The weighted average marginal cost, not average total cost.



target social harm, and should not be delivered through alcohol taxes. To the extent that these programs are desirable, direct government funding or concessions should be delivered in a manner unrelated to the method or quantity of production.

Urgent structural reforms are needed to remove specific exemptions or concessions for certain forms of alcohol most open to severe abuse, including cheap wine. However, convergence to a common volumetric rate of alcohol tax might occur over a longer period, to ensure that the gains from reform are not overwhelmed by immediate shocks to producers and consumers.

#### **Box E5–4: Social benefits from taxing wine on a volumetric basis**

Even a low rate of tax on alcohol can significantly reduce spillover costs.

Experience with the Northern Territory Living With Alcohol Program and its associated levy provides evidence of the link between alcohol price and social harm. Beginning in 1992, the levy raised the cost of a standard drink by around five cents. It was wound down following a High Court case that clarified the limits of state power to impose excise duties.

An evaluation of the program found many benefits, including a reduction in alcohol-caused road deaths and Northern Territory government savings in excess of \$124 million over the first four years due to the reductions in alcohol-attributable deaths, hospitalisations and road injuries (d'Abbs 2001).

As part of a more wide ranging alcohol management plan implemented in Alice Springs in 2007, restrictions on the sale of cask wine were introduced. This resulted in a dramatic fall in the amount of alcohol sold in wine casks, accompanied by an increase in sales of full-strength beer, with a fall in the level of overall alcohol sales. Police said they believed that the restrictions had led to a reduction in violent assaults. Although people had switched from wine to beer, they were not as drunk as before (Senior et al. 2009).

### **A common alcohol tax would better satisfy consumer preferences**

Even before taking into account the spillover costs of alcohol, moving to a single volumetric would minimise the biases introduced by the tax system as to the form in which people choose to consume alcohol.

Removing tax distinctions between different production processes and beverage types would allow for better satisfaction of consumer preferences at the same time as targeting social harm. The range of products available would be less influenced by disparities in tax rates. Moreover, tax treatment based only on alcohol content would reduce complexity, and improve the long-term sustainability of the tax system in the face of technological innovation.

### **A common alcohol tax base would introduce a 'floor price'**

A uniform rate of tax on the alcohol content of all beverages — whether produced as beer, wine or spirits — would relate the alcohol tax base more closely to social harm. It would improve the price signal faced by consumers, currently distorted by a range of tax rates

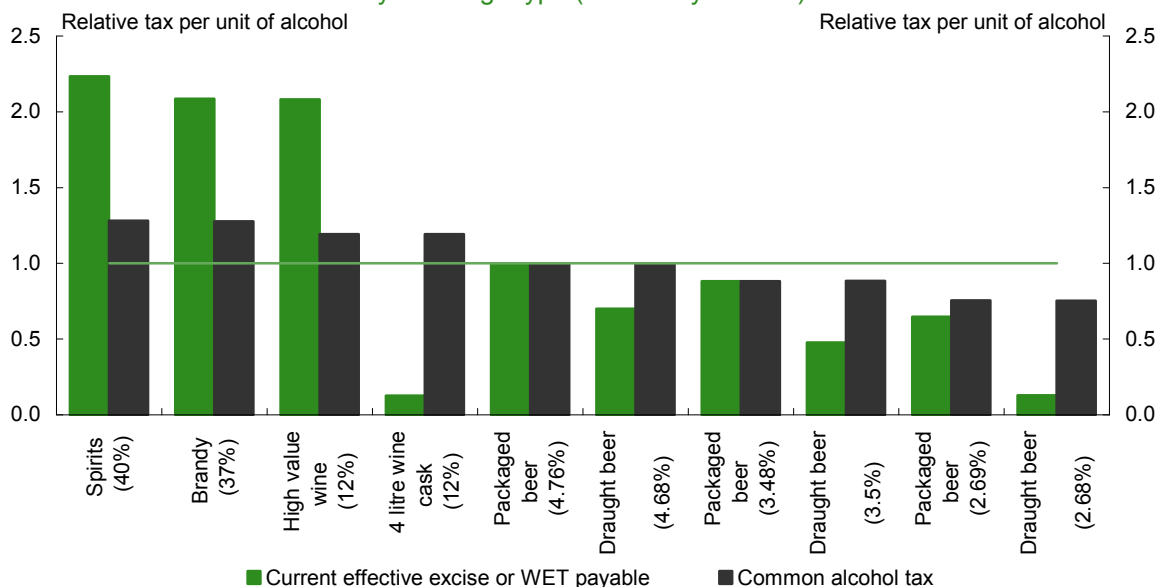


applying to different types of drink. A common alcohol tax would provide a floor price for alcohol (although alcohol could still sometimes be sold below cost or given away).

The maximum amount of alcohol that could be purchased with a fixed amount of money would fall, because forms of alcohol that are currently the cheapest would become more heavily taxed. Products that currently face high effective rates of tax per unit of alcohol, such as high-value wine and spirits-based products, would be taxed less heavily under a common alcohol tax.

For all beverages, the first 1.15 per cent alcohol by volume in any beverage would be exempt from taxation. This recognises that consumption of very low-alcohol products is unlikely to lead to social harm. It also provides a further incentive for producers to reduce alcohol concentration in all products, as less concentrated alcohol products would be taxed proportionately less. For example, Chart E5-3 shows that spirits currently face effective tax rates that are 2.2 times that of full-strength packaged beer. Under a common alcohol tax, full-strength spirits would be taxed around 1.3 times that of full-strength beer.

**Chart E5-3: Relative taxation of alcohol under a common alcohol tax<sup>(a)</sup>**  
By beverage type (alcohol by volume)



(a) The tax per unit of alcohol is measured relative to full strength packaged beer.  
 Note: The 1.15 per cent low-alcohol threshold reduces the effective tax payable on beer below the statutory rate. For example, the effective excise payable on full-strength packaged beer is  $1 - (1.15/4.9) = 76\%$  of the statutory excise rate. This treatment would be extended to all beverages under a common alcohol tax. The effective WET liability is calculated based on a 750ml bottle of high-value wine retailing at \$40 and a 4 litre wine cask retailing at \$12.99.  
 Source: Treasury estimates, ABS (2009c).

Transition to such a system would need to be managed carefully, to avoid potentially harmful shocks to consumers, and to reduce the impact on existing industry arrangements. For this reason, transitional arrangements might be designed to stabilise the nominal price of some products, and to limit the rate of price change (both upward and downward) for others, while monitoring the effect of these changes on spillover costs.

### Setting the rate of alcohol tax

The current wide variation in rates of tax on different types of alcohol makes it difficult to calculate an efficient alcohol tax rate. This is because the distribution of abusive and

non-abusive consumption is partly determined by these tax arrangements. In order to estimate the weighted average marginal spillover cost of alcohol, it would be necessary to first reform the structure of alcohol taxation, by removing the current biases to consume alcohol in one form rather than another.

Until reliable estimates are available, the average spillover cost per litre might be used as a proxy. As the current full-strength packaged beer excise rate is closest to the estimates of the average spillover cost of alcohol in Australia, it would be appropriate for rates of tax on other products to converge at this rate over time.

During the transition, data on spillover costs and consumer behaviour should be systematically collected to inform the process of setting the optimal tax rate. The final rate of tax would be intended solely to optimise price signals facing consumers. It should be set without regard to the government's fiscal position, and irrespective of any specific spending commitments related to alcohol abuse. The rate of tax should be indexed to ensure that the real rate of the tax only falls in the event of an adjustment to social cost estimates.

To ensure it is credible and sustainable, the process of determining the tax rate should be based on the best available information and an agreed and transparent methodology (see Section G5 Monitoring and reporting on the system). Consistent with Action 4.1 of the National Preventative Health Taskforce (2009), this process should incorporate independent modelling, in consultation with the departments of Health and Ageing and Treasury and an industry panel.

Estimates and models should be periodically re-assessed to take into account the effectiveness of alternative policies for reducing social harm, as well as changes in culture that affect consumption. If more targeted non-tax measures to reduce social harm are successful, the alcohol tax rate could be lowered.

## **Taxing alcohol consumed in Australia**

Alcohol produced for export should continue to be exempt from tax, as alcohol consumption should be regulated in the jurisdiction in which the spillover costs are borne (that is, in the destination country). Imported alcohol products (including by travellers) should be taxed at the same rate as domestically produced products, as the spillover costs of alcohol in Australia relate to alcohol consumed here, regardless of where it is produced.

Alcohol used for industrial, manufacturing, scientific, medical, veterinary and other purposes that poses no risk of social harm from human consumption would continue not to be taxed.

In principle, the home production of alcohol (for example, home brew or wine-making) would be subject to tax. In practice, this is unlikely to be feasible.

## **Reducing compliance and administration costs**

The excise system has evolved over the past century. In 2008–09, almost three hundred entities in the alcohol industry paid excise duty. This system is administered by the ATO. Excise-equivalent customs duty on imported goods is currently collected through a separate system by the Australian Customs and Border Protection Service.

Much of the existing apparatus for licensing the manufacturing, importing, storing or dealing in excisable products is due to differential (and sometimes high) rates of tax on many different classes of alcohol. Further, the additional value-based tariff on some imported spirits increases compliance costs associated with tracking goods in warehouses.

Treating all alcohol products on the same basis, regardless of how or where they are produced, would make much of this additional regulation redundant. The taxation of alcohol could be brought into a single regime, to ensure consistent compliance obligations between industries and to remove the administrative costs of running multiple systems for taxing alcohol. Such an approach would need to be developed over time in consultation with industry, and could also be extended to include other excisable goods. Businesses that produce a range of alcohol products would not need to deal with multiple tax systems.

The current excise system is particularly costly for smaller producers. However, wine producers, 80 per cent of whom have a turnover of less than \$2 million per year, are not currently in the excise system. There are also concessions for microbreweries and 'brew-on-premise' beer.

These small entities need not be immediately included in the current excise system, but should ultimately be brought under a common alcohol tax. The Australian government should explore streamlined arrangements for small taxpayers based on their volume of production. Small alcohol producers might be subject to less stringent licensing conditions, relaxed rules around calibration and testing of equipment, and be allowed to report their liability through the business activity statement. This would help ensure that compliance and audit resources are targeted on a cost-effective basis.

### **Finding**

A common alcohol tax that does not discriminate between beverage types would remove production and consumption biases from the alcohol taxation system, reduce compliance and administration costs, and better target the spillover costs of alcohol consumption.

### **Recommendation 71:**

All alcoholic beverages should be taxed on a volumetric basis, which, over time, should converge to a single rate, with a low-alcohol threshold introduced for all products. The rate of alcohol tax should be based on evidence of the net marginal spillover cost of alcohol.

### **Recommendation 72:**

The introduction of a common alcohol tax should be accompanied by a review of the administration of alcohol tax, to ensure that alcohol taxpayers do not face redundant compliance obligations.

## E5–4 Transition

Imposing a common alcohol tax would result in significant absolute price changes, both upwards and downwards, on a wide range of alcoholic beverages. To ensure that producers and consumers have sufficient time to adjust to new arrangements, the Australian government should develop and announce a long-term transition path to a common alcohol tax.

The long-term transition path would depend on the target volumetric rate of tax, the length of time over which the transition is to occur, and the size of the absolute and relative price impacts on various alcoholic products. This could be done by suspending indexation for the highest taxed-products, while increasing the rate of indexation of the lowest rates of tax.

However, some immediate changes to the current rate and structure of alcohol taxes are justified by the spillover costs associated with particular products, or to remove structural complexity from the existing system. For example, a volumetric tax on wine products should be introduced as a matter of urgency to raise the tax paid on cheap wine – effectively introducing a ‘floor price’ on alcohol. The system could also be simplified immediately by removing the additional 5 per cent tariff on imported spirits, and removing excise categories that provide concessional treatment for specific products.



## E6. Tobacco taxation

### Key points

While consumer sovereignty is an important principle in tax policy design, government intervention in the tobacco market is justified by the strongly addictive qualities of tobacco, its serious health impacts, its uptake by minors and the costs that smoking imposes on non-smokers.

Whether taxation is an appropriate intervention is an empirical question that depends on its costs and benefits relative to those of available alternatives.

Tobacco taxes raise prices and reduce both smoking rates and smoking intensity. Australian retail prices for cigarettes are moderate by international standards and taxes constitute a relatively small share of the retail price. Indexation of excise rates to consumer prices means that excise falls as a proportion of average wages over time.

To maintain the value of tobacco excise in terms of household income, it should be indexed to wages rather than consumer prices. The existing regime for tobacco taxation in Australia should be retained with the rates of tax substantially increased, depending on further evidence on the costs of harm from tobacco smoking.

### E6–1 Why tax tobacco?

The benefits that smokers get from smoking may include immediate pleasure, control of stress, improved self-image and the avoidance of withdrawal symptoms. The costs borne by smokers are primarily the cost of buying tobacco products and, in some cases, serious illness and premature death. Tobacco is a major cause of heart disease (including heart attack), lung cancer, chronic obstructive pulmonary disease (including emphysema) and stroke. Smoking is estimated to have accounted for around 15,000 deaths in Australia in 2003 (Begg et al. 2007). Giving up smoking considerably reduces the chances of serious disease. One study suggests that 4 per cent of quitters will avoid a heart attack, lung cancer, chronic obstructive pulmonary disease or stroke that they would have suffered had they continued to smoke for the next ten years (Hurley & Matthews 2007).

### Smokers suffer self-control problems

Tobacco differs from most goods in that its consumption poses self-control problems for most consumers and causes very substantial harm to many consumers. These problems do not by themselves mean that consumers are unable to make decisions about tobacco consumption that give them the most satisfaction over time. Even if a prospective smoker takes into account the chances of becoming addicted, the costs of addiction and the risky costs of consumption, choosing to consume may still be consistent with deriving the greatest available satisfaction over time (Stigler & Becker 1977).

However, there is strong evidence that this 'rational addiction' model does not accurately represent most smokers' choices. First, not only do most smokers become addicted but most addicted smokers display time-inconsistent preferences. That is, they weigh consumption in the present heavily and costs and benefits in the future less heavily. As each day arrives, their preferences shift to give a heavier weight to costs and benefits on that particular day — that is, their preferences change over time (Gruber & Köszegi 2001). A consumer with such preferences may be able to see that their lifetime satisfaction would be increased by giving up smoking and decide to give up smoking at some time in the future, but when the time to give up arrives, they may find themselves unwilling to put their plan into action. Smokers set up commitment mechanisms to help them overcome their inconsistent preferences — betting with others, advertising their decision to friends and relatives or joining a support group — but these are often ineffective. Between 2000 and 2005, about two-thirds of smokers in Victoria attempted to quit but only 30 per cent of these were successful (Brennan et al. 2007).

Second, the decision to start smoking is usually taken by young people. In Australia in 2004, the average age of initiation among those who had ever smoked was 16 (AIHW 2005). In the US, around three quarters of smokers begin smoking before the age of 19 (Gruber 2002). There is also evidence that young people are well informed about the health risks associated with smoking but underestimate how addictive it is. In research from the United States, 60 per cent of adolescents and 48 per cent of adults agreed with the statement 'I could smoke for a few years and then quit if I wanted to' (Arnett 2000).

Third, many daily cigarette smokers support an increase in cigarette taxes, under certain conditions. A Victorian survey in 2008 found that 61 per cent of current smokers supported an increase in tobacco taxes, provided that some of the money was used to fund services to help smokers quit (McCarthy 2009). Evidence from the US and Canada suggests that smokers in jurisdictions with high tobacco taxes are happier than those in low tax jurisdictions (Gruber & Mullainathan 2002). It is unusual for consumers to support higher taxes on a product that they consume themselves, or to be happier in the presence of higher taxes on such a product, and this provides further support for the view that some smokers see higher prices as an incentive to implement their plans to give up smoking.

Individual consumers are usually the best judges of how to spend their money on goods and services of any type ('consumer sovereignty'). But as smoking is addictive, accompanied by inconsistent consumer preferences and predominantly taken up by minors, the government has a legitimate role in mitigating the costs that smoking imposes on smokers themselves.

An important consequence is that tobacco taxes should be set to reduce the costs that smokers impose on themselves and others, not to raise as much revenue as possible. Tobacco taxes can raise significant amounts of revenue but this is only a by-product of their primary purpose.



## Principles

Consumer sovereignty is an important principle that underlies much tax policy design.

Several factors justify government intervention to reduce tobacco consumption. First, tobacco is strongly addictive. Second, its consumption is accompanied by inconsistent preferences – smokers place a heavier weight on the current day's costs and benefits than on any other day's. As a result, preferences shift from day to day. Third, smoking is extremely harmful to many long term smokers. Fourth, most people who become addicted do so before the age of 18.

## Smokers also impose costs on others

Smokers sometimes impose costs on others. The costs of passive smoking include the costs of disease and premature death caused by passive smoking, as well as the difficult-to-measure discomfort of those exposed to others' smoke. The US Surgeon General has concluded that 'exposure of adults to second-hand smoke has immediate adverse effects on the cardiovascular system and causes coronary heart disease and lung cancer' (US Department of Health and Human Services 2006). A recent assessment by Collins and Lapsley (2008b) concluded that second-hand smoke caused the deaths of 149 Australians in 2004–05.

Babies born to smokers weigh on average about 200 grams less than babies born to non-smokers (US Department of Health and Human Services 2004). Babies with low birth weight have poorer average health outcomes than other babies. Babies of Australian women who smoke during pregnancy are twice as likely as other babies to have low birth weight (less than 2.5 kilos) and are more likely to require special care (Laws et al. 2006).

Which costs are private and which are external will be affected by funding arrangements in the health sector. Given Australia's current health care funding arrangements, only a small proportion – around 17 per cent of all health care costs – is met by individuals themselves. The remainder is met by taxpayers through the public health system, by health fund members and by employers through workers' compensation premiums (AIHW 2008b). In any given year, a smoker's healthcare is likely to cost more on average than that of a non-smoker of the same age and sex. However, because smokers tend to die earlier than non-smokers, the *lifetime* healthcare costs of smokers and non-smokers in high-income countries may be fairly similar. Quantitative studies have reached conflicting conclusions (World Bank 1999).

Taxation is one method of addressing spillover costs but is not necessarily the best instrument available. For example, recent restrictions on smoking in restaurants, shops, workplaces, bars and other public places have reduced non-smokers' exposure to second-hand smoke, though non-smokers may still be exposed to significant levels of smoke in the home.

## Principles

The costs that smoking imposes on non-smokers further support the case for government intervention.

Taxation may be an appropriate policy choice where it is an effective way for the government to achieve its objectives in a market for specific goods and services and where the costs and benefits of taxation compare favourably with available alternatives.

## E6–2 Existing taxes on tobacco

Currently in Australia, cigarettes and cigars that contain 0.8 grams or less of tobacco are taxed on a 'per stick' basis, regardless of how much tobacco the stick contains. From 1 August 2009 the excise was \$0.25833 per stick or \$6.46 on a pack of 25. Excise rates are indexed twice a year in line with the CPI. Since wages generally rise more quickly than consumer prices, this means that excise falls as a proportion of average wages over time.

Tobacco products are also subject to GST, which is levied on the post-excise price. On a pack of 25 cigarettes with a retail price of \$13.00, excise accounts for 50 per cent of the retail price and GST for 9 per cent.

Other tobacco products — including cigars and cigarettes containing more than 0.8 grams of tobacco, rolling tobacco and smokeless tobacco — are subject to excise at a per kilo rate equivalent to the per stick tax on 0.8 gram sticks. From 1 August 2009, this amounted to \$322.93 per kilo of tobacco content. The main features of the existing excise system for tobacco have been in place since 1999, when the per-stick rate was introduced. There has been no real increase in the rate of excise since then.

A person over 18 years of age can bring 250 cigarettes (or 250 grams of other tobacco products) into Australia duty free. This tax concession costs the revenue around \$200 million per year. The sale of smokeless tobacco has been prohibited since 1991. It may legally be imported for personal use, subject to excise-equivalent rates of customs duty.

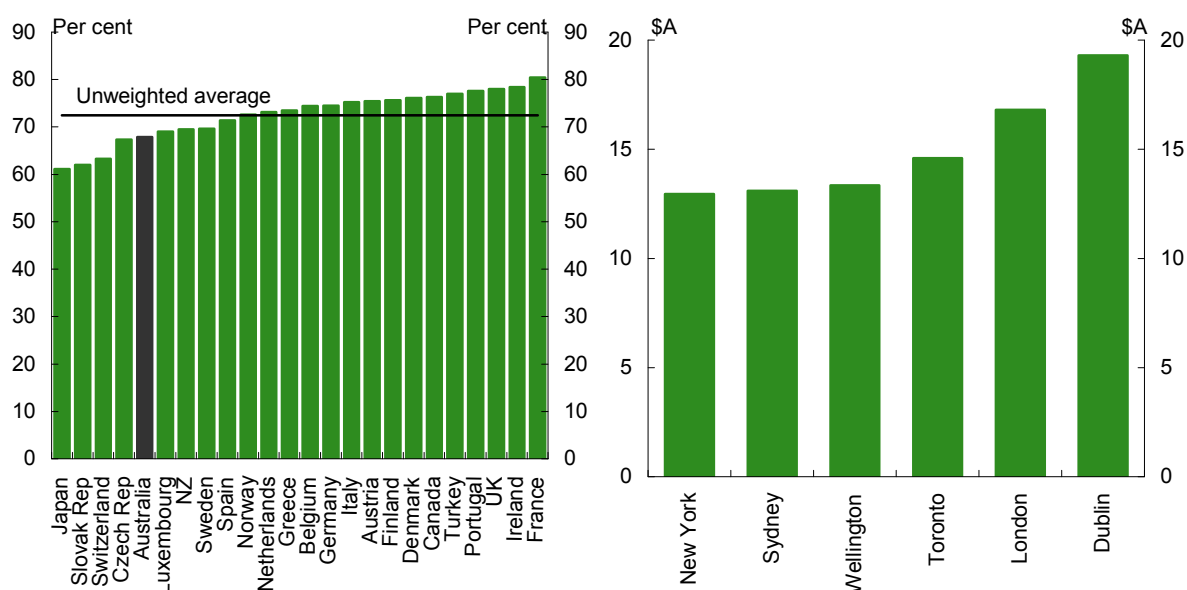
In 2007–08, the Australian government raised \$5,666 million from tobacco excise and \$273 million from customs duty on tobacco imports, together amounting to 1.7 per cent of total tax revenue collected by Australian governments.

Australian taxes on tobacco products are low, as a proportion of the retail price, compared with other OECD countries. Tobacco prices in Australia are moderate by the standards of comparable countries (see Chart E6–1).

**Chart E6–1: Tobacco taxes and prices in OECD countries**

Panel A: Tobacco taxes as a percentage of price, 23 OECD countries

Panel B: Price of 30 cigarettes in six English-speaking cities, September 2008



Note: Tobacco taxes in Panel A include VAT, and Australia's GST, as well as tobacco-specific taxes. Many European countries have much higher VAT rates than Australia's 10 per cent GST rate, so that the differences between total tax rates on tobacco products and other products are smaller in those countries than in Australia. In Panel B, prices are for popular brands from medium-priced stores.

Source: Panel A: Scollo and Winstanley (2008); Panel B: National Preventative Health Task Force (2009).

## Findings

By international standards, Australian retail prices for cigarettes are moderate and taxes constitute a relatively small share of the retail price.

Indexation of excise to consumer prices means that excise will fall in relation to wages over time.

Duty-free concessions allow international travellers, whether Australians or foreigners, to consume tobacco products in Australia free of specific tobacco taxes.

## Impact of tax on demand

Demand for tobacco products responds to price changes, but less so than demand for many other goods. A 10 per cent increase in price would decrease consumption by around 4 per cent (Chaloupka & Warner 1999). Demand among young people, low income people and men is more responsive than among older people, higher income people and women. Although many young people begin to experiment with cigarettes they obtain from others, there is strong evidence that high tobacco taxes, and consequent high prices, significantly reduce both smoking rates and smoking intensity among young people (Carpenter & Cook 2007; Ross & Chaloupka 2003).

## Findings

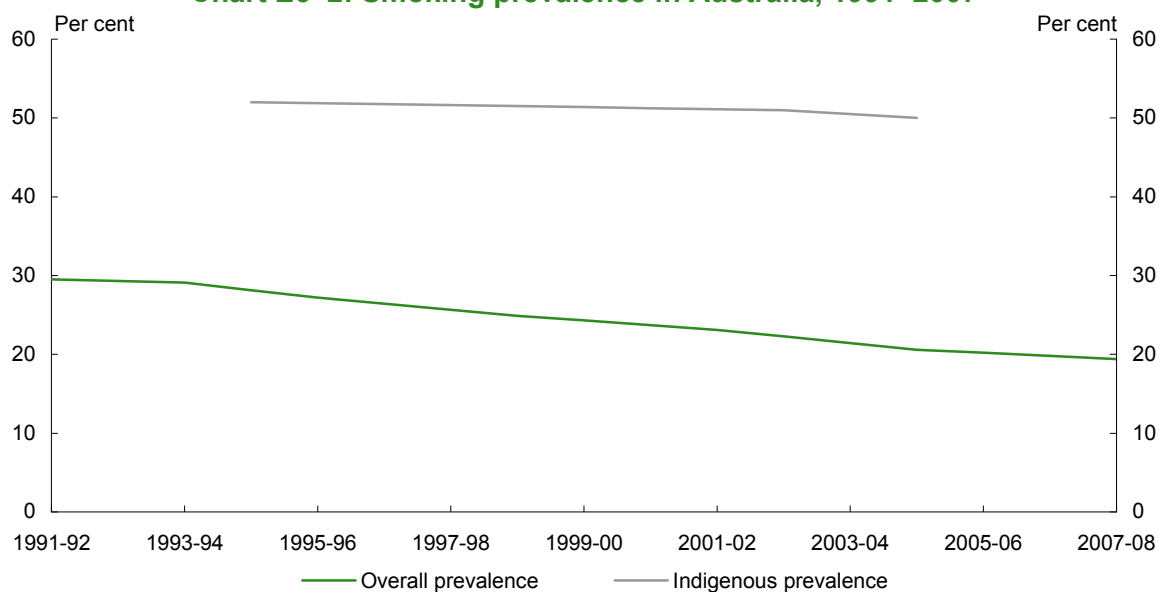
Tobacco taxes raise prices and reduce both the number of people who smoke and the total amount of tobacco consumed. As tobacco is a highly addictive commodity, consumption does not respond readily to price changes — that is, demand for tobacco is relatively inelastic.

Young people and low income people respond more to tobacco price changes than others.

## Low income and disadvantaged people smoke more

In 2007, 19.4 per cent of Australians aged 14 years or older had smoked in the past 12 months (AIHW 2008a). Eighty-six per cent of smokers smoked daily. The proportion of the population that smokes has been falling over the past 20 years (see Chart E6-2) and the average consumption per smoker has also declined, from 15.7 per day in 1997 to 13.0 per day in 2005 (Scollo & Winstanley 2008). Tobacco consumption varies among different demographic groups. People in lower socioeconomic groups smoke more than those in higher groups. People in the lowest 20 per cent by income devote 1.8 per cent of their total goods and services spending to tobacco compared to 0.8 per cent for people in the highest 20 per cent (ABS 2006c). In 2004, 23 per cent of people with an education level of Year 9 or less smoked while only 11 per cent of those who had studied at university smoked (Scollo & Winstanley 2008). Other indicators of socioeconomic status display a similar pattern (Siahpush & Borland 2001). Smoking rates are also high among some disadvantaged groups.

- In 2004–05, around 50 per cent of Aboriginals and Torres Strait Islanders were daily smokers (ABS 2006d), compared with around 17 per cent of the general population (AIHW 2005). Smoking rates among Indigenous people have not fallen significantly since 1994–95. Smoking is the single biggest contributing factor to the life expectancy gap between Indigenous and non-Indigenous Australians (Ivers 2001).
- People with mental illness are much more likely to smoke than others. A 1997–98 study found that smokers account for 73 per cent of men and 56 per cent of women with psychotic illnesses such as schizophrenia (Jablensky et al. 1999).
- Data from 1995 reveal smoking prevalence among single mothers of 46 per cent, compared with 26 per cent for the general population at that time (Siahpush et al. 2002).

**Chart E6–2: Smoking prevalence in Australia, 1991–2007**

Source: Scollo & Winstanley 2008.

Lower income people who continue to smoke are adversely affected by tobacco taxes. Many of them incur the health costs of smoking twice over – by paying high taxes designed to reduce those costs and by suffering the health effects of smoking. Assuming unchanged levels of tobacco consumption, a 10 per cent increase in tobacco excise rates would be equivalent to an additional tax on gross household income of 0.16 per cent for households in the lowest 20 per cent of incomes but only 0.03 per cent for households in the highest 20 per cent. A similar regressive impact would apply to specific disadvantaged groups in which smoking rates are particularly high. On the other hand, some lower income people would avoid serious harm by giving up smoking as a result of tobacco taxes – and are more likely to do so than high income people.

### E6–3 Excise rates should be higher

#### Recommendation 73:

The existing regime for tobacco taxation in Australia should be retained, with the rates of tax substantially increased, depending on further evidence on the costs of harm from tobacco smoking.

#### Recommendation 74:

Tobacco excise should be indexed to a broad measure of wages rather than CPI.

#### Recommendation 75:

There should be no duty free allowance on tobacco for international travellers entering Australia.

Consistent with the broad approach to goods and services taxation taken in this report, the principal issues for tobacco taxes are whether government policy should seek to contain the

very heavy mortality and morbidity costs borne by smokers and, if so, whether taxes are an effective means of doing so.

The strongly addictive properties of tobacco, together with the time-inconsistent preferences that characterise addicted consumers, are sufficient to make an in-principle case for government intervention. Taxation is not, however, the only effective policy instrument available to government. A range of other measures could help to reduce the costs of smoking borne by smokers: banning point-of-sale advertising; banning the promotion of tobacco companies; prohibiting marketing on packaging; limiting the places at which tobacco products can be sold; subsidising nicotine replacement therapies; imposing heavier penalties for, and improving the enforcement of prohibitions on providing tobacco products to minors. Limitations on where people are allowed to smoke can significantly reduce the external costs of smoking.

The Review Panel believes that governments should continue to use non-tax policy instruments to address the costs of smoking. Nevertheless, higher prices for tobacco can significantly reduce tobacco consumption and, therefore, the negative effects of smoking on smokers and others.

There are significant empirical difficulties in calculating an optimal level of taxation in a market where consumers have time-inconsistent preferences. The greatest practical difficulty is to estimate the strength of the extra weighting that consumers give to current period costs and benefits. Spillover costs need to be taken into account but are small compared with the costs borne by smokers themselves.

A model of tobacco consumption that incorporates time-inconsistent preferences, with plausible parameters, suggests that tobacco excise rates could be increased substantially (see Box E6-1; Gruber & Koszegi 2008). There are, however, considerable uncertainties surrounding these calculations: they should be treated only as indicative.

### Box E6–1: A model of tobacco consumption with time-inconsistent preferences

Economists have developed a formal model of tobacco consumption that takes into account the time-inconsistent preferences that most addicted smokers display (Gruber & Köszegi 2001). The model allows the calculation of an ideal tax rate that would correct for the self-control problems that smokers experience.

The ideal tax rate depends on a number of parameters. It depends on how strongly smokers privilege current costs and benefits over future costs and benefits. The stronger the current period preference, the harder smokers find it to carry out plans to stop smoking and the higher the tax needs to be to help them overcome their self-control problems. The more harm is done by current smoking, the higher the tax needs to be to limit the damage suffered by smokers with self-control problems. The ideal tax rate also depends on whether the smoker understands their self-control problem – that is, whether they are ‘naïve’ or ‘sophisticated’. A naïve smoker does not realise they have a self-control problem.

Estimating the Gruber and Köszegi model with Australian data, where available, suggests that tobacco tax rates could be either side of current levels (see Table E6–1). In the table, the value representing the strength of smokers’ current period preference can range from 0 to 1. A value of 0 would mean that current period preference is absolute, so that a smoker places no weight at all on what happens in future. A value of 1 would mean that there is no current period preference, so that a smoker recognises the full costs of smoking, and can make a rational decision about their current smoking on that basis. The values tested in the table cover the mid-range of empirical estimates.

**Table E6–1: Range of optimal tobacco tax rates for Australia (\$ per stick)**

	Strength of current period preference				
	0.60	0.65	0.70	0.75	0.80
Sophisticated smokers	0.31	0.27	0.22	0.18	0.14
Naïve smokers	0.47	0.41	0.35	0.29	0.23

Note: The optimal tax rates for naïve smokers do not take into account behavioural responses that may somewhat offset their self-control problems. Gruber and Koszegi do not derive the optimal tax taking this effect into account as they focus on the case of sophisticated smokers. The parameter for current period preference lies between 0 and 1; the lower the value, the higher the preference accorded to the current period. The current per stick tax is \$0.25.

While this is an attractive model that explains much actual smoking behaviour, there are a number of reasons not to place too much confidence in the estimates it generates.

- It is very difficult to measure the strength of an individual’s current period preference.
- Different groups may vary in the strength of their current period preference. If so, a uniform tax will overtax some and under-tax others. In particular, young people underestimate their chance of becoming addicted and their smoking responds more to price changes, so estimates for sophisticated smokers may underestimate the appropriate overall rate.
- It is difficult to estimate the value of life-years lost through smoking and of the other harms that smoking causes.
- Not all smokers are the same but they all pay the same tax. High tobacco taxes impose costs on the small proportion of occasional smokers who are at little risk of harm.



As Australia's tobacco taxes are low by international standards, it is feasible to increase them substantially. Doing so would encourage smokers to quit — a 10 per cent increase in the price of cigarettes would reduce the number of people who smoke by about 2½ per cent and would decrease total tobacco consumption by around four per cent (Chaloupka & Warner 1999). The degree of responsiveness among young people, low income people and men is higher than among older people, higher income people and women. As around three million Australians smoke and each long term smoker loses, on average, around six years of life, a substantial increase in the price of cigarettes could considerably reduce the number of life years lost by Australian smokers.

It is difficult to determine the right rate of tax for tobacco products. Assessment of the rate would be easier if we had better evidence about the marginal costs of tobacco use — that is, the costs of one more or less cigarette smoked — rather than just the average costs of tobacco use. More information about the strength of smokers' current period preference would also be useful.

There is, however, a good case for a substantial increase beyond those that would be entailed by the changes to indexation arrangements discussed below (see Recommendation 73).

### **Tobacco excise should be indexed to wages, not CPI**

Since the main public policy purpose of tobacco taxation is to reduce the harm smokers suffer from smoking by keeping prices high, the Review Panel believes it would be appropriate to index tobacco excise to wages rather than consumer prices. Wages tend to increase more rapidly than consumer prices, largely as a result of increased productivity, so tobacco excise, which is currently indexed to CPI, tends to decline as a proportion of average wages. Over time, this makes cigarettes more accessible to wage earners and others, such as pensioners, whose incomes are tied to wages. To maintain the value of tobacco excise as a proportion of average wages and hence, indirectly, as a proportion of household incomes, the Review recommends indexation to a broad measure of wages in the Australian economy (see Recommendation 74).

### **Higher taxes and illicit tobacco**

In 2005, it was estimated that one in 17 cigarettes consumed in Australia contained illegal 'chop chop' diverted from legal tobacco production (PwC 2005). This proportion is likely to have fallen since the end of legal tobacco growing in Australia in 2007. Importation of 'counterfeit' cigarettes — factory made and presenting as legally produced and distributed cigarettes — is relatively limited in scope.

Heavy taxation of any commodity increases incentives for the illegal supply of that commodity. For tobacco, this is a relatively minor problem at current levels of tax. However, if taxes rose significantly, there would be more incentives for illegal production and importation. This makes it more important for policy makers to use instruments other than taxation to address the costs of tobacco consumption. It is, however, unlikely that any feasible increase in taxation would see an increase in illegal supply sufficient to undermine the effectiveness of the existing taxation arrangements.

### **Duty free tobacco should be abolished**

The duty free tobacco allowance undermines the objectives of tobacco taxation and involves a significant revenue loss (in the order of \$200 million per year). There is no reason why international travellers should enjoy a tax concession on cigarettes smoked in Australia. The Review Panel believes that inbound duty-free arrangements should be abolished (see Recommendation 75). People could be allowed to bring into the country up to 25 cigarettes or their equivalent duty-free, so that smokers would not have to pay duty on their daily supply.



## E7. Gambling taxation

### Key points

Government restrictions on the supply of gambling services, implemented through licensing arrangements, mean that some gambling businesses earn economic rent. Economic rent is an efficient tax base and should be appropriated by the government, either through licence fees or taxation.

For the large majority of gamblers, gambling is simply consumption spending, comparable to spending on any other leisure activity. A small minority of gamblers experience self-control problems that lead to excessive losses. Problem gamblers impose costs on themselves and others.

It is not clear how problem gamblers react to higher taxes. In some forms of gambling, the price of gambling is not easily observable. Even if problem gamblers do observe changes in price, it is not clear that they respond by reducing the amount they lose. Gambling taxes that more than recoup economic rent earned by gambling businesses do, however, impose costs on responsible gamblers, who must pay higher prices for their entertainment.

Gambling taxes constitute an important revenue source for State governments. This means that they may have to make difficult choices in balancing revenue-raising with regulating gambling in a way that limits problem gambling. For this reason, the Australian government and State governments should together explore options for the regulation and taxation of gambling that would minimise conflicts in policy-making between revenue raising and addressing problem gambling.

The current tax burden on the gambling industry as a whole may be appropriate, but the way it is distributed across the industry may not be. The current rates of tax on different forms of gambling differ markedly from form to form though the reasons for these variations are not clear.

Gambling taxes should be focused on recouping economic rent generated by government restrictions on the supply of gambling services. If State governments retain gambling taxes, they should increase the focus on capturing rent.

Some gambling taxes and fees are used to provide common services to the industry – for example, some revenue from horse racing is used to support the racing industry.

## E7-1 The rationale for gambling taxes

### Principles

Government restrictions on the supply of gambling services, implemented through licensing regimes, mean that some gambling businesses earn economic rent. Economic rent is an efficient tax base and should generally be appropriated by the government, through either licence fees or taxation on player loss or turnover.

Taxes can only help problem gamblers counteract their self-control problems if they understand the price they face (the odds) and respond to higher prices by reducing their losses.

Governments that rely on gambling revenue to a significant extent may have to make difficult choices in balancing revenue-raising with regulating gambling to limit problem gambling. The regulatory role should be separated from the collection of revenue.

### Regulation and economic rent

Gambling is an activity widely enjoyed in Australia. Eighty per cent of Australian adults engage in some form of gambling (Productivity Commission 1999b). Around 15 per cent of adults gamble regularly, excluding lotteries and scratchies (Productivity Commission 2009a).

Because gambling allocates financial benefits in accordance with uncertain processes, which sometimes allow the gambler to gain a positive return, it has some features in common with investment in a risky asset. For a small number of professional gamblers, gambling functions as an investment that is expected to yield a positive return. For most recreational gamblers, however, spending on gambling is simply consumption spending, comparable to spending on any other leisure activity. A small minority of gamblers experience self-control problems that lead to excessive losses. For these people, gambling is an addictive pursuit.

Despite high participation rates, popular attitudes to gambling are ambivalent. A large proportion of the population regards gambling as a serious social problem and supports more stringent restrictions on the supply of gambling services (Centre for Gambling Research 2004). A common government response has been to place restrictions on the number and size of gambling establishments, their hours of opening, the facilities they offer or the design of games.

As a result of State government restrictions on the supply of gambling services in Australia, the holders of the limited number of licences are able to make more profit than they would in a competitive market — that is, they earn economic rent. Economic rent is an efficient taxation base (see Section C1 Charging for non-renewable resources and Section C2 Land tax and conveyance stamp duty).

In theory the government could appropriate 100 per cent of the economic rent without changing the amount of gambling services that companies would be willing to supply or the price to consumers. This is because — even if all the rent were taxed away — companies would still make normal profits; that is, they would receive enough gambling revenue to cover their costs and offer investors an adequate rate of return on their investment (see Box E7-1).

The government can capture the economic rent through taxation or through auctioning licenses to gambling providers. The price of a licence would generally reflect the economic rent that bidders expect to be able to earn from the gambling business.

If licences could be bought and sold, their scarcity and any taxes payable would be reflected in their market price. Taxes may be imposed up to the point where the market value of a licence falls to zero, that is where taxes consume all expected economic rent. At that point, the investors would still supply capital, but the gambling business would not be prepared to pay for a licence to provide gambling services.

## Problem gambling

Consumers will usually make choices about what to consume that provide them with the greatest available satisfaction, without the need for government intervention. A large majority of people who gamble derive satisfaction from it without harming themselves or others.

This principle is not, however, applicable to all consumers. Minors and people with intellectual disabilities, mental illnesses or severe addictions are not always able to make choices that provide them with the greatest possible satisfaction, especially over a long period rather than at a single point in time. In its most recent report on gambling, the Productivity Commission estimates that between 0.5 and 1.0 per cent of adults suffer significant problems from their gambling each year. It estimates that a further 1.4 to 2.1 per cent of adults are subject to moderate risks that may make them vulnerable to problem gambling (Productivity Commission 2009a).

Problem gambling is characterised by chasing losses, spending more money on gambling than intended, failing in attempts to stop gambling, losing time at work or study, accumulating large debts, liquidating assets or misappropriating money (Productivity Commission 1999b).

Problem gamblers can also suffer a wide range of adverse health effects, including depression, stress, anxiety, lethargy, insomnia, poor nutrition, suicidal thoughts, increased caffeine and nicotine consumption, sweats, confusion, panic and ulcers (Amies 1999). There may also be less definable personal costs arising from loss of self-control and the breakdown of family and other relationships. Problem gamblers who commit crimes to finance their gambling impose costs on the victims and may also incur the costs of punishment.

The self-control problems of problem gamblers are associated with 'time-inconsistent preferences' under which a person gives more weight to immediate costs and benefits than costs and benefits in the future (see Section E6 Tobacco taxation). One consequence is that a problem gambler may realise that it is in their long term interest to stop gambling and make plans to do so at a particular time, but find themselves unwilling to carry out their plan when the time to stop arrives. Episodes of problem gambling may also be triggered by environmental cues related to past gambling experiences – for example, if the person is exposed to a place, social situation or experience that is strongly associated with past gambling episodes (Bernheim & Rangel 2004).

In some cases, taxes may help addicted consumers overcome their self-control problems, but only if they understand and respond to the price they face. Other interventions may be more

effective, particularly where environmental cues play an important role in triggering episodes of addictive behaviour.

In considering the use of taxation to address problem gambling it is important to remember that taxes on gambling impose costs on all gamblers, including the large majority who are responsible gamblers.

## E7–2 Existing gambling taxes

### Findings

Gambling taxes constitute an important revenue source for State governments. Online gambling, however, may break down market power in some sectors of the gambling industry and reduce the States' capacity to tax economic rent. Competition between States may also limit their capacity to raise revenue from gambling.

The current tax burden on the gambling industry as a whole may be appropriate, but the way it is distributed may not be. The current rates of tax on different forms of gambling differ markedly from form to form for reasons that are not entirely clear. The burden of gambling taxes may sometimes fall on economic rent, but sometimes on gamblers and gambling businesses. There are also biases in the way different race wagering is taxed, which damages competition.

It is not clear how problem gamblers react to higher taxes. In most forms of gambling, the price of gambling is not easily observable. Even if problem gamblers do observe changes in price, it is not clear that they respond by reducing the amount they lose. Higher gambling taxes do, however, harm responsible gamblers, who must pay higher prices for their entertainment.

### How we currently tax gambling

At the Australian government level, GST is payable at a rate of one eleventh on the player loss of a gambling business, across all forms of gambling (ATO 2009a). This is equivalent to the treatment of other goods and services.

The four main types of gambling are wagering (betting on horses, sport etc), gaming machines (poker machines), casino gambling (casino table games like roulette, and gaming machines) and lotteries. Each of the four is taxed by State governments on a different basis.

Wagering is usually taxed on player loss. For example, totalisator wagering (through a TAB) involves the gambling business pooling the bets and deducting a percentage (the player loss) before distributing the remainder as prizes. Different States deduct different percentages. The rate of deduction also varies according to the type of bet. For example, in Victoria, the rate for place bets is 14.25 per cent while the rate for trifecta bets is 20 per cent. A proportion of the player loss is paid to State governments in tax (Australian Treasury 2008). Fees are also paid to the racing industry in each State (Productivity Commission 2009). Wagering through bookmakers is generally free of specific gambling taxes, although small taxes on bookmakers' turnover remain in Tasmania and the NT.



Gaming machines are taxed on player loss. In most States, a club with gaming machines pays tax on player loss according to an increasing scale. For example, in New South Wales marginal rates range from zero for clubs with revenue under \$200,000 per quarter to 30.9 per cent for clubs with revenue over \$20 million per quarter. (Victoria has a flat rate and Western Australia has no gaming machines outside its one casino.) In most States, a hotel with gaming machines is subject to higher rates than clubs, under either a flat rate on player loss or an increasing scale.

Casino gambling raises revenue for government by means of licence fees, together with a tax based on a measure of revenue, usually player loss. Licence fees vary in their structure. For example, Star City Casino in Sydney paid a one-off licence fee of \$256 million. Wrest Point Casino in Hobart pays a monthly licence fee, indexed annually, which amounted to \$129,600 in 2008–09. Casinos also pay a tax based on some measure of revenue, usually player loss. Tax rates vary from 8 per cent of gross profit in the Northern Territory to 21.25 per cent of gross gaming revenue (plus a super tax) in Victoria. Lower rates apply to commission-based players (high rollers). Casinos are generally subject to special, lower rates of tax on player loss from their gaming machines (Australian Treasury 2008).

Lotteries are taxed more heavily than other forms of gambling, with tax rates on player loss ranging from 45 to 90 per cent (Australian Treasury 2008). Average tax rates for other forms of gambling range from 20 to 35 per cent of player loss (Productivity Commission 1999a).

Full details of State gambling taxes are available in Treasury's *Architecture of Australia's tax and transfer system*.

In 2004–05, player loss across Australian gambling enterprises amounted to \$15.5 billion (ABS 2006d), on a total amount wagered of around \$130 billion. In 2007–08, the States raised \$4.9 billion from gambling taxes, amounting to 9.1 per cent of their tax revenue. Of this, 7.0 per cent came from race betting, 61.5 per cent from gaming machines, 7.7 per cent from casinos and 23.1 per cent from lotteries (ABS 2008b).

State governments impose restrictions on the availability and design of most gambling services. In every State, off-course wagering is dominated by a TAB (whether privately or publicly owned). In all States, limitations are placed on the total number of gaming machine licences and, in some States, on the number of machines in particular areas or venues. Minimum payout ratios — the ratio of prizes paid to money bet — are also enforced. All casinos are regional monopolies. NSW, WA and SA have a single, publicly owned lottery provider. Queensland has a single, private provider. Victoria and the NT have two private providers. Tasmania has three private providers. The ACT has a public and a private provider.

All State governments allocate part of gambling revenue to social programs such as problem gambling services and research into the impact of gambling on the community. In some States, substantial amounts of revenue are allocated to health services. In Victoria, for example, over \$1 billion per year from gambling revenue is allocated to various social programs: the Community Support Fund, the Hospitals and Charities Fund and the Mental Health Fund.<sup>21</sup>

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21 Victorian State Budget 2009–10, Statement of Finances, Budget Paper No. 4, p. 201.

## Do taxes help problem gamblers?

Some gamblers experience self-control problems, incurring substantial costs as a result and imposing costs on others. The family and friends of problem gamblers may incur costs from theft and relationship breakdown. It appears that if you have a problem gambler among your family or friends you are more likely to be a problem gambler yourself, so there may also be some external 'contagion' effects (Productivity Commission 1999b). Governments bear costs from problem gambling through the criminal justice and public health systems, though these appear to be relatively limited (Independent Gambling Authority 2003). Health fund members also bear some health costs. Problem gambling may also be associated with loan sharking and other criminal activity, which impose additional external costs (Productivity Commission 1999b).

Taxes are unlikely to be an effective way of reducing the costs of problem gambling. To the extent that existing gambling taxes recoup economic rent they do not affect the odds that gamblers face. But even when taxes do more than recoup economic rent, they can only mitigate the effects of problem gambling if they increase the average amount lost by a player per dollar bet, and if problem gamblers respond by reducing their losses.

The price of gambling for some games, such as many casino table games, is fixed by the rules of the game and will not be affected by gambling taxes (although businesses may be able to adjust the price by providing discounts of various types or making marginal adjustments to the rules).<sup>22</sup> In other games, such as TAB wagering, the price of gambling (that is, the average player loss) may be affected by gambling taxes but is not immediately apparent to the gambler. In such cases, increasing the price of gambling is not likely to affect the behaviour of problem gamblers.

Even where the price of gambling is affected by gambling taxes and is apparent to the gambler, problem gamblers may not markedly reduce their losses. If their gambling is constrained only by the amount of money available to them, their losses will not fall. If they face other constraints on their gambling, like the amount of time they can devote to gambling, higher prices may lead to higher losses and more severe problems (Productivity Commission 1999b).

Only around 1 per cent of the adult population are problem gamblers, so using taxes to help counteract problem gambling imposes high costs on the large majority of non-problem gamblers. Other policy interventions may help to address spillover costs and the costs borne by gamblers themselves. These interventions, some of which have been implemented in Australia, include:

- limiting or prohibiting the advertising of gambling services;
- requiring games to encourage (or be limited to) small bets;
- restricting the opening hours of gambling venues;
- requiring gambling venues to display clocks and admit natural light;

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<sup>22</sup> Casinos subsidise restaurant, accommodation, parking, and entertainment offerings to induce customers to gamble in their facilities. A variant is to provide customers who meet minimum betting requirements with complimentary goods and services.

- improving information to gamblers about the price of gambling services;
- limiting the granting of credit by gambling providers;
- mandating self-exclusion arrangements, where a gambler can ask a gambling venue not to admit them; and
- requiring the use of electronic card technology to provide gamblers with information on their bets and losses.

Measures such as these may be more closely targeted at targeting problem gambling than gambling taxes. However, given the Review's terms of reference, it has not made recommendations on the appropriate mix of non-tax measures to address problem gambling.

### The internet might increase competition and reduce economic rent in the gambling sector

The internet makes gambling services more accessible to consumers and can offer very low cost access to some forms of gambling — though this may be at the cost of some attractive aspects of the gambling experience (such as atmosphere). Australian-based internet gambling businesses should be taxed like other gambling businesses. In the longer term, a competitive internet gambling marketplace, characterised by low-margin and highly accessible offerings, may erode the capacity for State governments to create economic rent by restricting the supply of gambling services. If gambling taxes are focused on economic rent, revenues may fall away as gambling markets become more competitive and more mobile. This would allow consumers to enjoy the benefits of greater access and competition but could also increase the risks that people will develop gambling problems.

## E7–3 Improving gambling taxes

### Recommendation 76:

Gambling taxes should be reviewed to ensure that they are focused on recouping economic rent generated by government restrictions on the supply of gambling services or are being used efficiently to impose such restrictions.

### Recommendation 77:

Governments should eliminate gambling tax concessions for particular types of gambling business, such as clubs. If governments wish to subsidise particular types of businesses, they should do so through direct expenditures.

### Recommendation 78:

Governments should consider the allocation of responsibilities for the regulation and taxation of gambling, with a view to minimising conflicts in policy-making between revenue-raising and addressing problem gambling.

## Recouping economic rent created by government restrictions

Gambling businesses are able to earn economic rent only because State governments restrict the supply of gambling services (see Box E7-1). Capturing economic rent is the most compelling reason for imposing special taxes on gambling services (see Recommendation 76). Other potential reasons for imposing specific gambling taxes are discussed below.

One option for capturing economic rent that State governments could consider is a simple rent tax calculated on the basis that, for most gambling businesses, the amount invested in the business is closely related to the amount provided to gamblers as prizes. Any return to the business above a normal rate of return on the amount of prizes would be regarded as economic rent and taxed at a relatively high rate.

A tax based on the amount of prizes would, however, be a very rough approximation to a rent tax. A normal profit for a business arises when its sales just meet the full costs of its inputs; that is, wages plus a normal return on the capital invested in the business (taking into account how risky the business is). A business earns economic rent when its sales exceed the full costs of its inputs. In a gambling business, player loss is the gross revenue of the business, equivalent to gross sales for other businesses. In this case a more accurate tax on economic rent could be calculated as:

$$\tau (B - P - W - K\theta) \text{ where}$$

$\tau$  is the rate of rent tax;

$B$  is the amount of bets placed in the period;

$P$  is the amount of prizes paid in the period;

$W$  is the amount of wages paid in the period;

$K$  is the amount of capital employed in the period; and

$\theta$  is the risk-adjusted rate of return.

The allowance for capital could be calculated for each tax paying business individually (at the cost of additional complexity) or could be set at an average value for each form of gambling, on the assumption that cost structures are similar across any particular industry segment. It would also be necessary to consider what, if any, allowance for licence fees should be included in the measure of capital invested.

The effectiveness of gambling-specific taxes in capturing economic rent is affected by the way they are structured. Governments need to consider trade-offs between the accuracy of the tax in targeting economic rent and the compliance costs that it could impose on gambling businesses. Most gambling businesses already calculate the amount bet and the amount paid in prizes for GST purposes, but an allowance for capital would require capital investment to be allocated between gambling and other activities. Some non-profit organisations are not currently required to lodge a Business Activity Statement for GST purposes, so some additional compliance costs might arise in that quarter. It would also be necessary to consider how a gambling rent tax would interact with income tax and the GST, including the priority of debts incurred under the different taxes.













































































































































































































































































































































































































































































































































































































































































































































