Car Insurance:
Is No-Fault the Answer?

Ryan C. Hayward
The College of New Jersey

I. Introduction

A brief examination of auto-insurance rates shows that some of the highest premiums paid in the country are concentrated in the tri-state area of New York, New Jersey, and Connecticut (Ohio Insurance Institute). The escalating costs of auto-insurance were a focus of the 1998 gubernatorial race in New Jersey. New Jersey Governor, Christine Whitman made lowering auto-insurance rates in the state of New Jersey a major focus of her campaign, stating that she would consider any proposal "that provides true relief to or motorists and reduces automobile insurance rates." Furthermore, as one *Insurance Advocate* correspondent has stated, 'she (Whitman) has pointed to choice auto-insurance (where the insured has the option of giving up the right to sue in return for lower rates) as the primary means of lowering the state's auto-insurance. This is the focus of her insurance reform plan, referred to by Donald Cleasby[1] (1997) as the "three C's" proposal of Choice, Competition, and Costs. Choice auto-insurance is a variation of a pure no-fault compensation system, which is believed by many to lower auto-insurance rates significantly.

This paper tests the claim that no-fault insurance lowers the overall premiums paid by motorists. It will compare the benefits and costs of the two legal regimes for auto-insurance that are in question: tort compensation and no-fault. In addition, it looks at several other factors that are argued by many to have a significant effect on the costs of auto-insurance. This paper will test the effect of these factors using cross-sectional data from the 48 continental states in the United States, along with a dummy variable for the type of compensation system in place in each state. These factors can be usefully divided into four categories: (1) Demographic factors, such as age, population density, and gender; (2) Economic factors, like the price of cars or per capita income; (3) Social factors, including alcohol use, crime rates and fraudulent claims; and (4) The Compensation System (tort or no-fault).

II. Background

The most common criteria automobile insurance companies use in setting automobile insurance premiums are demographic factors. Important demographic factors include: population and population density, age, marital status, average income (also an economic factor), zip codes, gender, and credit rating (also an economic factor). Weston (2000) cites Los Angeles, who's motorists pay some of the highest insurance in the state, as an example of how relative auto-insurance premiums are shown to be significantly higher in those geographic areas with higher population density. Two additional factors affecting premiums, which usually go hand-in-hand, are the age and/or experience of the driver. Mooney (1998) states that drivers under the age of 25, on average, pay significantly greater premiums than those drivers over the age of 25. This is most likely due to the significantly higher crash rates of drivers under the age of 25. Moreover, many insurance companies offer lower insurance rates to women, citing statistics showing lower accident frequency and fewer claims for women than for men. Both of these facts, however, can be due to other factors that can make the data appear misleading, such as accident rates (as a percentage), and miles driven. Barth (1998) found that marital status can also be a factor that can significantly lower ones auto-insurance premiums, evidenced by the many insurance companies that give a discount to married persons below the age of 25.

Recently in some states, insurance companies have been given permission from the government to use zip codes in setting auto-insurance premiums. Before this legislation was passed, drivers in rural areas felt that their premiums were too high and that their premiums helped to subsidize those of urban and suburban drivers. Weston (2000) believes that in these areas where zip codes are permitted to be used in writing insurance premiums, there will, most likely, be an increase in suburban and urban premiums with a decrease in those of rural drivers[2]. Lastly, many companies are beginning to

incorporate credit ratings in the setting of premiums, which has been widely debated everywhere. However, opponents question the relevance of credit ratings in writing auto-insurance, stating that it is not an accurate predictor of ones driving performance[3].

Another set of factors that can affect the amount an individual spends on his or her auto-insurance premiums are economic factors. Important economic factors include: average income (regionally), severity of claims, and the price of cars (Regan, 1998).

In prosperous economic periods, people tend to purchase more expensive automobiles, which will obviously cost more to insure. Furthermore, average income in a certain area can also be an indicator of how the economy is performing, and is found to have an effect on automobile purchases, and thus, affect auto-insurance rates.

Costs of medical care and lawyer fees also affect auto-insurance. As costs for medical care increase, so do auto-insurance premiums. In 1997, the number of reported accidents were down nationwide, but insurance rates still rose significantly. Dr. Robert Hartwig argues that this is due to the significant rise in medical costs nationwide. He estimated the pace of medical inflation to be up more than fifty percent since 1997 (Insurance Advocate, 12/00). The same logic holds true for lawyer fees, which are reported by Haire (1995) to make up from ten to thirty percent of every auto-insurance premium dollar spent in the country[4].

Related to the two factors above is the severity of the claims that are made, with regard to medical costs. The more severe an injury, the more expensive will be the medical costs and, thus, insurance rates will increase (Brock, 1996). Also, with more severe claims come more complicated lawsuits, leading to increased litigation costs, and higher premiums[5].

Another set of factors that can play a significant role in determining auto-insurance premiums are social factors. A few of the more important social factors are: crime rates (more specifically motor-vehicle theft rates), uninsured drivers, and alcohol use (per capita).

The first factor on this list is crime rates, which can have direct effect on the extent of the premiums paid on auto-insurance. Evidence is shown in urban auto-insurance rates, which are typically higher than rural rates, possibly due to the higher crime rates in these urban areas. Furthermore, it is argued by many that motor vehicle theft rates have a direct affect auto-insurance premiums. Another social factor is the alcohol use per capita for a specific region. Cummins (1999) found that areas with high alcohol use per capita often have higher accident rates and consequently, have higher auto-insurance premiums.

Lastly, the percentage of uninsured drivers in a state can have a significant effect on average auto-insurance rates. In California, for example, estimations for the percentage of uninsured drivers are as high as 25% in some areas, and even higher in others. This is shown in the premiums paid by California drivers, which are amongst the highest in the country (McCracken, 1998).

The last factor that we will discuss in this paper that can play a significant role in determining auto-insurance premiums is the compensation system. The two alternative compensation systems that we will explore are tort and no-fault.

Currently, there are two systems in place as far as compensation is concerned: tort and no-fault. A tort system provides a way in which the courts assign negligence or blame to a person (the "tortfeasor"). Black's Law Dictionary defines a tort as "a private or civil wrong or injury, including action for bad faith breach of contract, for which the court will provide a remedy in the form of an action for damages…" Furthermore, a tortfeasor is held responsible only if he or she is determined by the court to have caused the injury or damage and was guilty of wrongdoing or fault, unless a form of

strict or absolute liability applies. Under the tort system of compensation, fault must be determined in the case of an accident, and the insurance of the person at fault will cover the damages of both parties. Under this system, opposed to no-fault, parties are allowed to file tort lawsuits to recover non-economic losses.

With a no-fault approach, the emphasis is shifted from liability-based compensation, to compensation without regard to fault. This would prohibit tort litigation in almost all circumstances regardless of the extent of bodily injury, except in extreme displays of gross negligence, like excessive speeding or driving under the influence. Nordman (1997) argues that under a no-fault compensation system there would be a significantly lower number of tort cases in the courts, and the amount of money that accounts for litigation fees in the average auto-insurance premium would fall, which would lead to overall reductions in premium costs.

III. The Data

In order to build a statistical model to try to determine which factors are significant in explaining auto-insurance premiums we had to collect data on a number of variables. The dependent variable in each regression is average auto-insurance for 1997 across the continental United States. The source for this information was the website for the Ohio Insurance Institute. The independent variables gathered are for 1996.

The data for compensation type (tort or no-fault) was also provided by the Ohio Insurance Institute. In the statistical models, this data shows up as an independent dummy variable (1 for tort, 0 for no-fault).

The data for the uninsured motorist estimate was gathered at the Insurance Research Council (IRC) website. The IRC used claims from the National Association of Independent Insurers, Insurance Services Office, National Independent Statistical Service, and many individual state departments of insurance to make an estimate of uninsured drivers in the U.S. in 1996. The estimate used accident data from 1995 and 1996[6].

Official data for motor vehicle thefts in the U.S. for 1996 was taken from the Federal Bureau of Investigation's website. The rate was measured per 100,000 total population in each of the respective states.

The U.S. is per-capita alcohol consumption for 1996 is from the government's website for the National Institute of Health. To measure the per-capita alcohol consumption, we use gallons of ethanol sold in each state per person. It includes alcohol consumption across a series of alcoholic beverages.

The remainder of the data was gathered from the 1996 Federal Highway Administration: Highway Statistics book for 1996, published by the United States Department of Transportation. These factors are the percentage of total drivers that are female, per capita income, population density[7], urbanization rate[8], fatality rate[9], and the percentage of total drivers that are younger than 25.

IV. Analysis and Results

a. Overview

After analyzing numerous models and the individual variables within them, we concluded that the coefficients that we would use to try to explain the average auto-insurance by state would be percentage of total drivers that are female, percentage of total drivers younger than 25, compensation

type, per capita alcohol use, uninsured drivers, population density, motor vehicle theft rate, and fatality rate. We estimated four different models using a combination of these eight variables. The first five of the variables are common to all of the models.

b. The Models

Because the motor-vehicle theft rate, drivers under 25, and the fatality rate are highly correlated with population density, the first model that is in Table 2 is estimated using a Two-Stage Least Squares method, and encompasses all eight variables. This is the best model with an adjusted R-squared of .69 and a F-statistic of 14.08 ($p<.0001$).

In the next model [AVGINS(2)], motor vehicle theft rate and fatality rate are dropped, while all of the other variables remain. However, drivers under 25 was found to be correlated with population density, and like the first model, was estimated using a Two-Stage Least Squares method. In the third model [AVGINS(3)], population density is dropped and motor vehicle theft rate is added. In the last model [AVGINS(4)], motor vehicle theft rate is dropped and fatality rate is added.

Based on these results, we may draw a series of conclusions. First, Nordman (1997) argues that a no-fault auto-insurance regime will ultimately lower the average insurance rates in the states where it is implemented. However, in the first model, we find that compensation type has a significant negative effect on auto-insurance rates. Furthermore, in two of the other three models, the dummy variable used was significant (at or above the .1 level). This suggests that instituting no-fault raises average annual rates by about fifty dollars. Therefore, it can be concluded by this study, that having a no-fault compensation system in place does not reduce insurance rates. These results could be due to the many different forms of no-fault currently in place in the U.S., and the differing thresholds in place

in each state. Further studies on the effects of no-fault on auto-insurance will examine and account for the many different types of no-fault in place in each state in the U.S.

Second, consistent with Pullman (2000), population density is a significant factor in determining auto-insurance rates in the U.S. It is highly significant in both models (at the .01 level), and supports the claim that auto-insurance rates increase in states with higher population densities. Average insurance rise by about forty cents as the population density rises by one person per square mile. Furthermore, the motor vehicle theft rate (residual), is significant in both models (at the .01 level), and supports claims made by many that insurance rates are driven higher in areas with high motor vehicle theft rates. A one-unit increase in the theft rate (thefts per 100,000 population) increases insurance rates by about thirty cents.

Third, we found that the percentage of total drivers that are female is significant (at the .1 level). Controlling for the theft rate (residual) and the fatality rate (residual), a one-unit increase in the percentage of drivers that are female lowers the average insurance rates by about twenty dollars. This is consistent with the fact that most insurance companies charge lower rates to women than to men.

Fourth, we found no evidence that auto-insurance rates are higher in states with higher per capita alcohol use. In all models tested, as expected, the estimated coefficient was positive, however, none of the models showed a significant effect on auto-insurance rates. More extensive data on actual drinking and driving frequency by state for 1996, which was unavailable, could be a more significant predictor, and will be incorporated in further studies on no-fault auto-insurance. Furthermore, we found no evidence that auto-insurance rates are higher in states with a higher percentage of uninsured motorists.

Fifth, controlling for population density, the fatality rate (residual) has a large impact on average insurance rates (significant at a .1 level). A one-unit increase in the fatality rate (fatal injuries per 1000) raises average insurance rates by about three hundred and twenty dollars.

Lastly, controlling for the theft rate and the fatality rate, the percentage of drivers under 25 has no effect on insurance rates. While Mooney (1998) argues that the percentage of drivers under 25 increases insurance rates, this is true only when we remove the theft rate or the fatality rate from the regression.

V. Conclusion

This study has examined the effects of several variables on the average auto-insurance rates for the 48 continental states in the Unites States. Its focus is on testing the widely accepted belief that a no-fault compensation system will drastically lower the average auto-insurance rates in each state. It uses the data from 1996 to explain auto-insurance rates in 1997, and tests the following independent variables: population density, percentage of female drivers, motor vehicle theft rate, fatality rate, per capita alcohol use, uninsured drivers, drivers under 25 and compensation type (dummy variable).

In conclusion, we found that having a no-fault auto-insurance regime in place will not lower average auto-insurance rates, and actually raises them by fifty dollars. We also found that population density, motor vehicle theft rate, and the fatality rate are all significant, and have a positive effect on auto-insurance rates. Conversely, we found that the percentage of drivers that are female is significant, and has a negative effect on auto-insurance rates. Lastly, per capita alcohol use, percentage of uninsured drivers, and total drivers under 25, were all found to be insignificant.

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TABLE 1

Variable Definitions

AVGINS	Average price of auto-insurance by state for 1997.
POPDENS	Total population per square mile for 1996.
FEMALE	Percentage of total drivers that are female for 1996.
MVTRATE	Total motor vehicle thefts per 100,000 for 1996.
UNIDRIV	Estimated percentage of uninsured drivers for 1996.
FATALRAT	Total number of auto-related fatally injured persons per 1000 for 1996.
PCALCUSE	Per capita ethanol consumption based the population age 15 and older for 1996.
COMPTYPE	Dummy variable indicating the type of compensation system in the state (1 if tort, 0 if no-fault) for 1996.
DRIVER25	Percentage of total drivers under the age of 25 for 1996.

TABLE 2

Regressions

Dependent Variable

	AVGINS(1)	**AVGINS(2)**	**AVGINS(3)**	**AVGINS(4)**
Coefficients:				
Constant	1706.051 (643.06)**	1578.37 (748.06)**	1026.62 (791.983)	1341.41 (911.96)
POPDENS	0.412 (.056)***	.422 (.066)***	------	------
FEMALE	-21.949 (12.689)*	-20.779 (14.76)	-2.74 (15.38)	-3.66 (17.8119.381)
MVTRATE	0.315 (.08)***	------	0.388 (.103)***	------
FATALRAT	322.607 (177.44)*	------	------	-109.48 (233.04)
PCALCUSE	39.676 (29.21)	38.661 (34.63)	18.12 (36.78)	16.52 (42.53)
UNIDRIV	1.731 (2.351)	7.12 (2.363)***	1.17 (2.86)	6.68 (3.07)**
DRIVER25	236.53 (780.182)	-275.336 (904.03)	-1894.59 (802.24)**	-2827.95 (943.13)***
COMPTYPE	-52.57 (31.26)*	-53.287 (37.05)	-100.87 (37.55)***	-108.10 (44.03)**
R^2	0.7428	0.6196	0.5625	0.4154
Adj-R^2	0.69	0.5639	0.4985	0.3298
F-value	14.08	11.13	8.79	4.86
Prob>F	<.0001	<.0001	<.0001	0.0008
n	48	48	48	48

Standard errors given in parentheses.
* = significant at .1 level, ** = significant at the .05 level, *** = significant at the .01 level.

NOTES

[1] Quoted in the Insurance Advocate article, "NAII: Whitman's Plan Needs Controls for Cost Drivers."

[2] Data on population density will be used to test claims that there are differences between the insurance rates of rural and urban areas.

[3] Data for credit ratings by state was unavailable, and thus, left out of this study. Further studies on no-fault will incorporate this data as it becomes available.

[4] Data for medical costs and lawyer fees by state was incomplete, and thus, left out of this study. Further studies on no-fault will include this data in the regression models.

[5] Data for severity of claims was unavailable. However, fatality rate is closely linked with severity of claims and acts as a proxy.

[6] Data for uninsured motorists is estimated by the Insurance Research Council.

[7] Total population per square mile.

[8] Percentage of total population living in an urban area.

[9] Fatally injured persons per 1,000 licensed drivers.