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"Efficiency - Equity - Clarity"

Pay-As-You-Drive Vehicle Insurance

Implementation, Benefits and Costs

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Abstract

Vehicle insurance is generally considered a fixed cost with respect to vehicle use. Motorists usually receive little or no cost savings when they reduce mileage. Pay-As-You-Drive (PAYD) pricing converts insurance to a variable cost, so premiums are directly related to annual vehicle mileage. This makes vehicle insurance more actuarially accurate (premiums better reflect each vehicle's claim costs) and gives motorists a new opportunity to save money when they reduce their mileage, and so reduces average annual mileage by participating vehicles. It can help achieve several public policy objectives including increased equity, congestion reduction, road and parking cost savings, road safety, consumer savings, energy savings and pollution reductions. This paper compares several PAYD pricing options, and evaluates various concerns and criticisms about this reform. The analysis indicates that PAYD pricing is technically and economically feasible, and can provide significant benefits to motorists and society.

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Introduction

This paper explores the feasibility of implementing *Pay-As-You-Drive (PAYD)*, also called *Distance-Based* and *Per-Mile* vehicle insurance pricing (for more information see Vickrey, 1968; Litman, 1997; Edlin, 1999; Litman, 2003; Funderburg, Grant and Coe, 2003; Litman, 2003; and various references in “Pay-As-You-Drive Insurance,” VTPI, 2005). Insurance is currently a fixed cost with respect to vehicle travel. A marginal reduction in vehicle mileage usually provides little or no insurance premium savings to individual motorists. PAYD pricing converts insurance into a variable cost, so reducing a vehicle’s annual mileage reduces its insurance premiums, all else being equal.

Basic PAYD premiums are calculated by dividing existing premiums by a vehicle’s rate class average annual miles. For example, a \$250 annual premium for a 10,000 annual mile vehicle class becomes 2.5¢ per mile, and a \$1,800 annual premium for a 15,000 annual mile vehicle class becomes 12¢ per mile. Insurance premiums currently average about \$800 per vehicle-year, or about 6.5¢ per vehicle-mile (NAIC, 2004). Based on standard travel elasticity values (long-run elasticity of vehicle travel with respect to operating costs between -0.15 and -0.35), converting all premiums to PAYD pricing reduces affected vehicles’ average annual mileage by 10-12% (USEPA, 1998; “Transport Elasticities,” VTPI, 2005). There are several specific ways PAYD could be implemented:

1. *Mileage Rate Factor* means that annual mileage is incorporated as a significant rating factor using the existing premium rating system. It is the easiest option to implement, but is constrained by the weight that can be placed on self-reported mileage estimates. Its travel impacts and benefits are small.
2. *Pay-at-the-Pump (PATP)* funds basic insurance coverage through a fuel surcharge. It is not actuarially accurate because payments are based on vehicle fuel consumption, not risk factors. There would probably be little administrative cost savings because most motorists would still need to pay registration fees and purchase optional coverage as they do now. Under most proposals less than half of insurance payments would be distance-based, and cross-border and illegal fuel purchases could be major problems. It causes a relatively large reduction in fuel consumption but modest reductions in vehicle travel.
3. *Per-Mile Premiums* changes the unit of exposure from the vehicle-year to the vehicle-mile, incorporating all existing rating factors. It requires odometer audits to provide accurate mileage data, predicted to cost an average of \$5-10 per vehicle-year. It could be mandatory or a consumer option. It significantly improves actuarial accuracy and provides significant consumer savings. Because it causes large reductions in vehicle travel (estimated at 10-12% per affected vehicle) it provides large benefits. As a consumer option it is predicted to attract 25-50% of motorists.
4. *GPS-Based Pricing* uses GPS (Global Positioning System) technology to track vehicle travel, allowing premiums to reflect when and where a vehicle is driven. It typically costs \$150 or more per vehicle-year for equipment (although this cost may decline somewhat in the future as more vehicles have factory-equipped GPS transponders) and raises privacy concerns. It is most actuarial accurate, but, its high costs offset the direct benefits for most consumers. As a consumer option it is predicted to attract 10% or less of total motorists, so total benefits would be modest for the foreseeable future.

Table 1 summarizes the implementation costs and effectiveness at achieving various objectives for five PAYD pricing options.

Table 1 Summary of PAYD Pricing Options

	Implementation Costs	Effectiveness
Mileage Rate Factor	Low	Low
Pay-At-The-Pump	High	Medium
Per-Mile Premiums, Mandatory	Low	High
Per-Mile Premiums, Optional	Low	Medium
GPS-Based Pricing	High	Medium

This table summarizes overall implementation costs and effectiveness at achieving objectives.

Relationship Between Mileage and Crashes

A key factor in the efficiency and equity of PAYD insurance pricing is the degree to which annual vehicle mileage affects insurance claims costs. Considerable research indicates that increased annual mileage tends to increase annual crash risk, all else being equal (CAS, 1996, p. 35, 242 and 250; Edlin, 1999; Litman and Fitzroy, 2005). Even a “perfect” driver faces risks from causes beyond their control – an animal running into the roadway, catastrophic mechanical failure, a heart attack – that increase with mileage. Annual crash risk is the product of two factors: per-mile crash risk times annual mileage. Although higher-risk drivers may crash every 50,000 miles, while lower-risk drivers may crash every 500,000 miles, in either case a reduction in mileage reduces collisions.

Since about 70% of crashes involve multiple vehicles, each 1.0% mileage reduction should reduce total crash costs by 1.7%. For example, if you reduce your mileage by 10% you would expect a 10% reduction in your crash risk. If you did not reduce your mileage but all other motorists reduced their mileage by 10% you could expect a 7% reduction in crash risk, since 70% of your crashes involve other vehicles. If you and all other motorists reduce mileage by 10% you could expect a total 17% reduction in crash risk. The elasticity of vehicle insurance costs with respect to mileage is between 1.42 and 1.85, which means that a 10% reduction in total vehicle mileage reduces total crash costs, insurance claims and casualties by 14% to 18% (Edlin, 1998).

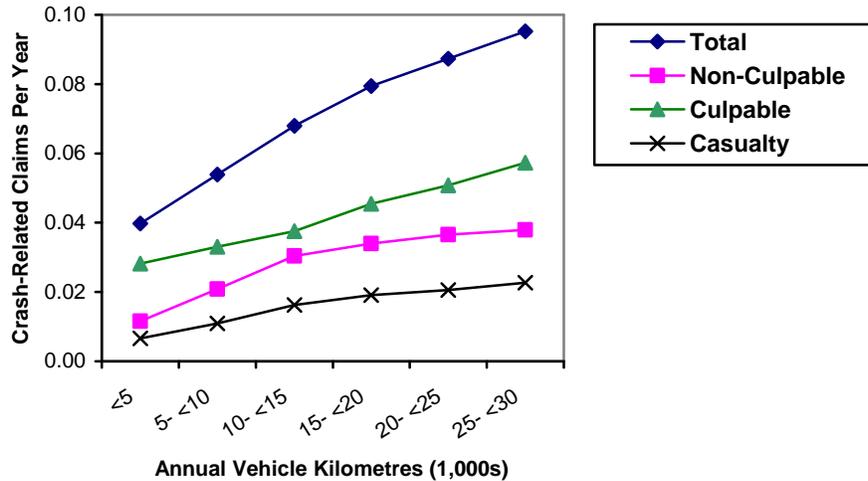
High annual mileage drivers tend to have relatively low per-mile crash rates, while lower-mileage motorists tend to have relatively high per-mile crash rates, as summarized in the box below. However, these factors reflect crash rates *between different motorists* and do not necessarily apply to mileage reductions by *individual motorists*. Most risk factors described in the box do not change when an individual driver reduces annual mileage.

Higher-mileage vehicles tend to have relatively low per-mile crash rates because (Janke, 1991):

- Higher-risk motorists tend to limit their annual mileage while high-mileage drivers are likely to be relatively capable drivers.
- Higher-mileage motorists tend to drive newer, mechanically safer vehicles.
- Urban drivers tend to have higher crash rates and lower annual vehicle mileage.
- Higher-mileage motorists tend to do a greater share of driving on grade-separated highways.

In the past, there was little reliable information on the relationship between individual vehicles' annual mileage and crashes. Most insurance companies collect little or no mileage data, and any information they do collect is self-reported, which vehicle owners tend to understate to qualify for lower rates. However, new data sources are providing better information on the relationships between mileage and claim costs. Mileage readings collected during emission checks in the Vancouver, BC region were matched with individual vehicles' insurance claim records for more than 500,000 vehicle-years. Figure 2 illustrates the crash rates by annual vehicle mileage for all records in aggregate. It clearly shows that annual crash rates tend to increase with annual mileage. The same patterns were found when vehicles were disaggregated into various insurance rating classes based on factors such as driver history, type of vehicle and territory (Litman, 2001). This indicates that PAYD pricing increases actuarial accuracy (makes premiums better reflect an individual vehicle's claim costs).

Figure 2 Crash Rates by Annual Vehicle Mileage



Annual crashes tend to increase with annual kilometres at the aggregate level.

Mileage is not the only risk factor. It is not necessarily the most important risk factor. But it clearly has a substantial impact. As a result, within existing rate categories lower mileage motorists overpay and higher mileage motorists underpay their insurance claim costs. Because crashes and claims increase with mileage but premiums do not, motorists who drive less than average tend to overpay their true insurance costs, while motorists who drive more than average overpay within their rate category (i.e., motorists with the same risk ratings who pay the same premiums for a given level of insurance coverage).

A critical question with regard to PAYD insurance is whether mileage reductions produce comparable reductions in crashes and claims. If not, insurers could face losses, since revenues would decline more than costs. For example, if PAYD pricing causes a 10% reduction in mileage and premium revenue but only a 5% reduction in crashes and claims, insurers would be financially worse off. This could occur if lower-risk driving is more price sensitive than higher-risk driving.

Some data described above suggest that this could occur, since marginal per-mile crash rates are nearly flat at very high-mileages, which implies that the last few thousand miles driven each year by a high-mileage vehicle has zero risk (in some cases it even suggests that increased mileage *reduces* crash risk). However, this reflects crash rates *between* different vehicles, not the result of mileage changes by *individual* vehicles. All available data indicate that mileage reductions usually do reduce crashes and claims, and normally provide a proportionally *greater* reduction in *total* crash costs and claims by reducing a vehicle's risk of causing a crash and its exposure to risks caused by another motorist.

Benefits and Costs

Pay-As-You-Drive insurance is based on the principle that prices should reflect costs, and consumers who reduce the costs they impose should receive proportionate savings. Reduced driving reduces the risk of crashes and insurance claims. With current pricing, claim cost savings that result when motorists reduce their mileage are retained as profits by insurers, or returned to premium payers as a group. With PAYD pricing these savings are returned to the individual motorist that reduces mileage. The less you drive the more you save, reflecting the insurance cost savings you create.

Figure 3 PAYD Provides Savings To Motorists Who Reduce Mileage



Pay-As-You-Drive pricing returns to individual motorists the insurance cost savings that result when they drive less. As a result, it reduces average annual vehicle mileage, reducing total accidents and other traffic problems.

Pay-As-You-Drive pricing gives motorists a new opportunity to save money. To illustrate this, consider the situation of a low-income worker who becomes unemployed and so drives fewer miles. With current pricing they continue paying the same insurance premiums, although both their income and risk of a claim have declined. After extended unemployment they may find insurance costs, and therefore vehicle ownership, a major financial burden. With PAYD, unemployed workers who reduce their mileage pay smaller premiums, while still being able to insure a car for essential trips, job searches and occasional employment.

Motorists who continue their current mileage are no worse off on average with PAYD pricing (excepting any additional transaction costs). To the degree that motorists reduce mileage, and therefore crashes and insurance claims, the savings that result are net benefits to society, not just economic transfers.

Pay-As-You-Drive insurance pricing can provide the following benefits:

- It increases consumer choices and offers motorists a new opportunity to save money. PAYD pricing can be optional, allowing individual motorists to choose the pricing system that offers them the greatest benefits.
- It increases actuarial accuracy. It makes premiums more accurately reflect the insurance costs of an individual vehicle, which is fairer and more economically efficient.
- It can significantly increase road safety. When motorists reduce their annual mileage they reduce crash risk to themselves and to other road users.
- It reduces average annual mileage by participating vehicles, which should reduce traffic accidents, congestion and roadway costs, energy consumption and pollution emissions.
- It increases insurance affordability, reducing the financial burden on lower-income motorists. It reduces the need to rely on cross-subsidies from low-risk motorists to provide “affordable” unlimited-mileage insurance coverage for higher-risk motorists. It should substantially reduce uninsured driving.
- It is progressive with respect to income. Most lower income motorists should save money.

These benefits can be substantial, repaying incremental implementation costs many times over. For example, if applied to most vehicles, PAYD could reduce total vehicle traffic by 10-12%, providing billions of dollars in annual savings from reduced crash costs, reduced congestion costs, road and parking cost savings, and consumer cost savings. If universally applied it could provide approximately a third of the energy savings and emission reductions required for private vehicle travel to meet Kyoto targets (it would reduce vehicle travel about 10%, compared with a 30% reduction in energy consumption required by Kyoto).

There are also barriers and costs associated with PAYD pricing:

- It requires insurers and brokers to change how they calculate premiums, develop new procedures and modify computer programs.
- When first implemented, insurers will face uncertainty as they develop actuarial experience with this rate structure.
- PAYD pricing systems often increase transaction costs. Incremental costs range from less than \$10 to more than \$150 per vehicle-year, depending on the system used.
- It makes premiums and insurance revenues less predictable. Motorists and insurers would not know total premiums until the end of the insurance term.
- It increases premiums for some motorists.
- It has mixed political support, and there may be opposition from some stakeholders.
- Many people are skeptical of predicted benefits.

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4 **Responses to Concerns About Per-Mile Insurance**

5 *This section discusses concerns that have been raised about PAYD pricing. For technical*
6 *information on these issues see Litman (2003).*

7
8 *Insurance pricing already incorporates mileage.*

9 Although some insurance companies incorporate mileage-related rate factors such as commute
10 distance or estimated annual mileage, none begins to approach actuarially accurate, marginal
11 pricing, so they fail to give motorists accurate price signals.

12 *Mileage is less important in predicting crashes than other rating factors.*

13 Whether mileage is more or less important than other risk factors is irrelevant for PAYD pricing
14 options that incorporate existing rating factors (all except PATP). Until recently insurance
15 companies had no reliable source of mileage data and so could not accurately determine the
16 relationship between mileage and claims. Data based on independent odometer readings shows a
17 strong relationship between mileage and claims within existing price categories.

18
19 *Travel foregone could be lower risk than average, resulting in little crash reduction, and less*
20 *insurance cost savings than reduced premium revenue.*

21 There is no evidence that it is true. Available evidence indicates that broad vehicle travel
22 reductions result in proportionally greater crash reductions and insurance savings. Additional
23 research and pilot projects that test the effects of PAYD pricing could address this concern.

24 *Pay-As-You-Drive insurance unfairly increases costs to high-mileage drivers.*

25 Pay-As-You-Drive pricing would increase costs for motorists who drive significantly more than
26 average within their price group. This is justified on actuarial grounds, and so increases fairness.
27 Most motorists save money and experience net welfare gains with PAYD pricing, particularly
28 lower-income motorists, who tend to drive less than average within their price groups. Since
29 high-mileage motorists tend to drive newer cars and have high vehicle expenses, few would
30 experience more than a few percent increase in total vehicle costs.

31 *Automobile insurance reform should focus on equity, affordability and safety.*

32 Pay-As-You-Drive pricing helps achieve all of these goals. It increases equity by making
33 premiums more actuarially accurate and reducing costs for lower income motorists. It allows
34 motorists to save money and makes vehicle ownership more affordable. It significantly increases
35 road safety.

36
37 *Safety advances/congestion reduction/air pollution reduction/energy conservation can best be*
38 *pursued in ways other than mileage-based insurance.*

39 It is unnecessary to choose between PAYD pricing and other strategies. PAYD pricing
40 complements other strategies. Because of its multiple benefits, PAYD insurance can be one of the
41 most cost-effective ways to achieve these objectives.

42 *People need their cars too much to give them up. There will be no travel reduction.*

43 Pay-As-You-Drive insurance is not expected to cause people to give up cars. In fact, by reducing
44 fixed costs, vehicle ownership should increase slightly. There is extensive evidence that vehicle
45 travel is affected by vehicle operating costs. A modest (5-15%) mileage reduction is predicted.
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Consumers will not accept this change.

Market surveys and pilot projects indicate significant consumer demand for PAYD pricing. A broad range of interest groups support PAYD pricing. Support should increase as consumers and citizens learn more about its benefits.

Odometer fraud will be a major problem.

Although some odometer fraud may occur, it is expected to be a minor problem overall, with fraud rates comparable to other common consumer transactions, and far lower than with current insurance pricing. Odometers are increasingly tamper resistant, regular odometer auditing should discourage and identify most tampering, and the financial incentive for fraud is relatively low. Insurers financial exposure would be minimal since odometer fraud voids coverage.

It would increase administrative costs to insurers and inconvenience vehicle owners.

Although any price change adds short-term administrative costs for insurers, this does not stop insurance companies from implementing them. Odometer audits can be performed with minimal incremental costs, particularly if performed in conjunction with other scheduled maintenance. Incremental costs, predicted to total \$5-\$10 per vehicle year, are far smaller than direct benefits to consumers and society.

If PAYD pricing were better, insurance companies would already use it.

Individual insurers face several barriers to implementing PAYD pricing. An individual company faces relatively high administration costs to establish odometer auditing. An individual insurance company only captures a small portion of the total benefits, since most financial savings are passed back to customers or accrue to competitors. Insurers do not profit from reductions in uncompensated crash costs, congestion, infrastructure costs, or pollution, or benefit directly from increased equity.

Insurance companies currently maximize profits by maximizing their gross revenue, because they are dependent on investment income. A pricing strategy that reduces total crashes could reduce profits if regulators or market competition required a comparable reduction in premiums. Although there are potential financial and marketing benefits, these longer-term saving would have to offset an individual insurer's short-term revenue losses and risks. It is therefore not surprising that few insurers have implemented PAYD pricing.

This type of pricing has never been used before.

Some vehicle insurance is already distance-based: rates for fleets and commercial vehicle coverage are often based on mileage. Several insurers are now implementing pilot projects, and two (Nedbank and Polis Direct) have implemented full-scale programs. There is nothing unique about pricing based on use. Prices for most goods are based on some measure of consumption, such as water and electric meters, and scales used to weigh food. Vehicle rentals and sometimes leases incorporate odometer-based price components. Vehicle insurance is unusual for having pricing that allows unlimited consumption (i.e., vehicle mileage).

Odometer auditing would be an invasion of privacy.

Odometer readings are already collected during vehicle servicing, vehicle sales and crash investigations. Odometer readings are even sold by private companies to used vehicle purchasers. Odometer auditing simply standardizes the collection of this information. Odometer auditing does not identify when or where a vehicle has been driven, or provide any other information that could be considered private. Odometer auditing would provide significant additional consumer benefits.

Examples and Case Studies

Aryeh (www.aryeh.co.il)

Aryeh Insurance offers PAYD insurance in Israel. Premiums are billed monthly using mileage data collected by small wireless transmitters in vehicles and receivers at fuel pumps, offered by PAZ (www.pazomat.co.il), the country's largest petroleum company. About 15% of all vehicles (and a larger portion of company and government agency cars) already have the device installed for automatic payment.

Polis Direct Kilometre Policy (www.kilometerpolis.nl)

Polis Direct (www.polisdirect.nl), a major Dutch insurance company, began offering their "Kilometre Policy" in November 2004. Participating motorists must be at least 24 years of age, have a car that sold new for less than €42,000 (euros), and drive less than 40,000 kms annually. Per-kilometer premiums are calculated by dividing current premiums by the current policy's maximum annual kilometers, so a motorist who currently pays €500 for up to 20,000 kilometers would pay €0.025. Participants pay an "advance premium," which is 90% of their current premiums, so those who currently pay €500s would pay an advance premium of €450. At the end of the policy term the motorist receives a rebate of up to 50% of their premium for lower mileage (in this case, a rebate up to €250 if they drive less than 10,000 kms), or a surcharge up to 50% if they drive more than the current maximum (in this case, they could pay up to €750 if they drive 30,000 kilometers during the policy year. If this motorist drives 20,000 kilometers their total annual premium is the same as with a standard policy. In the following years the advance premium is calculated based on the number of kilometers actually driven the previous year. Mileage is calculated using odometer readings collected during annual vehicle inspections, called the "national car card," and recorded in the national vehicle registration database.

PAY PER K Coverage

(www.nedbank.com/website/content/products/product_overview.asp?productid=331).

Nedbank, a major South African insurer, now offers *Pay Per K* vehicle insurance, which bases premiums on monthly mileage. *Pay per K* monitors the distance a vehicle is driven each month by means of a NedFleet card that is linked to the vehicle's comprehensive motor insurance. Each time the vehicle is refueled an odometer reading is recorded and used to calculate a monthly insurance bill. Monthly premiums will fluctuate depending on the distance traveled in the preceding month, and are debited monthly in arrears. This means motorists only pay for those times when their vehicle is actively on the road and therefore most at risk.

Norwich-Union PAYD Pilot Project

(www.norwichunion.com/pay_as_you_drive/index.htm?plp_ci_payd)

In 2003, Norwich-Union, the largest insurance group in the UK, began a two-year pilot project of Pay-As-You-Drive insurance pricing involving about 5,000 vehicles. Each participating vehicle is fitted with a small data recorder which measures vehicle usage and sends data directly to Norwich Union using mobile telephone technology. In a survey commissioned by Norwich Union, nine out of ten people say they would prefer their motor insurance to reflect the usage of their car and the type of journeys they make - with the majority favouring "pay as you go" systems similar to those offered by gas and electricity suppliers. As stated by programme director Robert Ledger, "Customers choosing 'Pay As You Drive' insurance will benefit from individual premiums based on how often, when and where they actually used their cars. Motorists would receive a fairer deal as this initiative provides them with the opportunity to really be in the driving seat when it comes to controlling their premiums."

General Motors and On-Star Offers PAYD Rates

www.onstargm.com/promo/html/promo_mileage.htm

Beginning in 2004, General Motors Acceptance Corporation (GMAC) Insurance has been offering mileage-based discounts to OnStar subscribers located in certain states (GMAC, 2004). The On-Star system is used to automatically report vehicle odometer reading at the beginning and end of the policy term to verify vehicle mileage. Under the program, motorist who drive less than specified annual mileage receive the following insurance premium discounts:

1-2,500 miles	40% discount
2,501-5,000 miles	33% discount
5,001- 7,500	28% discount
7,501-10,000	20% discount
10,001-12,500	11% discount
12,501-15,000	5% discount
15,001-99,999	0% discount

Progressive and Aviva Programs

The Progressive *TripSense* (<https://tripsense.progressive.com>) in Minnesota, and AVIVA *Autograph* (<https://secure.avivacanada.com/autograph/product.php>) policies in Ontario, offer vehicle insurance discounts up to 25%, based on how much a vehicle is driven.

Drivers who choose to join these pilot programs receive a TripSensor, a free, matchbox-sized device that plugs into a vehicle's On-Board Diagnostic (OBDII) port, which is found near the steering column in virtually all 1996 or later model year vehicles. The TripSensor records how much, how fast and when the vehicle is driven. This information is used to calculate discounts the customer may receive when they renew their policy. TripSensor also collects information about rapid acceleration and braking that is not currently used to calculate the discount. The companies are collecting this information to better understand how they affect accident rates.

Motorists receive an automatic 5% discount if they choose to upload their driving data, plus additional discounts of up to 20% based on how much, how fast and when they drive. Sharing driving data is always optional.

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4 **Conclusions**

5 This paper investigates Pay-As-You-Drive vehicle insurance. Considerable research
6 indicates that annual crash rates and claim costs tend to increase with annual vehicle
7 mileage. Annual mileage is one of several factors that have a significant impact on annual
8 crash rates. It would not be actuarially accurate to use mileage *instead* of other rating
9 factors, for example, to charge all motorists the same per-mile insurance fee, but actuarial
10 accuracy improves significantly if annual mileage is incorporated *in addition* to existing
11 rate factors. Any other price structure overcharges low-mileage motorists and
12 undercharges high-mileage motorists within each price class.

13
14 Pay-As-You-Drive insurance reflects the principle that prices should be based on costs. It
15 does not simply shift costs from one group to another. It gives consumers a new way to
16 save money by returning to individual motorists the insurance claims cost savings that
17 result when they drive less. This lets motorists limit their insurance costs by limiting
18 consumption, as with most other consumer goods. Motorists who continue their current
19 mileage would be no worse off on average than they are now (excepting additional
20 transaction costs), while those who reduce their mileage could save money. These result
21 in net savings to motorists and net benefits to society.

22
23 Pay-As-You-Drive insurance is technically and economically feasible. Several insurers
24 have successfully implemented PAYD pricing pilot projects or full-scale programs.

25
26 Pay-As-You-Drive pricing can help achieve several public policy goals, including
27 actuarial accuracy, equity, affordability, road safety, consumer savings and choice,
28 reduced traffic congestion, road and parking facility cost savings, and environmental
29 protection. It can reduce the need for cross-subsidies currently required to provide
30 “affordable” unlimited-mileage coverage to high-risk drivers.

31
32 Pay-As-You-Drive insurance can provide significant traffic safety benefits. Most crashes
33 involve multiple vehicles, and PAYD insurance gives higher-risk drivers an extra
34 incentive to reduce mileage. As a result, each 1.0% reduction in total mileage caused by
35 PAYD insurance can reduce total crash costs by more than 1.0%. If applied to all
36 vehicles, PAYD insurance could reduce total crashes by 12-15%.

37
38 Pay-As-You-Drive pricing can provide substantial benefits to lower-income motorists.
39 Since annual vehicle mileage tends to increase with income, fixed-price insurance tends
40 to cause lower-income motorists to subsidize the insurance costs of higher-income
41 motorists within their rate class.

42
43 This analysis indicates that Mandatory Per-Mile Premiums provide the greatest net
44 benefits, due to relatively low implementation costs and high effectiveness at achieving
45 objectives (Parry, 2004, reaches a similar conclusion). These benefits increase further if
46 vehicle registration fees are also mileage-based. Optional PAYD pricing results in greater
47 direct consumer benefits per participating vehicle, but smaller total benefits due to low
48 market penetration and the low average mileage of motorists who would choose it.

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3 Because GPS-Based Pricing provides an extra incentive to reduce peak-period driving it
4 provides extra congestion and pollution reduction benefits. This might justify partial
5 subsidy of this option, depending on the value placed on these incremental benefits.
6 However, more research is needed to evaluate actual incremental costs and benefits.
7

8
9 There is likely to be strong public support for *optional* PAYD insurance pricing since it
10 increases consumer choice and gives individual motorists a new opportunity to save
11 money. Consumers are accustomed to being able to choose from various rate structures
12 for many types of goods, such as telephone service, Internet service and air travel. Over
13 time, an increasing portion of motorists would switch to optional PAYD policies.

14
15 There is mixed public support for *mandatory* PAYD insurance. Citizens generally
16 support pricing that increases fairness and affordability, and helps solve specific
17 problems, but are skeptical of reforms that may reduce convenience, increase costs, or
18 burden certain groups. Support depends on how the concept is presented. There tends to
19 be more support if described as a reward to consumers who reduce their mileage and
20 related risk than if described as a surcharge on higher-mileage motorists. Many of the
21 concerns raised about PAYD pricing reflect misunderstanding of the concept, and so can
22 be addressed with public education.

23 Insurers have five legitimate concerns about PAYD:

- 24 1. It is possible that the mileage foregone will be lower than average risk. As a result, premium
25 revenue could decline more than claim costs.
- 26 2. Optional PAYD pricing could attract motorists with relatively high per-mile claim costs.
- 27 3. With optional PAYD pricing, motorists in multi-vehicle households could shift driving from
28 vehicles with PAYD premiums to those with unlimited-mileage premiums.
- 29 4. Total premiums would probably decline, assuming PAYD pricing is successful at reducing
30 claims. Although revenue reductions would be offset by reduced claim costs, this would
31 reduce investment income, which could reduce insurance company profits.
- 32 5. Some motorists may try odometer fraud to steal insurance. However, odometers are
33 increasingly tamper-resistant, and most types of fraud could be detected during annual audits
34 and crash investigations. Odometer auditing should provide data comparable in accuracy to that
35 used in other common commercial transactions.
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39
40 Offsetting these financial risks is the fact that a percentage reduction in mileage usually
41 provides a proportionally greater reduction in claims. Available evidence suggests that
42 each 1% reduction in mileage typically causes a 1.4-1.8% reduction in claims, making
43 insurers financially better off overall. This increases the net savings from PAYD pricing
44 and reduces the financial risks to insurers.

45
46 Legitimate concerns can be addressed by implementing PAYD pricing pilot projects to
47 obtain information on feasibility, costs, consumer demand, travel impacts, crashes, and
48 revenue impacts. These could start small, and if no major problems are encountered they
49 could expand until all motorists are offered PAYD pricing.
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