

# **Greening motoring costs**

Reducing motoring fixed costs and increasing running costs to help the environment

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## Introduction

This paper aims to explore the efficiency, equity and environmental case for removing lump-sum taxes on motorists (registration fees, stamp duties and possibly annual insurance charges such as compulsory third-party and comprehensive) and replacing them with user-based charges (fuel excise and mileage-based insurance) more reflective of the marginal cost of road users' driving activities. These changes would tend to lower aggregate kilometres driven, bestowing benefits that would include reduced pollution (both greenhouse gas and local), congestion, accidents, and a reduction in the fuel-import bill. This proposal would be redistributive, shifting charges from low-income people (less frequent road users) towards high-income people and businesses (more extensive road users).

The proposal is not meant to be a full solution to pricing road use, which would probably need to involve the partial abolition of fuel excise and its replacement by a system of road-user charges involving satellite tracking technology.<sup>1</sup> Rather, it is aimed at incremental reform which is achievable in the short run.

## The real costs of motoring

Motorists naturally focus on the private costs of motoring. According to the NRMA, the whole-of-life cost of running a medium-sized car equates to about 87 cents a kilometre.<sup>2,3</sup> The largest component of this is depreciation, estimated at 38 cents or 44 per cent of the total. Petrol and tyres cost 19 cents a kilometre and maintenance six cents, so that the marginal cost of driving, the total cost or travelling each extra kilometre, is about 25 cents.

By contrast, economists point to the 'external' costs, the costs that motorists impose on society by their driving decisions, which include:

- some of the costs of accidents (on some assumptions, one-third of total accident costs in Australia are external)
- the cost of local pollution (that is, pollution apart from greenhouse gas emissions), and carbon pollution (greenhouse gases)
- congestion costs, which are heavy in big cities and almost non-existent in most country areas.

As discussed in the following paragraph, the total quantum of these costs in Australia has been estimated to be as high as 11 to 12 cents a kilometre, equating to an implied fuel excise of 92 cents a litre in urban areas. This may even be an under-estimate.

The current fuel excise is 38 cents a litre, making the effective fuel-tax rate in Australia 50 cents a litre when applicable GST is included.<sup>4</sup> Stanley suggests that this is well below the marginal

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<sup>1</sup> H Pender, *Taxing Cars—Fleeing the Fleet or Subsidising Smog? A tax treatment of vehicle ownership and use in Australia*, Australian Tax Research Foundation Study No 33, Sydney, 1999. Pender discusses an optimal pricing regime and notes the need to take account of road wear, fair return on land used or reserved for roads, and costs of capacity expansion.

<sup>2</sup> NRMA (National Roads and Motorists' Association) *Motoring + Services*, (2008). *2008 Private Whole of Life Vehicle Operating Costs Report: Ascending Costs Summary*, 20 October, NRMA, Sydney. Available at: [http://www.mynrma.com.au/cps/rde/xbcr/mynrma/2008\\_Private\\_Operating\\_Costs\\_Report\\_Summary.pdf?cps\\_sessionid=SID-91D44CD0-640AA7B1](http://www.mynrma.com.au/cps/rde/xbcr/mynrma/2008_Private_Operating_Costs_Report_Summary.pdf?cps_sessionid=SID-91D44CD0-640AA7B1).

<sup>3</sup> In this paper, currency is in Australian dollars unless otherwise specified.

<sup>4</sup> With an average fuel economy for cars of 12 litres per hundred kilometres, this equates to 6 cents a kilometre.

social costs imposed by urban road-users (84 to 92 cents a litre) and too high for rural road-users (20 cents a litre). His study indicates a high cost of congestion (60 cents a litre) relative to other external costs.<sup>5</sup> The Bureau of Transport and Regional Economics<sup>6</sup> (BTRE) has forecast that the aggregate costs of congestion, estimated at \$9.4 billion in 2005,<sup>7</sup> will continue to grow strongly, reaching \$20 billion by 2020. Ironically, the decision to abolish indexation of the fuel excise in 2001<sup>8</sup> means that it is falling in real terms even as the external costs of motoring are rising as congestion worsens year by year.

## Using taxes to 'internalise' externalities

Pollution taxes can be used to apprise motorists of the full private and social costs of their activities. Such taxes are called 'Pigouvian' taxes after the English economist Arthur Pigou, and are generally held to be the least-cost means of reducing externalities.<sup>9</sup> Pigou's ideas are increasing in popularity as policymakers become more aware of the heavy social and economic costs paid by modern societies as a result of ignoring the external costs associated with pollution-generating activities, including motoring.

Pigou's concept of encouraging polluters to factor the social (external) costs of their polluting activities into their decision-making (internalising) involved taxing these activities at a rate approximating the external cost of the consequent pollution, thereby creating a double social dividend. First, the reduction in pollution creates a net improvement in social welfare;<sup>10</sup> second, revenues from the green tax can be used to reduce other distorting taxes, thus lessening the associated 'excess burden' (economic efficiency) losses. Alternatively, motoring taxes can be used to improve motoring infrastructure or public transport.

For example, Edlin and Karaca-Mandic estimated the aggregate external cost of accident externalities in the US at US\$220 billion in 1996 and suggested that a correcting Pigouvian tax could raise US\$66 billion in California alone, approximately US\$2,000 to US\$3,000 per vehicle per annum.<sup>11</sup> They concluded that a gasoline levy was the most administratively-convenient Pigouvian tax as most states already had one and uninsured drivers are unable to avoid it. Alternatively, per-mile insurance premiums are favoured, as discussed later in this paper.

Many economists regard a petrol excise as a relatively blunt instrument. They consider it an effective tool for taxing greenhouse gas emissions, which are directly related to fuel consumption, but argue that other forms of external cost are better addressed by explicit road-user charges. This is the view of the Australian Automobile Association (AAA), which suggests user charges could, in theory, reflect five separate costs imposed by road users:

- a road-wear charge to reflect pavement damage, which would vary by axle-type and load (with particular impact on heavy vehicles)

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<sup>5</sup> J Stanley, 'Getting the Prices Right: Policies for More Sustainable Fuel Taxation in Australia', Paper presented to BIC National Conference, Sydney, 17th April 2002. Available at: <http://www.busvic.asn.au/database/files/Getting%20the%20Prices%20Right.pdf>.

<sup>6</sup> BTRE (Bureau of Transport and Regional Economics), (2007). *Estimating urban traffic and congestion cost trends for Australian cities*, Working paper 71, BTRE, Canberra. Available at: <http://www.bitre.gov.au/publications/49/Files/wp71.pdf>.

<sup>7</sup> This is broadly consistent with the existing fuel excise, which raises \$15 billion.

<sup>8</sup> R Webb, 'Excise taxation: developments since the mid-1990s', Research Brief, Parliament of Australia, 13 April 2006. Available at: <http://www.aph.gov.au/library/pubs/rb/2005-06/06rb15.pdf>.

<sup>9</sup> A C Pigou, *The economics of welfare*, Macmillan, London, 1920.

<sup>10</sup> Social welfare is economic welfare plus or minus net environmental 'goods' and 'bads'.

<sup>11</sup> A Edlin and P Karaca-Mandic, 'The Accident Externality from Driving', *Journal of Political Economy* 114:5, 2006, p. 951. Available at: [http://works.bepress.com/cgi/viewcontent.cgi?article=1024&context=aaron\\_edlin](http://works.bepress.com/cgi/viewcontent.cgi?article=1024&context=aaron_edlin).

- a charge to cover crash costs not covered by insurance premiums
- an environmental charge to cover air and noise pollution
- a carbon charge to address the costs of greenhouse gas emissions
- a congestion charge levied only if congestion exists at a particular time and place.<sup>12</sup>

In Australia and around the world, road-user charges based on vehicle weight and kilometres travelled are increasingly being used to tax heavy vehicles. In 2004, the Chancellor of the Exchequer in the UK suggested a move from fuel taxes, proposing instead a GPS-based,<sup>13</sup> nationwide, variable time, distance and place charge. Motorists would pay by the mile, depending on where and when they drove. In December 2007, the Dutch Minister of Transport, Public Works and Water Management announced the introduction of a road-user charge based on the latest satellite technology to register distance driven, offset by lower fixed charges for motorists..

Under the new Dutch system (to be introduced for trucks in 2011 and for cars over the period 2012 to 2016), motorists will no longer pay road tax or sales tax on new cars, the equivalent of registration fees and stamp duty in Australia. Instead, they will pay fees related to kilometres travelled. Tariffs per kilometre will depend on vehicle characteristics and, eventually, time and place. As it is more reflective of actual usage, the charge should lead to a fairer allocation of costs. In addition, positive effects are expected on traffic, the economy and the environment.<sup>14</sup>

## Cost and tax implications

Although a system of road-user charges is the theoretical ideal, it may be necessary to consider taking several steps to get there. At the state level, the major taxes paid by motorists include stamp duty on the registration of motor vehicles and registration fees and the most logical first step would be the replacement of these with a higher fuel excise. In 2006–07, total revenue from non-fuel taxes totalled \$6 billion, comprising \$3.8 billion from registration fees and transfers, \$2 billion from registration duty on transfers and \$223 million from surcharges and levies on compulsory third party insurance.<sup>15,16</sup> In 2007–08, fuel excise of 38.143 cents a litre raised \$14.46 billion.

Thus a total of \$20.5 billion needs to be raised, which corresponds to a fuel excise of 54 cents a litre, an increase of 16 cents a litre. With a current average fuel price around \$1.24 a litre, this implies a fuel price rise to \$1.42 a litre,<sup>17</sup> an increase in the cost of fuel of 14.5 per cent.

<sup>12</sup> AAA (Australian Automobile Association), 'Reform of Fuel Tax and other Motoring Taxes and Charges: Submission to Henry Review of Taxation', October 2008, p. 14. Available at: <http://www.aaa.asn.au/documents/submissions%2F2008%2FHenry%20Tax%20Review%20submission%20final.pdf>.

<sup>13</sup> Known either as Global Navigation Satellite System (GNSS) or Global Positioning System (GPS). GNSS is the standard term for satellite navigation systems that provide geo-spatial positioning with global coverage. A GNSS allows small electronic receivers to determine location to within a few meters using signals transmitted along a line of sight by radio from satellites.

<sup>14</sup> Rapp Trans (UK) Ltd, 'Road User Charging', [2009]. Available at: [www.rapp-trans.co.uk/itsa\\_road\\_user\\_charging.html](http://www.rapp-trans.co.uk/itsa_road_user_charging.html).

<sup>15</sup> H Clarke and D Prentice, *A Conceptual Framework for the Reform of Taxes Related to Roads and Transport*, prepared for the Treasury, Canberra, June 2009, Table 8. Available at: [http://taxreview.treasury.gov.au/content/html/commissioned\\_work/downloads/Clarke\\_and\\_Prentice.pdf](http://taxreview.treasury.gov.au/content/html/commissioned_work/downloads/Clarke_and_Prentice.pdf).

<sup>16</sup> ABS (Australian Bureau of Statistics), *Taxation revenue, Australia 2006–07*, Cat. 5506.0, Canberra, 2008. See this publication for similar figures.

<sup>17</sup> This includes an extra 1.6 cents in GST.

However, the average cost of motoring would be unaffected by the proposal. Most drivers (two-thirds) would be winners.<sup>18</sup> Only businesses and individuals who use vehicles a great deal are likely to be losers as a result of the suggested change.

A numerical example illustrates how the proposal would work. In NSW, the annual registration cost varies by weight but averages around \$280. Stamp duty is three per cent on an average car, say \$900. Amortised over 10 years that is \$90 a year, so the implied total saving from abolishing these taxes is \$370 a year. The increase in petrol cost for an average car is \$325, so the net saving is \$45 a year. Most people drive fewer kilometres than the average and would therefore be better off; people who drive twice the average number of kilometres (29,200) would experience a net increase in motoring costs of \$280 a year.

The rise in the marginal cost of driving will tend to have a slight downward impact on kilometres travelled. It will also affect peoples' decision to buy a new car, and will favour the purchase of more fuel-efficient cars, which emit less CO<sub>2</sub>. Thus, by bringing the marginal cost of an extra kilometre closer to estimates of the marginal external costs of driving in cities as calculated by the BTRE for example,<sup>19</sup> the change would both help the environment and assist with the reduction of road congestion in the cities.

A drawback of this proposal is that it raises the cost of driving in country areas above the estimated marginal cost of motoring, which principally relates to urban congestion, and it may be that special measures will be needed to compensate country users who tend to drive relatively long distances. Lower fuel excises applied in country areas would be a way of solving this difficulty with several zones of gradually-declining excises to ease the problem of the arbitrary zone boundaries necessarily created.<sup>20</sup> Alternatively, there could be annual rebates based on postcode areas.

Subjecting motorists to higher excises while eliminating fixed charges is a politically viable way of setting the marginal cost of motoring closer to the true social costs because, contrary to a simple rise in excise, the net change in taxes actually reduces costs for most drivers.<sup>21</sup> On the other hand, those who do lose out experience losses that are, on average, twice the size of the gains realised by the winners, so the risk is that a vocal minority will be resistant to the change and the response of the majority will be tepid. However, there are net benefits in aggregate such that the change should be politically achievable.

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<sup>18</sup> Drivers travelling more than the average number of kilometres will be net losers; those travelling less will be net winners. Most drivers travel less than the average, which is inflated by high-mileage drivers so that the median mileage is less than the mean.

<sup>19</sup> BTRE.

<sup>20</sup> In the long term, the better solution to this problem is to impose explicit congestion charges on cities. However, the technology to make this possible is still being developed and it may be necessary to proceed to this outcome incrementally. This is the subject of a separate paper.

Pender discusses the issue of how to deal fairly with rural and urban users in an optimal road-charging regime. He finds that the profit and loss accounts are quite different because of the need to deal with congestion and noise in the urban context. However, because of the high per capita cost of infrastructure in the rural context, the actual sizes of the balance sheets are not so different. See Pender, *Taxing cars*.

<sup>21</sup> This is because the median number of kilometres travelled is less than the mean, and the mean is the crossover point where, with revenue-neutral change, cost increases begin to exceed cost decreases. The two-thirds figure is from US work on mileage-based insurance. See J E Bordoff and P J Noel, *Pay-As-You-Drive Auto Insurance: A Simple Way to Reduce Driving-Related Harms and Increase Equity*, The Brookings Institution Policy Brief 2008-06, Washington D.C., 2008. Available at: [http://www.brookings.edu/papers/2008/~media/Files/rc/papers/2008/07\\_payd\\_bordoffnoel/07\\_payd\\_bordoffnoel\\_pb.pdf](http://www.brookings.edu/papers/2008/~media/Files/rc/papers/2008/07_payd_bordoffnoel/07_payd_bordoffnoel_pb.pdf).

Moving private costs closer to social costs can also be achieved by mileage-based insurance charges, called Pay-As-You-Drive (PAYD), which are politically viable because, again, there is no net increase in the aggregate cost of motoring even while the marginal cost rises steeply.

## Mileage-based insurance

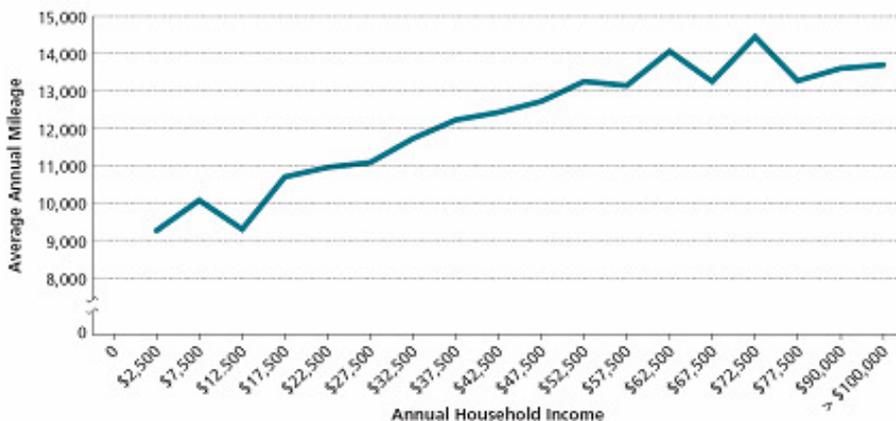
Substituting higher fuel excise for fixed government charges is a first step towards aligning the private and social costs of driving. A second logical step is to replace fixed insurance charges, such as third-party accident and comprehensive, with mileage-based insurance (PAYD), expanded to include components such as a flat-rate charge to cater for non-mileage-dependent risks like theft. Several of these schemes have already been set up in the US and in some other countries, including Australia.

Although flat-rate pricing may be convenient both for producers and consumers, variable pricing is more efficient and is the norm for most products. For example, gas and electricity are not charged at a flat rate and car insurance should not be either because the more people drive, the greater is their level of risk, other risk factors being equal. There is a market failure here, as motorists face a zero marginal price for undertaking an activity that has a positive marginal cost.

In the US, there is growing interest in PAYD among consumers, insurers and regulators. 'Advocates promote it as a way to achieve a variety of objectives, including increased fairness, affordability, traffic safety and environmental objectives'.<sup>22</sup> Risk factors are incorporated so that higher-risk drivers pay more and lower-risk drivers less, per unit of distance travelled.

Under the fixed-rate system, low-mileage drivers in each risk class end up subsidising high-mileage drivers in the same risk class. This is regressive, as low-income drivers tend to drive fewer miles (Figure 1). Although the data in this figure are from the US, it is not unreasonable to suppose that the Australian situation would be similar.<sup>23</sup>

Figure 1: Average mileage per vehicle, by Household Income Level



Source: Bordoff and Noel, *Pay-as-you-drive auto insurance*, Figure 3.

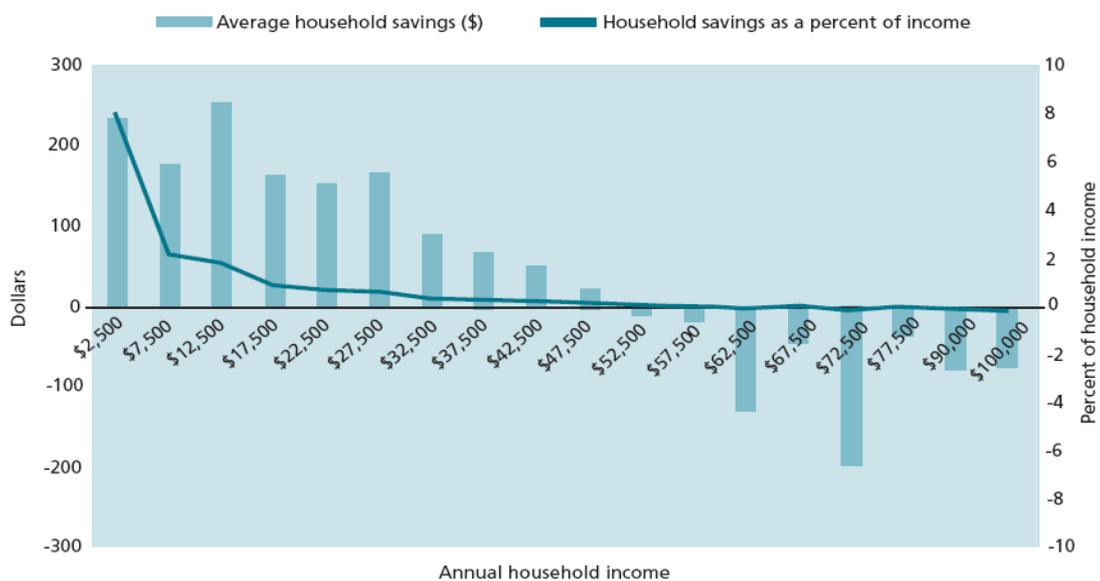
<sup>22</sup> Litman, T (2005) 'Pay-As-You-Drive Pricing and Insurance Regulatory Objectives', *Journal of Insurance Regulation* 23:3, National Association of Insurance, Spring, p. 36. Available at [www.vtqi.org/jir\\_payd.pdf](http://www.vtqi.org/jir_payd.pdf).

<sup>23</sup> It is not possible to be entirely confident in the absence of Australian data. For example it may be that many low-income earners live in outer suburban and country areas and drive long distances as a consequence. On the other hand, like many other activities, driving is likely to be income-elastic.

PAYD premiums are estimated to average 6.5 cents a mile in the US, or 5 cents a kilometre in Australia, where the average third-party injury insurance premium is in the order of \$350 and the average comprehensive premium is around \$750 per annum.<sup>24</sup> Combined, the total cost is \$1,000 and average kilometres travelled are 14,600 per annum,<sup>25</sup> implying a cost of 6.8 cents a kilometre if both premiums were to be charged according to road-use. That compares with an average petrol cost of 15.4 cents a kilometre,<sup>26</sup> so that the marginal cost of motoring would rise by some 44 per cent. This can be expected to have a marked impact on distance travelled and hence on the frequency of accidents. It would also be favourable to low-income motorists.

Figure 2 below shows the incidence of costs and savings from the PAYD proposal in the US context. It is anticipated that the distribution of savings in Australia would be broadly similar so that low-income groups would be the greatest gainers.

Figure 2: Savings from PAYD insurance



Note: Savings in 2007 dollars but household income groups in 2001 dollars. Savings are deflated to 2001 dollars to calculate percentage of 2001 income levels.

Source: Bordoff and Noel, *Pay-as-you-drive auto insurance*, Figure 1.

<sup>24</sup> In 2003–04, households spent an average of \$1,300 per annum on car insurance and registration. See ABS (Australian Bureau of Statistics), 'Australian social trends, 2006', Cat. 4102.0, Canberra, 2006. Available at: [http://www.abs.gov.au/ausstats/abs@\\_NSF/7d12b0f6763c78caca257061001cc588/72db6c90e484bddcca2571b00015ad8d!OpenDocument](http://www.abs.gov.au/ausstats/abs@_NSF/7d12b0f6763c78caca257061001cc588/72db6c90e484bddcca2571b00015ad8d!OpenDocument). This figure updated to 2009 is around \$1,550. However, many households have more than one car (the average is 1.5), and many cars have only compulsory insurance, thus the figures in the text are an approximation.

<sup>25</sup> ABS (Australian Bureau of Statistics), (2008). 'Survey of Motor Vehicle Use, Australia, 12 months ended 31 Oct 2007', Cat. 9208.0, Canberra. Available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/9208.0?OpenDocument>.

<sup>26</sup> The average rate of fuel consumption for all motor vehicles in the 12 months ended 31 October 2008 was 14.1 litres per 100 kilometres. This figure, however, includes trucks and the usage for private vehicles is 11.7 litres per 100 kilometres, implying a cost per kilometre of 15 cents if the price of petrol is \$1.28 a litre. See ABS (Australian Bureau of Statistics), *Experimental Estimates of Motor Vehicle Use Australia 12 months ended 31 October 2008*, Information paper, Cat. 9222.0, Canberra, 14 August 2009. Available at: [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/7F13E5C45942303DCA2576110016660D/\\$File/92220\\_12%20months%20ended%2031%20october%202008.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/7F13E5C45942303DCA2576110016660D/$File/92220_12%20months%20ended%2031%20october%202008.pdf).

Based on simulations of similar policies in the US, PAYD could be expected to reduce kilometres travelled by 10 to 15 per cent, with a corresponding impact on pollution and congestion costs. Crash risk is lessened more than proportionately with lower mileage; for example, if all drivers were to drive 10 per cent less often, the estimated reduction in total crashes is 17 per cent.<sup>27</sup>

Note that PAYD can be voluntary—no-one need be forced into it. But once it became widespread, the loss of low-mileage customers would drive up the average claims experience so that premiums for drivers still in the fixed-rate schemes would be forced up. Eventually, the expectation is that the more rational mileage-based pricing policy would become ubiquitous.

The increased risk of accidents coincident with the greater the number of kilometres driven provides the main rationale behind mileage-based insurance<sup>28</sup> but opposed to this there is evidence that people who drive longer annual distances have a lower risk profile than those who drive less. However, for any given level of skill, more mileage equals more risk. Thus, the appropriate response is to modify the per kilometre charge according to the risk rating of the individual driver in the same manner as a no-claim bonus depends on claims history. This rating should also take account of lower risk rural locations so that the cost per kilometre of rural driving would be less than in the cities. This would involve, for example, an insurance charge dependent on the policy holder's postcode.

The accuracy of insurance cost projections improves markedly if mileage is included in addition to other risk factors.<sup>29</sup> The current structure needlessly encourages people to travel unlimited kilometres with all the associated environmental and accident costs. 'Put differently, unlimited mileage insurance pricing is a transportation market distortion that results in economically excessive automobile travel ... This exacerbates traffic problems and increases transportation costs'.<sup>30</sup>

A study by Edlin of the University of California at Berkeley estimates that a universal system of per-mile auto insurance would reduce driving nationally by about nine per cent with potential insurance savings of US\$8 billion a year and congestion-related savings of an additional US\$9 billion a year.<sup>31</sup> Bordoff and Noel estimate a similar reduction in mileage but total benefits of US\$50 to US\$60 billion a year, largely from reduced congestion and accidents. They also find that two-thirds of households would pay less under such a policy.<sup>32</sup> Litman, Director of the VTPI in British Columbia, estimates that PAYD would reduce driving by around 10 per cent and crashes by 15 per cent.<sup>33</sup> The disproportionate impact on crashes occurs because PAYD would tend to reduce driving by low-income drivers who, in the US, tend to display higher crash rates.<sup>34</sup>

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<sup>27</sup> Litman, p. 41.

<sup>28</sup> This relationship is non-linear. In the US, high-mileage drivers drive six times as much as low-mileage drivers but have only 2.4 times as many crashes. The correlation improves when the calculations include controls for risk factors such as age and so on.

<sup>29</sup> VTPI (Victoria Transport Policy Institute), 'Pay-As-You-Drive Vehicle Insurance: Converting Vehicle Insurance Premiums Into Use-Based Charges', *TDM Encyclopedia*, 24 November 2008. Available at: <http://www.vtpi.org/tdm/tdm79.htm>.

<sup>30</sup> Litman, p. 45.

<sup>31</sup> A Edlin, 'Per-Mile Premiums for Auto Insurance', *Economics for an Imperfect World: Essays In Honor of Joseph Stiglitz*. MIT Press, 2003. Available at: [http://works.bepress.com/cgi/viewcontent.cgi?article=1031&context=aaron\\_edlin](http://works.bepress.com/cgi/viewcontent.cgi?article=1031&context=aaron_edlin).

<sup>32</sup> Bordoff and Noel.

<sup>33</sup> Litman.

<sup>34</sup> It is not clear if this would be the case in Australia. Interestingly, the high price of petrol in 2007–08 reduced road fatalities in the US by 20 per cent while reducing actual driving by only three to four per cent. The

There are barriers to introducing PAYD. Insurers would incur costs both to monitor miles travelled and develop new pricing models, while most of the benefits would accrue to society as a whole in the form of avoided external costs. In addition, regulations in many US states inhibit pay-per-mile insuring. To overcome the externality issue, Bordoff and Noel suggest a tax credit of \$US100 for every PAYD policy sold, to be phased out when five million vehicles nationwide, two per cent of the US fleet, are covered by such policies.<sup>35</sup> The view is that market penetration rates as low as two per cent would be sufficient to undermine existing lump-sum policies and start a snowball effect in favour of PAYD. As low-mileage motorists opt out of fixed-price insurance, the necessary insurance premiums would rise, causing this segment of the market to ultimately collapse. But Bordoff and Noel estimate that the process will take a decade.

In the US, insurance is the largest vehicle cost for many low-income drivers and the average motorist spends almost as much on insurance as on fuel. In Australia, the situation is rather different because fuel costs are higher due to higher excises and GST and annual fees and charges are 70 per cent of fuel costs.<sup>36</sup> But the general conclusion that low-income motorists are disadvantaged by fixed-cost insurance still stands.

The technology to enable PAYD insurance is relatively straightforward. The most basic system is for motorists to pay an annual premium, as now, with the ability to claim a rebate if their mileage is less than the pre-set amount. They would declare a self-reported odometer reading and would need to be subject to random compliance checks. The Australian insurer currently offering PAYD insurance requires motorists to report their odometer readings at the beginning of a policy when they purchase a certain number of kilometres. Odometer readings are verified if there is a claim.<sup>37</sup>

It is technically possible to measure mileage electronically, with data automatically transferred every time, say, a vehicle is refuelled. Most new cars already record mileage electronically, and fitted electronic devices could record and transmit mileage information. The cost of such technology, which already exists for part of the fleet (for example, taxis), is falling. The bottom line is that implementation is not a current obstacle and it will become easier as technology develops. The main compliance issue relates to motorists tampering with their odometers but these are becoming more tamper-proof and can be checked fairly simply by random audit, annual audit, or audit in the event of a claim.

Obviously, people would be ill-advised to lie about their mileage if it meant that they were uncovered when an accident actually occurred.

In the case of compulsory third-party insurance, PAYD could be mandated by state and territory governments. In the case of third-party property and comprehensive insurance, some public incentive might be necessary to begin the market transformation. Given the scope for reducing congestion, public investment in roads and accident costs, this initiative could be expected to pay for itself.

## **PAYD versus pay-at-the-pump**

Pay-at-the-pump (PATP) involves using a fuel-tax surcharge possibly supplemented by a risk-based fixed charge as an alternative to mileage-based insurance. In some US proposals, the

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hypothesis was that low-income drivers, a high-risk group in the US, used their cars less as petrol prices rose.

<sup>35</sup> Bordoff and Noel.

<sup>36</sup> NRMA.

<sup>37</sup> Realpayasyoudriveinsurance, 2009. Available at: <http://www.payasyoudrive.com.au/default.aspx>.

surcharge involves a system of no-fault injury compensation, similar (in part) to the national injury compensation proposals of the 1974 National Rehabilitation and Compensation Scheme Committee of Inquiry (Woodhouse Inquiry) in Australia.

PATP is inferior to PAYD in two key aspects. The first is that PATP calculates prices for accident risk much less precisely than risk-based individual premiums. Secondly, a rise in the price of petrol means that some of the response is aimed at improvements in fuel economy rather than reduced driving and, as a consequence, benefits in the form of reduced accidents and congestion are not as great as they are under PAYD.

That said, PATP may be the second-best alternative to a fully-fledged PAYD scheme, and perhaps better in some respects as it would ensure that all drivers have insurance coverage. In addition, a rural/urban differential can be applied relatively easily. But if implemented, PATP should be restricted to compulsory third-party accident insurance because it is basically unfair to high-mileage drivers whose risk does not increase proportionately to the extra miles they drive.

## Why don't insurance companies already charge per kilometre?

Edlin examines this issue and concludes that the primary reason for insurance companies' failure to charge per kilometre is probably monitoring costs. 'Traditionally the only reliable means of verifying mileage was thought to be bringing a vehicle to an odometer-checking station. In addition ... a firm charging per-mile premiums would also suffer abnormally high claims from those who committed odometer fraud ... [N]ow that cheap technologies exist allowing mileage verification at a distance, at least two firms are now experimenting with per-mile premiums ... Adverse selection provides another explanation that tends to close the per-mile premiums market.'<sup>38</sup>

Finally, Edlin notes that most of the benefits of per-kilometre charging, including reduced accidents, pollution and congestion, accrue to society as a whole and only partially to the individual driver or insurance company.<sup>39</sup> This is the justification for government intervention to promote the change.

## Summary—impact of PAYD insurance

PAYD insurance can provide the following benefits.

- Consumer savings and economic efficiency. The average motorist is predicted to save \$50 to \$100 a vehicle.
- Increased fairness. Current insurance pricing overcharges motorists who drive less than average and undercharge those who drive more than average.
- Progressive with respect to income. Lower-income motorists tend to drive less than average and thus subsidise the insurance costs of higher-income motorists, making current insurance pricing regressive.
- More affordable vehicle insurance. PAYD allows more lower-income households to insure a vehicle, and makes it more cost-effective for households of any income to own a second vehicle. This can result in lower fuel consumption if an economical second vehicle is used for most commuting and the larger car driven only when needed, at weekends and on holidays for example.

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<sup>38</sup> Edlin, 'Per-Mile Premiums for Auto Insurance', p. 73

<sup>39</sup> Edlin, 'Per-Mile Premiums for Auto Insurance'.

- Reduced uninsured driving. Significant numbers of vehicles are uninsured because high premium costs result in owners failing to insure low-annual-mileage vehicles because they don't consider it cost effective. PAYD pricing makes insurance more affordable for such drivers.
- Reduced vehicle travel. PAYD insurance is predicted to lower vehicle travel by up to 10 per cent, thus reducing all the external costs of motoring, including greenhouse gas emissions and usage of a depreciating resource, oil. Because vehicle travel is reduced, fewer roads are required, resulting in big savings.
- Increased safety. Vehicle crashes should decline even more than mileage because a mileage reduction of 10 per cent is predicted to reduce crashes by 17 per cent. Higher-risk motorists would pay higher per-kilometre fees and would therefore have the greatest incentive to reduce their driving.
- Congestion and emissions reduction benefits. VTPI suggests that PAYD vehicle insurance applied to all vehicles in an urban area could reduce congestion delays by 10 to 25 per cent.<sup>40</sup>
- Benefit for women. In the US, women drive roughly half as much as men do and have half the accidents, but still pay comparable premiums. They would be big winners from the per-kilometre policy.

## Conclusions

US and Canadian researchers have pointed to considerable benefits from the mileage-based pricing of car insurance. In fact, if insurance were currently mileage-based, it would be impossible to mount a defence for any move to change to a fixed-price system, just as a move to price water or gas in the same way would be opposed. It is purely an accident of history that car insurance has evolved in the manner it has.

Although there is already a business offering mileage-based insurance in Australia, a strong case exists for government intervention to encourage this development, especially where compulsory third-party insurance is concerned. This category of insurance is everywhere subject to semi-monopoly supply and could easily be changed by government regulation.

In addition, modelling of the benefits of PAYD car insurance by North American researchers suggests that considerable gains would be achieved by converting lump-sum charges for registration and stamp duties into mileage-based charges as advocated in the first part of this paper. The marginal cost of motoring would rise and the fixed costs would reduce, resulting in increased efficiency because for most people the costs of motoring would more closely approach the marginal costs imposed by their road use.

Because fixed costs would be lowered or even eliminated by the changes proposed in this paper, the problem of unregistered and uninsured vehicles should reduce. In Victoria, for example, it is estimated that one per cent of the car fleet, some 44,000 vehicles, are unregistered<sup>41</sup> and it is likely that a much higher proportion is uninsured. Extrapolating these numbers nationally demonstrates the severity of the problem. This proposal would make it much easier for low-income earners, who drive relatively little on average, to afford registration and insurance and, for everyone, driving would become a safer and more enjoyable experience.

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<sup>40</sup> VTPI, p. 5.

<sup>41</sup> B Smith, 'Rego system "a risk to drivers"', *theage.com.au*, 3 July 2006. Available at: <http://www.theage.com.au/news/national/regosystem-a-risk-to-drivers/2006/07/02/1151778811505.html>.

Even though more people might own more cars, they will choose to use them less, replacing driving with walking, cycling and the use of public transport.

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