

1005 N. GLEBE ROAD, ARLINGTON, VA 22201 (703) 247-1500

The basic concept of various pay-at-the-pump proposals is that part of the mandatory component of automobile insurance liability premiums would be collected as an additional fee along with each gallon of gasoline. This idea has attracted some support because it appears to be simple and fair, and it could produce environmental benefits because higher gasoline prices would reduce vehicle mileage.

Every motorist buys gasoline, proponents of pay-at-the-pump point out. Motorists who buy the most gasoline are presumed to drive the most and, therefore, to be at the greatest risk of a crash. These are the motorists who would pay the most for insurance under pay-at-thepump plans, so it's fair. Right? In fact, no. The problem is that, contrary to the claims of its advocates, pay-at-the-pump insurance wouldn't improve on present insurance systems. It's basically unfair and could have the unintended effect of compromising safety.

Insurance Risk Factors

The underlying principle of insurance is that the premiums collected should relate to expected losses. Members of groups whose losses are expected to be highest should pay the highest premiums and vice versa. Current insurance systems use various factors — for example age, sex, marital status, driving record, vehicle type, geographic location, and the amount and type of driving self-reported by motorists — to identify relatively homogenous risk groups.

But advocates of pay-at-the-pump contend that this system essentially overlooks what should be an important determinant of insurance expense — total miles traveled. They would make this a more important factor by decreeing that, the more gasoline people buy, the more their insurance would cost. The idea is that drivers with greater exposure in terms of miles traveled have correspondingly higher risk of getting into crashes.

But it isn't even true that people who buy the most gasoline necessarily drive the most miles. Motorcyclists, for example, can travel many more miles on less gasoline than drivers of cars and other vehicles. Furthermore, the number of miles traveled doesn't necessarily predict insurance losses. Other risk factors are much more important. Factors such as age, sex, driving record, type of vehicle, and traffic density are much better predictors of insurance losses than miles traveled. It's only when these more important risk factors are equal that drivers with greater exposure in terms of miles traveled have a correspondingly greater opportunity to be in a crash. Some pay-at-the-pump proposals, which recognize there are more important risk factors than either gasoline consumption or miles traveled, have been modified to add surcharges and credits to account for these other important factors. But then the initially simple (and in-valid) pay-at-the-pump concept turns into a burdensome bureaucratic monstrosity.

Road Type: Miles traveled by themselves aren't so important largely because not all miles are the same in terms of crash risk, let alone insurance risk. Road type counts much more. For example, California data show that crash risk per mile driven is almost three times higher on nonfreeways than on freeways.¹ Whether the road is rural or urban counts, too. It influences whether injuries or only property damage is likely to occur in a crash and, if there are injuries, how severe they'll be. Fatal crash rates are higher in rural areas where speeds are faster. Insurance claims, however, are dominated by the relatively minor crashes and the soft tissue injury claims they often generate, and these crashes occur more frequently in urban areas. Where you drive is thus a more important indicator of risk than how far you drive.

Vehicle Density: The Highway Loss Data Institute (HLDI) is a nonprofit organization that collects and analyzes information on the insurance losses of various makes and models of motor vehicles. Data analyzed by HLDI consistently show that insurance losses for both injuries and vehicle damage are substantially higher for vehicles garaged in high-density — that is, urban — areas.² Yet these vehicles travel, on average, fewer miles annually than vehicles garaged in rural areas.

A HLDI study of injury and collision damage patterns in 12 large metropolitan areas also shows strong relationships between vehicle density and insurance losses. Cars garaged in central cities generate substantially more injury claims than cars in suburban locations.³ Insurance risk is thus higher for cars garaged in urban areas, even though fewer miles are driven in such cars.

¹ Janke, M.K. 1991. Accidents, mileage, and the exaggeration of risk. Accident Analysis and Prevention 23:183-88.

² Highway Loss Data Institute. 1993. Insurance special report: insurance losses by vehicle density, 1990-92 models (A-40). Arlington, VA: Highway Loss Data Institute.

³ Highway Loss Data Institute. 1995. Insurance special report: attas of insurance injury and collision losses in large metropolitan areas (A-46). Arlington, VA: Highway Loss Data Institute.

According to the 1990 Nationwide Personal Transportation Survey, the average miles traveled per driver was 9,027 miles in urban areas, 10,645 miles in suburban areas, and 12,027 miles in rural areas. Yet insurance liability premiums are highest in urban areas where drivers pile up the fewest miles. For example, in central Los Angeles a minimum liability policy would cost an adult driver with a clean record almost six times more than a similar driver in Eureka, California.

Look at it this way: A suburban family has two cars with the same gas mileage. One car is used for daily commuting, and the other is used for suburban trips to stores, school, soccer practice, etc. Even if the mileage of the second car is greater, its expected risk of generating an insurance claim is lower than that of the car used for commuting. Liability premiums under current insurance systems reflect this, but pay-at-the-pump plans would mean higher insurance expenses for the car with the lower risk.

Adverse Safety Consequences

Another important concern is the adverse safety consequences that could result from payat-the-pump which would, in effect, reward with lower insurance expenses the owners of vehicles that get the most miles per gallon. This would encourage people to buy and/or maximize their use of smaller, more fuel-efficient — but less safe — vehicles. Lower income rural residents who put lots of miles on their vehicles and already face higher risk of dying in crashes, compared with urban residents, would be most likely to make such shifts.

Studies conducted since the late 1950s have shown very strong relationships between vehicle size and occupant deaths and serious injuries (see attached bibliography). These studies were conducted by a wide range of organizations including the U.S. Department of Transportation, the University of Michigan's Highway Safety Research Institute, the University of North Carolina's Highway Safety Research Center, Harvard University, the Brookings Institution, the New York State Department of Motor Vehicles, and the Insurance Institute for Highway Safety. All have this finding in common: Small cars are less safe than big cars. HLDI data also show that small cars have far worse insurance claims experience than large cars.⁴ Yet adopting pay-at-the-pump would mean far lower insurance costs for small cars

⁴ Highway Loss Data Institute. 1992. Insurance special report: trends in injury and collision losses by car size, 1979-89 model passenger cars. (A-39). Arlington, VA: Highway Loss Data Institute.

than for larger ones. And motorcycles, which are by far the least safe vehicles on the road,⁵ would generate the smallest insurance payments per mile driven under pay-at-the-pump.

Border Effects

Insurance is regulated at the state level, and minimum mandatory requirements can and do vary from state to state. Some states require only limited liability coverage, others require more extensive coverage, and some require no-fault insurance. Some states don't require any minimum insurance coverage at all but, instead, require uninsured motorists to post a bond. Thus, base premiums for minimum mandatory coverages vary substantially from state to state. Under pay-at-the-pump, this would lead to substantial differences in the amount collected at the pump — differences that would encourage motorists in some states to cross into other states to buy cheaper gasoline. This would lead to increased travel and, in states with higher insurance premiums, consumers who live too far from borders to cross for gasoline would have to pay even more for their fuel to make up the shortfall because of those who do cross borders to buy less expensive gasoline.

Uninsured Motorists

One of the supposed benefits of pay-at-the-pump is that motorists who currently are uninsured would pay for at least part of their coverage. According to this argument, insured motorists wouldn't have to bear the burden of the uninsured ones, as they do under present systems. But there's a major flaw because the overall impact of uninsured motorists on existing insurance premiums is relatively modest. Plus, the effect of uninsured motorist coverage varies widely throughout the country and within individual states. This problem is typically greater in urban than in rural areas,⁶ though rural motorists would pay the bigger insurance premiums at the pump. In largely urban New Jersey, for example, one insurer's semiannual rate in 1993 for basic uninsured motorist coverage was \$31.60. In Kansas, the comparable premium for uninsured motorist coverage was only \$6.80. What this means is that rural residents with little exposure to uninsured motorists would pay disproportionately more for insurance, because of their higher mileage, compared with urban residents who live and drive where the uninsured motorist problem is greater.

⁵ Insurance Institute for Highway Safety. 1994. Fatality facts: motorcycles. Arlington, VA: Insurance Institute for Highway Safety.

⁶ Insurance Research Council. 1989. Uninsured motorists. Wheaton, IL: Insurance Research Council.

Another Drawback of Pay-at-the-Pump

Most shortcomings of pay-at-the-pump involve equity issues or issues related to occupant safety. There are more shortcomings, including the addition of new state bureaucracies to collect and distribute the insurance component of pay-at-the-pump fees. California's Department of Motor Vehicles estimated in 1993 that provisions of a proposed pay-at-the-pump law in that state would cost \$74 million for personnel and equipment without offsetting savings in insurance companies' overhead. In fact, overhead would probably increase.

Conclusion: Abandon Pay-at-the-Pump

A number of fundamental problems plague the concept of pay-at-the-pump insurance including the fact that rural residents, who drive more miles than urban residents but are lower risk when it comes to automobile insurance, would pay bigger premiums than higher risk urban residents. Plus, high-insurance-risk vehicles like small cars and motorcycles would cost less to insure than larger but lower risk vehicles.

Pay-at-the-pump could also encourage a shift toward smaller, lighter vehicles to save on gasoline costs. People in rural areas are most likely to be affected by this — because they drive the most miles, they would be the most likely to switch to smaller vehicles, which would increase their already higher risk of injury or death in a crash.

It makes no sense to adopt major insurance reform to address environmental issues unless the reform first makes sense from an insurance perspective — and pay-at-the-pump doesn't make sense. It cannot be modified to rectify its deficiencies, and the concept should be abandoned.

Attachment: Selected Studies on the Relationship Between Car Size/Weight and Safety

1958	Automotive Crash Injury Research. 1958. Some preliminary observa- tions on 'light' versus 'heavy' cars in accidents. New York, NY: Automo- tive Crash Injury Research of Cornell University.
1964	Kihlberg, J.K.; Narragon, E.A.; and Campbell, B.J. 1964. Automobile crash injury in relation to car size (Report VJ-1823-R11). Buffalo, NY: Automotive Crash Injury Research of Cornell University.
1969	New Jersey Highway Authority. 1969. Compact car accident study: Gar- den State Parkway, 1969. Trenton, NJ: New Jersey Highway Authority.
1970	Campbell, B.J. 1970. Driver injury in automobile accidents involving cer- tain models. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
	U.S. Department of Transportation. 1970. Submission of information from the New York State Department of Motor Vehicles' vehicle safety design surveillance system. Hearing on Automotive Repair Industry, Part Four, 1576. Washington, DC: U.S. Senate Committee on the Judi- ciary, Subcommittee on Antitrust and Monopoly.
1972	Milic, P.I. 1972. An analysis of accidents in New York State by make of vehicle (DOT HS 800 735). Albany, NY: New York State Department of Motor Vehicles.
1973	Campbell, B.J. and Reinfurt, D.W. 1973. Relationship between driver crash injury and passenger car weight. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
	New York State Department of Motor Vehicles. 1973. Two car collision study (DOT HS 800 977). Albany, NY: New York State Department of Motor Vehicles.
	O'Day, J.; Golomb, H.; and Cooley, P. 1973. Statistical description of large and small car involvement in accidents. Proceedings of the Automotive Safety Engineering Seminar. Warren, MI: General Motors Corporation.
1974	Campbell, B.J. 1974. Driver injury in automobile accidents involving cer- tain car models: an update. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
	Campbell, B.J.; O'Neill, B.; and Tingley, B. 1974. Comparative injuries to belted and unbelted drivers of subcompact, compact, intermediate, and standard cars. Proceedings of the Third International Congress on Auto-

.

1974 (cont'd) motive Safety I (DOT HS 801 480). Washington, DC: National Highway Traffic Safety Administration.

Marumo, N.; Aya, N.; Takahashi, K.; and Nousho, H. 1974. Compatibility between different-sized vehicles on crash survivability. Proceedings of the Third International Congress on Automotive Safety I (DOT HS 801 480). Washington, DC: National Highway Traffic Safety Administration.

Mela, D.F. 1974. How safe can we be in small cars? Proceedings of the Third International Congress on Automotive Safety II (DOT HS 801 481). Washington, DC: National Highway Traffic Safety Administration.

Negri, D.B. and Riley, R.K. 1974. Two car collision study II (DOT HS 245 478). Albany, NY: New York State Department of Motor Vehicles.

Scott, B.Y. 1974. A safety comparison of compact and full size automobiles. Proceedings of the Third International Congress on Automotive Safety I (DOT HS 801 480). Washington, DC: National Highway Traffic Safety Administration.

Mela, D.F. 1975. A statistical relation between car weight and injuries (DOT HS 801 629). Washington, DC: National Highway Traffic Safety Administration.

O'Day, J. and Kaplan, R. 1975. How much safer are you in a large car? SAE Technical Paper 750116. Warrendale, PA: Society of Automotive Engineers.

O'Neill, B.; Joksch, H.; and Haddon, W. Jr. 1975. Relationships between car size, weight, and crash injuries in car-to-car crashes. Proceedings of the Third International Congress on Automotive Safety I (DOT HS 801 480). Washington, DC: National Highway Traffic Safety Administration. Reprint: Empirical relationships between car size, weight, and crash injuries in car-to-car crashes. Report on the Fifth International Technical Conference on Experimental Safety Vehicles, 362-68. Washington, DC: National Highway Traffic Safety Administration.

Preston, F. 1975. Interactions of occupant age, vehicle weight, and the probability of dying in a two-vehicle crash. HIT Lab Reports 5:12. Ann Arbor, MI: University of Michigan Highway Safety Research Institute.

Scott, B.Y. 1975. Large and small car accident performance: a large scale accident database analysis. SAE Technical Paper 750113. War-rendale, PA: Society of Automotive Engineers.

Insurance Institute for Highway Safety 1005 North Glebe Road, Arlington, VA 22201 July 1995 Attachment-2

1975

1976	Highway Loss Data Institute. 1976 Insurance injury report: passenger cars, vans, pickups, and utility vehicles (annual statistical report on insurance injury losses). Arlington, VA: Highway Loss Data Institute.
	Robertson, L.S. and Baker, S.P. 1976. Motor vehicle sizes in 1,440 fatal crashes. Accident Analysis and Prevention 8:167-75.
1977	Dutt, A.K. and Reinfurt, D.W. 1977. Accident involvement and crash in- jury rates by make, model, and year of car. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
	Dutt, A.K. and Reinfurt, D.W. 1977. Accident involvement and crash in- jury rates by make, model, and year of car: a follow-up. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
	Hutchinson, T.P. 1977. Intra-accident correlations of driver injury and their application to the effect of mass ratio on injury severity. Accident Analysis and Prevention 9:217-27.
	O'Neill, B.; Ginsburg, M.; and Robertson, L. 1977. Effects of vehicle size on passenger car occupant death rates. SAE Technical Paper 770808. Warrendale, PA: Society of Automotive Engineers.
1978	Carlson, W.L. 1978. Crash injury and vehicle size mix. Proceedings of the 22nd Conference of the American Association for Automotive Medicine. Morton Grove, IL: American Association for Automotive Medicine.
	Stewart, J.R. and Stutts, J.C. 1978. A categorical analysis of the rela- tionship between vehicle weight and driver injury in automobile acci- dents (DOT HS 803 892). Washington, DC: National Highway Traffic Safety Administration.
1980	Zaremba, L.A. 1980. Injuries to unrestrained occupants in small car- small car and large car-large car head-on collisions. Accident Analysis and Prevention 12:11-29.
1981	Highway Loss Data Institute. 1981. Automobile insurance losses, per- sonal injury protection coverage: the effects of car size on crash losses, 1977-80 models (A-13). Arlington, VA: Highway Loss Data Institute.
	U.S. Department of Transportation. 1981. Small car safety in the 1980s (DOT HS 805 729). Washington, DC: National Highway Traffic Safety Administration.

Insurance Institute for Highway Safety 1005 North Glebe Road, Arlington, VA 22201 July 1995

Attachment-3

1982	Chi, G.Y.H.; Reinfurt, D.W.; Britton, C.V.; Leung, A.Y.; and Fischer, W.C. 1982. Driver injury in accidents involving certain vehicle subgroups classified by make/model and model year, make/model, and market size. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
	Evans, L. 1982. Car mass and likelihood of occupant fatality. SAE Technical Paper 820807. Warrendale, PA: Society of Automotive Engineers.
	The Folksam Traffic Safety Group. 1982. Safety development for private cars, a study of injuries to persons in cars insured by Folksam. Stockholm, Sweden: The Folksam Traffic Safety Group.
	Grime, G. and Hutchinson, T.P. 1982. The influence of vehicle weight on the risk of injury to drivers. Proceedings of the Ninth International Tech- nical Conference on Experimental Safety Vehicles, 726-41. Washington, DC: National Highway Traffic Safety Administration.
	Insurance Institute for Highway Safety. 1982. Car size, deaths linked; small imports found worst. Status Report 17:1. Arlington, VA: Insurance Institute for Highway Safety.
	Insurance Institute for Highway Safety. 1982. Small car deaths, injuries worst; models vary greatly. Status Report 17:20. Arlington, VA: Insurance Institute for Highway Safety.
1983	Gustafsson, H.; Nygren, A.; Olofsson, B.; and Tingvall, C. 1983. Safety standards in private cars: risk of injury in different models. Stockholm, Sweden: The Folksam Traffic Safety Group.
	Hedlund, J. 1983. The effects of vehicle size on occupant fatalities: a dis- cussion of the paper 'Handling, braking, and crash compatibility aspects of small, front-wheel drive vehicles' by W. Dreyer, B. Richter, and R. Zo- bel. National Center for Statistics and Analysis, Collected Technical Studies III (DOT HS 806 403). Washington, DC: National Highway Traf- fic Safety Administration.
1984	Evans, L. 1984. Driver fatalities versus car mass using a new exposure approach. Accident Analysis and Prevention 16:19-36.
	Evans, L. 1984. Fatality risk for belted drivers versus car mass (GMR-4781). Warren, MI: General Motors Research Laboratories.
	Gustafsson, H.; Nygren, A.; and Tingvall, C. 1984. Safe cars and dan- gerous cars. Stockholm, Sweden: The Folksam Traffic Safety Group.

.

1984 (conťd)	Joksch, H.C. and Thoren, S. 1984. Car size and occupant fatality risk adjusted for differences in drivers and driving conditions (Report 4308-754). Hartford, CT: Center for the Environment and Man.
	Jones, I.S. and Whitfield, R.A. 1984. The effects of restraint use and mass in "downsized" cars. SAE Technical Paper 840199. Warrendale, PA: Society of Automotive Engineers.
1985	Evans, L. 1985. Car size and safety: results from analyzing U.S. accident rate. Proceedings of the 10th International Technical Conference on Experimental Safety Vehicles, 548-60. Washington, DC: National Highway Traffic Safety Administration.
1987	Evans, L. and Wasielewski, P. 1987. Serious or fatal driver injury rate versus car mass in head-on crashes between cars of similar mass. Accident Analysis and Prevention 19:119-31.
	Insurance Institute for Highway Safety. 1987. Small passenger vehicles a problem. Status Report 22:2. Arlington, VA: Insurance Institute for Highway Safety.
1988	Partyka, S.C. 1988. Vehicle size: cars and trucks (DOT HS 807 294). Washington, DC: National Highway Traffic Safety Administration.
1989	Crandall, R.W. and Graham, J.D. 1989. The effect of fuel economy standards on auto safety. Journal of Law and Economics 32:97-118.
	Insurance Institute for Highway Safety. 1989. Occupant death rates by car series. Status Report 24:11. Arlington, VA: Insurance Institute for Highway Safety.
	Partyka, S.C. 1989. Car size: safety and trends (DOT HS 807 444). Washington, DC: National Highway Traffic Safety Administration.
	Partyka, S.C. and Boehly, W.A. 1989. Passenger car weight and injury severity in single-vehicle nonrollover crashes. Proceedings of the 12th International Technical Conference on Experimental Safety Vehicles. Washington, DC: National Highway Traffic Safety Administration.
1990	Kahane, C.J. 1990. Effect of car size on frequency and severity of roll- overs. Washington, DC: National Highway Traffic Safety Administration.
	Partyka, S.C. 1990. Differences in reported car weight, fatality and reg- istration data files. Accident Analysis and Prevention 22:161-66.

Insurance Institute for Highway Safety 1005 North Glebe Road, Arlington, VA 22201 July 1995

Attachment-5

1990 (cont'd) U.S. Department of Transportation. 1990. Effect of car size on fatality and injury risk in single-vehicle crashes. Washington, DC: National Highway Traffic Safety Administration.

Ernst, G.; Bruhning, E.; Glaeser, K.P., and Schmid, M.1991. Compatibility problems of small and large passenger cars in head-on collisions. Proceedings of the 13th International Technical Conference on Experimental Safety Vehicles. Washington, DC: National Highway Traffic Safety Administration.

Evans, L. and Frick, M.C. 1991. Driver fatality risk in two-car crashes: dependence on masses of driven and striking car. Proceedings of the 13th International Technical Conference on Experimental Safety Vehicles. Washington, DC: National Highway Traffic Safety Administration.

Insurance Institute for Highway Safety. 1991. Occupant death rates, 1984-88 model cars. Status Report 26:4. Arlington, VA: Insurance Institute for Highway Safety.

Kahane, C.J. 1991. Effect of car size on the frequency and severity of rollover crashes. Proceedings of the 13th International Technical Conference on Experimental Safety Vehicles. Washington, DC: National Highway Traffic Safety Administration.

Klein, T.M. 1991. A collection of recent analyses of vehicle weight and safety. Proceedings of the 13th International Technical Conference on Experimental Safety Vehicles. Washington, DC: National Highway Traffic Safety Administration.

National Highway Traffic Safety Administration. 1991. Effect of car size on fatality and injury risk. Washington, DC: National Highway Traffic Safety Administration.

Evans, L. and Frick, M.C. 1992. Car size or car mass: which has greater influence on fatality risk? American Journal of Public Health 82:1105-12.

Graham, J.D. 1992. The safety risks of proposed fuel economy legislation. Risk: Issues in Health and Safety 3:95-126.

Highway Loss Data Institute. 1992. Insurance special report: trends in injury and collision losses by car size: 1979-80 models (A-39). Arlington, VA: Highway Loss Data Institute.

Insurance Institute for Highway Safety 1005 North Glebe Road, Arlington, VA 22201 July 1995

Attachment-6

1992

1991

1992 (cont'd) National Research Council. 1992. Automotive fuel economy: how far should we go? Washington, DC: National Academy of Sciences.

Wood, D.P. and Mooney, S. 1992. The role of car size and aggressivity in relative collision safety. Proceedings of Safety Road in Europe (VTI 30A PT4). Linkoping, Sweden: Swedish Road and Traffic Research Institute.

1993 Evans, L. and Frick, M.C. 1993. Mass ratio and relative driver fatality risk in two-vehicle crashes. Accident Analysis And Prevention 25:213-24.

Robertson, L.S. 1993. Size, not mass, of car affects severity of injury in accidents. American Journal of Public Health 83:769-70.

Wood, D.P; Mooney, S.; Doody, M.; and Riordain, S.O. 1993. Influence of car crush behavior on frontal collision safety and car size effect. SAE Technical Paper 930893. Warrendale, PA: Society of Automotive Engineers.

Evans, L. 1994. Car size and safety: a review focused on identifying causative factors. Proceedings of the 14th International Technical Conference on the Enhanced Safety of Vehicles. Washington, DC: National Highway Traffic Safety Administration.

Evans, L. 1994. Driver injury and fatality risk in two-car crashes versus mass ratio inferred using Newtonian mechanics. Accident Analysis and Prevention 26:609-24.

Evans, L. and Frick, M.C. 1994. Car mass and fatality risk: has the relationship changed? American Journal of Public Health 84:33-37.

Insurance Institute for Highway Safety. 1994. Driver death rates by vehicle make and series. Status Report 29:11. Arlington, VA: Insurance Institute for Highway Safety.

Highway Loss Data Institute. 1994. Injury, collision, and theft losses by make and model (annual brochure comparing insurance losses of passenger vehicles by make and model). Arlington, VA: Highway Loss Data Institute.

Insurance Institute for Highway Safety. 1995. Passenger vehicles. IIHS Facts (annual fact sheets based on data from the U.S. Department of Transportation's Fatal Accident Reporting System). Arlington, VA: Insurance Institute for Highway Safety.

Insurance Institute for Highway Safety 1005 North Glebe Road, Arlington, VA 22201 July 1995

1994

1995