

June 30, 2008

# Externalities and Pay as You Drive Auto Insurance

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Adam Cole  
General Counsel and Deputy Commissioner  
California Department of Insurance

Re: Second Comments for Workshop on Pay-As-You-Drive Auto Insurance.

Dear Mr. Cole,

Thank you for allowing a second opportunity for comments following up on the June 23, 2008 Workshop on Pay-As-You-Drive insurance.

These comments supplement my previous comments and do not comprehensively address the benefits or implementation issues in PAYD.

Let me address a few issues brought up during the workshop. First, I would like to elaborate on your question to me: “Why will free markets and unfettered choice by insurance companies and their customers not lead to good outcomes?”. Second, I will propose two possible ways to implement Pay-As-You-Drive insurance. Third, I address the issue of mandates verses options.

### **Why Externalities Justify Mandates.**

During the workshop, you asked why the market wouldn’t handle externalities. It is a classic principle of economics that externalities are not minimized by markets and that they justify taxation, mandates, or other government intervention.

Why not? Externalities mean costs that are not born by either the buyer or seller in a market. Because they don’t bear them, they won’t consider these costs in their decisions of how much to trade and under what conditions and terms to trade. Hence, markets will never correct externalities without some government intervention. That is in the nature of externalities.

One example of an externality is global climate change, which you cited as a primary motivation for the Departments’ consideration of Pay-As-You-Drive. Every driver, with each mile she drives, contributes to climate change. Yet most of the costs of extra climate change are not borne by this driver herself but by the billions of other people on earth. She bears only a tiny fraction of the damage she causes. Pay-As-You-Drive may limit this damage and help to address this externality, but we cannot expect insurers or insureds to place sufficient weight on mileage on their own to do so.

Stepping back for a moment, you will see that the tort system and then the superimposed mandatory insurance system are efforts by the state to address the problem of one driver negligently hitting another and not paying for the damage (an externality that absent the combination of tort liability and insurance would be commonplace).

There is also an accident externality that insurance will not address. The externality is that each driver's driving affects the accident risk of others. The more miles each person drives, the more cars are on the road and the more potential there is for accidents. Every driver knows this instinctively: aren't you more nervous driving in heavy traffic than on an empty road? This point has been made at a theoretical level from many different angles by many researchers. Perhaps, Nobelist William Vickrey was first in the sixties. Steve Shavell of Harvard and Peter Diamond of MIT made the point in the 1970s. Standard law and economics texts make the point: see, for example, Robert Cooter and Thomas Ulen's "Law and Economics" textbook. My own theoretical modeling supports this idea, but more important than theory, data on insurance premiums confirm it. The average insurance premium rises with traffic density controlling for other relevant factors.

My estimates with Pinar Karaca-Mandic, published in the *Journal of Political Economy*, one of the top peer reviewed journals in economics, find that the externality effect is over \$2000/year for the average driver in California. This implies that if this driver cuts her driving by 5-10% as she might choose to do if her insurance were priced by the mile, then the accident costs of others (with whom she might be in accidents) would fall by \$100-\$200/year. Her own insurance covers her "internalized" cost of accidents, perhaps \$1000/year. Her own costs will also fall, so she might save perhaps \$50-\$100 in lower insurance premiums: Her own insurance cost savings are partially offset by her own diminished utility from less driving, so that on balance, she herself is better off by \$25-\$50. (More exact estimates are found in my paper "Per-Mile Premiums" or in a recent Brookings Institution Hamilton Project paper.)

There is some incentive of a given insured and insurer to adopt a per-mile premium policy, but it could easily be exceeded by the transaction costs of monitoring mileage, paying refunds for low mileage etc.<sup>1</sup> (The fact that per mile premiums are not typically offered strongly suggests as much). However, the external benefits of accident reductions are much larger and justify mandates of per mile premiums or other Pay-As-You-Drive plans.

### **Possible Pay-As-You-Drive Plans.**

All the benefits from Pay-As-You-Drive — less accidents, less emissions, less congestion, less road expenditures — depend upon people choosing to drive less. To this end, as much of the fixed cost of insurance as possible must be shifted to the marginal mile of driving where the decision is, and people must understand this. The system must be simple and transparent.

Two possibilities emerge. One is to simply charge by the mile instead of by the year, so that both refunds and surcharges are possible at year/period end. The other is to give an

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<sup>1</sup> To the extent that a single insurer such as State Farm has a large market share, it will internalize somewhat more of the externality effects than the estimates above account for. Nonetheless, most of the gains from Pay-As-You-Drive remain external to any given insurer and its insured(s).

ex post refund based upon number of miles in a linear and transparent fashion, but not to have surcharges.

Sample invoices for these two possibilities are in Exhibit A. Invoices must transparently convey to drivers the possibility of reducing insurance costs by reducing mileage. The appearance of invoices could be crucial to successful implementation of PAYD.

Does charging 8 cents per mile on average make mileage the biggest factor in violation of prop 103? No. Per mile rates should be risk adjusted. For example, a dangerous driver driving in urban areas might pay 20 cents per mile. A safe driver living in a rural area might pay only 2 cents per mile. Insurers would determine the rate for a given driver based upon competition and the regulatorily acceptable risk factors. If the per-mile rates vary enough with other risk factors like safety record, then it would be fair to say that those factors could have greater weight than mileage under a per-mile system. Still, if the insurance is quoted and calculated on a transparently per-mile basis, the incentives to reduce driving will be maximized.

### **Mandates versus Optional**

Given that insurers have not adopted per-mile premiums to any great extent in any state, I have my doubts whether they will in California even if actual verified mileage data is given to them for free (e.g., through smog checks).

Much as the economist in me hates to do so, I advocate mandates of some sort. Ideally, premiums would be quoted on a per mile basis. Second best would be to have half of the premiums be on a per-mile basis. The per-mile price should be risk adjusted based upon safety record, city, age and other factors.

Simplest would be to mandate that by 2012, all policies be on a per-mile basis. There might be political advantages to phase in a mandate, however.

I make one final note. Having compulsory insurance as we do could be viewed as a much larger step than mandating that insurance be quoted per mile rather than per year.

Sincerely,

Aaron S. Edlin

## Exhibit A: Invoices

### Insurance invoice at end of the year under Per-Mile Premiums for low-mileage driver.

Amount paid	\$960
Per-Mile premium	
You drove 9,000 miles	
Rate	\$0.08 per mile
Premium	\$720
<b>Refund</b>	<b>\$240</b>

**Thank you for driving less, reducing accidents and helping to prevent climate change! Your low mileage earned you the enclosed refund.**

**(Next year, for each 100 miles you reduce your driving, you will save an additional \$8 in insurance charges)**

### Insurance invoice at end of the year for those who drive more than 12,000 miles per year under Per-Mile Premiums, Possibility #1: Surcharge

Amount paid	\$960
Per-Mile premium	
You drove 14,000 miles	
Rate	\$0.08 per mile
Premium under per mile premiums	\$1120
<b>Surcharge</b> for driving over 12,000 miles	<b>\$160</b>
Amount Due	<b>\$160</b>

**Consider reducing your driving. For each 100 miles you reduce your driving, you will save \$8 in insurance charges.**

### Insurance invoice at end of for those who drive more than 12,000 miles per year under Per-Mile Premiums, Possibility #2

Amount paid	\$960
Per-Mile premium	
You drove 14,000 miles	
Rate	\$0.08 per mile
Premium under per mile premiums	\$1120
<b>Refund:</b>	<b>None</b>

Your premium under per-mile premiums would be higher than what you have paid, so we can't provide a refund. **Consider driving less to earn a refund.** For every 100 miles you reduce driving under 12,000 miles per year, you reduce your premiums by \$8.

## References and Further Reading:

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