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Assessment of the Effect of No-Fault Insurance on Fatal and Injury Accident Rates

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Final Report

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16. Abstract

This study assesses the effects of no-fault insurance on fatal and injury accident rates. Past studies are reviewed and analyzed. A statistical model is developed which compares the change in fatal and injury accident rates of the 16 no-fault states with the remaining 34 states which use a tort liability system of automobile accident reimbursement. No-fault states are compared as a group with the tort states, and are then compared individually.

This study concludes that there is no evidence that no-fault insurance affects fatal and injury accident rates.

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PREFACE

The introduction of "no-fault" automobile insurance by sixteen states in the early 1970's has led some to question if accident rates have been affected by this change. We reviewed three past studies on this topic and found varying statistical methods and conflicting conclusions. We therefore saw a need for an updated statistical study on the effects of no-fault insurance on fatal and injury accident rates.

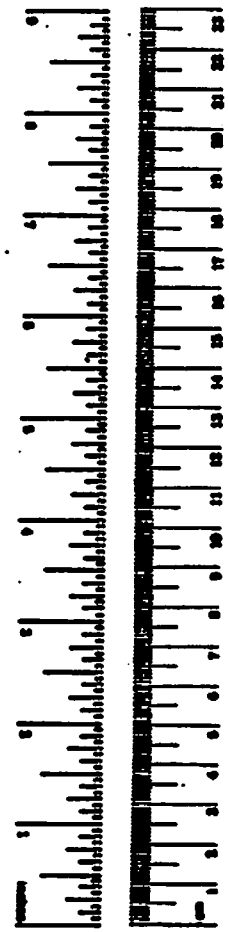
Many people have contributed to this study. The author gratefully acknowledges the contributions of Paul Hoxie, who directed the project, Peter Mengert, who aided in the development and execution of the statistical tests, and Simon Prensky and E. Donald Sussman, who added their valuable substantive and editorial review.

In addition, computer calculations were completed with a great deal of help from Alexander Blumenstiel and James Leavitt.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
	inches	2.5	centimeters	
	feet	30	centimeters	
	yards	0.9	meters	
	miles	1.6	kilometers	
	AREA			
	square inches	6.5	square centimeters	
	square feet	0.09	square meters	
	square yards	0.8	square meters	
	square miles	2.6	square kilometers	
	acres	0.4	hectares	
	MASS (weight)			
	ounces	28	grams	
	pounds	0.45	kilograms	
	short tons (2000 lb)	0.9	tonnes	
	VOLUME			
	teaspoons	5	milliliters	
	tablespoons	15	milliliters	
	fluid ounces	30	milliliters	
	cups	0.24	liters	
	pints	0.47	liters	
	quarts	0.95	liters	
	gallons	3.8	liters	
	cubic feet	0.03	cubic meters	
	cubic yards	0.76	cubic meters	
	TEMPERATURE (exact)			
	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
	millimeters	0.04	inches	
	centimeters	0.4	inches	
	meters	3.3	feet	
	meters	1.1	yards	
	kilometers	0.6	miles	
	AREA			
	square centimeters	0.16	square inches	
	square meters	1.2	square yards	
	square kilometers	0.4	square miles	
	hectares (10,000 m²)	2.5	acres	
	MASS (weight)			
	grams	0.035	ounces	
	kilograms	2.2	pounds	
	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
	milliliters	0.03	fluid ounces	
	liters	2.1	pints	
	liters	1.06	quarts	
	liters	0.26	gallons	
	cubic meters	35	cubic feet	
	cubic meters	1.3	cubic yards	
	TEMPERATURE (exact)			
	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	

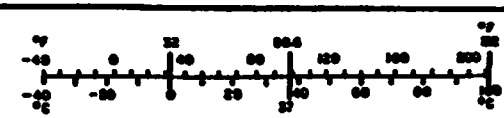


TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report uses a statistical approach which examines and compares the change in fatal and injury accident rates of the no-fault states with the tort states. Pre/post no-fault ratios are calculated for all states and used as a measure of the change in accident rates. The period from 1967 to 1981 is included for the sixteen states which have introduced no-fault insurance, and for the remaining thiry-four states with a system of tort liability reimbursement for motor vehicle accidents. One test compared the overall change in fatal and injury accident rates of the sixteen no-fault states with the overall change in rates for the thirty-four tort states. Using this test, an observed difference of greater than 7% to 8% would be statistically significant at the 95% confidence level. However, the measured differences of approximately 0.7 percent for the fatal accident pre/post ratio, and 1.5 percent for the injury accident pre/post ratio are not statistically significant.

A second test was conducted comparing the change in accident rates of **individual** no-fault states with the mean change in tort state accident rates. Only one state out of sixteen in the fatal accident test showed a pre/post ratio which is significantly different from the mean tort ratio, and only two no-fault states had a pre/post ratio which was significantly different from the mean ratio for the injury accident test. However, differences from the mean in the injury accident test were in opposite directions, which suggests that no-fault did not have a consistent effect on accident rates. In addition, several tort states in both the fatal and injury accident tests exhibited significant differences from the mean tort ratio, which clearly indicates that other influences affect the pre/post accident rates.

A group comparison which did not yield a significant difference, and individual findings which are inconclusive and contradictory, lead us to conclude that no-fault insurance has no measurable effect on fatal and injury accident rates.

1.0 Introduction:

The rapidly increasing administrative costs of tort liability reimbursement for motor vehicle accidents led some states in the early to mid-seventies to adopt a system of "no-fault" automobile insurance. In 1977, DOT studied the no-fault experience in the sixteen no-fault states, and concluded that no-fault systems were not only less costly to operate, but were more efficient in directing and paying benefits.

It has been postulated, however, that no-fault systems change drivers' perceptions of the financial risk involved in automobile accidents, and consequently alter driver behavior. Several arguments have been introduced to support this hypothesis. First, no-fault insurance offers greater financial reimbursement for the driver at-fault in motor vehicle accidents (under tort systems, drivers at-fault were penalized). This argument is especially applicable to single-vehicle accident situations since they involve only at-fault drivers. Second, no-fault insurance decreases tort liability by instituting a dollar limit under which suits are prohibited, and increased coverage by providing medical benefits where none had previously existed. Finally, driver behavior may be distorted because no-fault plans create the impression that insurance premiums are no longer a function of driver accident history. These arguments suggest that no-fault insurance reduces the financial penalties associated with accidents and might encourage riskier driving.

The purpose of this study is to determine if the existing fatal and injury accident data support the hypothesis that no-fault insurance significantly alters fatal and injury accident rates.

Several studies have been undertaken to determine the specific effects of no-fault insurance plans on state motor vehicle accident rates. The 1977 DOT study devoted a small section to the possible effects of no-fault on accident rates. DOT concluded that the introduction of no-fault insurance was not associated with a systematic trend in accident rates. In 1982, Elisabeth Landes, of Lexicon,

Inc., attempted to show, both theoretically and empirically, that no-fault increases accident rates. Given her assumptions of human behavior, and the variables that she believed significantly affected accident rates, she concluded that no-fault systems lead to higher accident rates. A re-examination of the Landes report was completed by the Insurance Institute for Highway Safety in June, 1983. The authors, Paul Zador and Adrian Lund, questioned the assumptions and the statistical methods used in the earlier Landes report. Using revised statistical methods, Zador and Lund concluded that Landes may have been incorrect in reporting that no-fault increases fatal and injury accident rates.

In this report, we use a statistical approach to examine the before and after accident experience of the sixteen no-fault states. This will then be compared with our best estimate of what would have happened to accident rates in these states had no-fault not been introduced - that is, the before and after accident experience of the 34 states that retained a system of tort liability reimbursement for motor vehicle accidents. The trend in accident rates will be calculated for all states over a period of years that covers the introduction of no-fault in the test states. No-fault accident rate trends that differ from the mean tort experience will be tested for statistical significance.

This report is organized into four sections:

- An introduction is presented;
- Previous studies are reviewed and analyzed;
- This report's approach is explained and findings are presented;
- Conclusions and recommendations are noted.

In addition, an appendix is included which contains the complete data sets used in this report.

2.0 Previous Studies:

In 1977, the U.S. Department of Transportation published a study which assessed the no-fault experience in the sixteen no-fault states. The report summarized the no-fault plans in each state, and analyzed no-fault insurance's performance according to a list of criteria. The DOT report was primarily concerned with whether no-fault was performing as expected; that is, if no-fault plans were more efficient than the alternative tort liability system. The study concluded, as mentioned previously, that no-fault was less costly to administer, and that it had improved the system of payments and had increased benefits where increases were needed. The impact of no-fault on accident rates was only one criterion that was analyzed. Although not a statistical study, fatal and injury accident rates were listed for the period from 1970 to 1975, and the report concluded that a systematic trend toward higher accident rates, after the introduction of no-fault by fifteen states, was not obvious in the data.

The 1982 Landes report attempted to show, both theoretically and empirically, that no-fault insurance plans increase accident rates. In her theory, she assumes that an individual's accident probability ($P_{ind.}$) is negatively related to the level of driving care taken by that individual ($C_{ind.}$), and the average level of driving care taken by all drivers (C_{all}). That is, $P_{ind.} = f(C_{ind.}, C_{all})$. Drivers will minimize a (negative) utility function that reflects the cost of driving carefully, their income, the expected cost of an accident, and the cost of insuring against those accidents. She concludes that since no-fault limits compensation for such damages as "pain and suffering", drivers will reduce their level of driving care and this will increase the probability and rate of accidents.

Empirically, Landes sets up a multiple regression model which analyzes the available accident data according to several variables which she believes affect accident rates. The overall effect of no fault on fatal accident rates included

the effects of:

- o The first year of the introduction of no-fault;
- o The average effect of all years of no-fault;
- o The degree of liability restriction (tort threshold);
- o The verbal threshold in the state of Michigan (a qualitative liability threshold);
- o The grand mean;
- o The specific state;
- o The specific year;
- o The population size for that state (for the specific year);
- o The population density per square mile of that state.

She concludes that no-fault increases accident rates, with states that have the highest tort threshold showing the greatest increase.

The Zador/Lund report is essentially a critique of the Landes paper. On a theoretical basis, they criticize some of Landes' assumptions. For example, Landes assumes, for simplicity, that an individual's accident probability "can be perfectly and costlessly monitored by all participants in the activity - drivers, the courts, and in this analysis, the insurance companies." Zador/Lund mention that the "costless information assumption" is no longer used by many economists, and that it appears wholly unrealistic in this study. In addition, Landes postulates that drivers will minimize a utility function according to several variables, but offers no reference or support of this postulate.

Landes' empirical testing is also criticized by Zador and Lund. Specifically, they state that many variables which may affect accident rates are left out of Landes' test, and that the actual statistical analysis was faulty. The variables not used in Landes' test, but which Zador/Lund state may also affect fatal accident rates include:

- o Changes in drinking age;
- o Legal changes such as motorcycle helmet laws;
- o Travel patterns;
- o Speed limits;

o Vehicle size and design.

In addition, they point out that, "Landes' procedure for estimating which levels of stringency led to significant increases in fatal crashes was invalid." Specifically, Landes estimated the effect (E) that tort liability restriction would have on fatal accident rates in each no-fault state from a single data set. They then mention that:

> "Since Landes had only one data set, the repeated estimates for E are not valid. Under the circumstances, statistical theory provides justification for making only a single least squares prediction on E; further predictions on E require more than one data set."

The Zador/Lund revised linear regression model shows that there is little evidence to support the hypothesis that no-fault significantly increases accident rates.

In summary, the 1977 DOT study, while not statistical, saw no obvious upward or systematic trend in accident rates after the introduction of no-fault by fifteen states during the period from 1970 to 1975. The Landes report uses a more sophisticated method to analyze the problem, and concludes that no-fault does increase accident rates. The Zador/Lund critique of the Landes paper points out some problems with Landes' method which seem to invalidate her conclusion. Using a revised multiple regression model, they find no significant relationship between no-fault insurance plans and accident rates. We will present a different approach to the problem. Instead of a multiple regression model that uses explicit controls, we will construct a statistical study which implicitly controls for the variables that affect accident rates. We will then compare the before and after accident experience of no-fault states with tort states.

3.0 Current Approach and Study:

The objective of this study is to determine if the introduction of no-fault insurance is associated with a detectable change in accident rates. Specifically, fatal and injury accident rates are observed for all states for a period of years

covering the introduction of no-fault in the sixteen test states. Trends in accident rates are measured for each state by calculating a pre/post no-fault ratio. A mean ratio is computed for the 34 tort liability states. The tort state mean ratio is then compared with each individual no-fault pre/post ratio. A no-fault mean difference from the mean of the tort states is calculated and judged for significance. The significance of difference from the mean tort state ratio isjudged with the use of a calculated standard deviation.

We summed fatal and injury accident rates per 100 million vehicle miles travelled (vmt) for each state for a period of years immediately prior to the introduction of no-fault insurance in the test state, and for the same period of years after no-fault took effect. The fatal accident data set was complete for the period 1967 - 1981. Thus a four year pre/post comparison was possible for Massachusetts, which introduced the first no-fault law in 1971. To be consistent, all the fatal accident ratios were calculated using the four years immediately before and after no-fault introduction. The actual year of introduction was not included in the analysis since it is not unambiguously either before or after.

Since injury data were not complete, the period of years summed before and after no-fault was adjusted to minimize the measure of standard deviation. The number of years before and after was decreased, as necessary, to maximize the number of states in each comparison. The larger the number of states, the smaller the measure of standard error. No-fault laws introduced in 1971 allowed a four year pre/post ratio. 1972 laws used three years before and after; 1973 laws used two years before and after; and 1974 through 1976 laws used one year before and after.

From the fatal or injury accident rates - before and after the introduction of no-fault - we calculated the pre/post ratios for the test states and for each tort state. A mean pre/post ratio for each year of no-fault introduction was calculated for all tort liability states (34 states were in this category) for the same period of years before and after as previously specified.

On Table 1, the sum of the no-fault state's differences from the mean of the tort states is divided by 16 (n) to yield the mean difference ($\overline{D}$) of -.00656. The standard deviation (σ_d) among the 16 states is computed using the equation: $\sigma = \sqrt{\Sigma(d-\overline{D})/n-1}$. The standard deviation of the mean ($\sigma_{\overline{D}}$) can then be computed by dividing by n. That is: $\sigma_{\overline{D}} = \sigma_d/\sqrt{n}$. This yields a $\sigma_{\overline{D}}$ of .03509. At the 95% confidence level, $\overline{D}$ would have to lie outside the interval -.07682 to +.06557 (for 33 degrees of freedom this is ±2.03 standard deviations from the calculated mean $\overline{D}$) to conclude that the mean no-fault pre/post fatal accident ratio is significantly different from the meantort fatal accident pre/post ratio. No-fault insurance would have to affect fatal accident rates by more than ±7% for this test to verify a significant effect of no-fault insurance with the available data.* At the 95% confidence level, we cannot distinguish $\overline{D}$ (-.00656) from zero. Based on these data we must conclude that no-fault insurance has no measurable effect on fatal accident rates.

Similar results are found in the injury accident data (see Table 2). At the 95% confidence level, $\overline{D}$ would have to lie outside the interval -.07108 to +.08627 (± 2.03 standard deviations from the calculated mean $\overline{D}$) to conclude that the mean no-fault pre/post injury accident ratio is significantly different from the mean tort injury accident ratio. No-fault insurance would have to affect injury accident rates by more than ±8% for this test to verify a significant effect of no-fault insurance with the available data. From Table 2, D is clearly within this interval, so we cannot distinguish $\overline{D}$ (+.01519) from zero.

*The seven percent difference is calculated as 2.03 standard errors in the estimate of the mean difference ($2.03\,\sigma_{\overline{D}}$ = .07122) divided by the mean tort state pre/post ratio. The mean tort state pre/post ratio varies between 1.159 and 1.364, depending on the year. Thus, a conservative estimate of this test's accuracy is .07122/1.159, or approximately 7%.

SUMMARY OF DATA ON PRE/POST NO-FAULT TESTS:

Table 1: Fatal Accident Rates (per 100 million vmt):

NO-FAULT STATE	YEAR OF NO-FAULT INTRODUCTION	PRE/POST RATIO	MEAN PRE/POST RATIO FOR TORT STATES	STANDARD DEVIATION	STATE'S DIFFERENCE FROM MEAN	NUMBER OF STANDARD DEVIATIONS AWAY
COLORADO	1974	1.264	1.321	.134	-.057	-.429
CONNECTICUT	1973	1.177	1.364	.128	-.187	-1.464
FLORIDA	1972	1.471	1.359	.106	.112	1.061
GEORGIA	1975	1.522	1.243	.131	.279	2.126
HAWAII	1974	1.061	1.321	.134	-.260	-1.942
KANSAS	1974	1.319	1.321	.134	-.003	-.020
KENTUCKY	1975	1.310	1.243	.131	.067	.511
MASSACHUSETTS	1971	1.110	1.320	.105	-.210	-1.994
MICHIGAN	1973	1.293	1.364	.128	-.071	-.560
MINNESOTA	1975	1.223	1.243	.131	-.020	-.151
NEVADA	1974	1.375	1.321	.134	.054	.400
NEW JERSEY	1973	1.387	1.364	.128	.023	.177
NEW YORK	1974	1.275	1.321	.134	-.046	-.347
NORTH DAKOTA	1976	1.333	1.159	.106	.174	1.645
PENNSYLVANIA	1975	1.195	1.243	.131	-.048	-.365
UTAH	1974	1.409	1.321	.134	.088	.657

$\overline{D} = -.00656$ $\sigma_d = .14034$

$\sigma_{\overline{D}} = .03509$ $2.03\sigma_{\overline{D}} = .07122$

95% Confidence Interval = -.07682 to +.06557

Table 2: Injury Accident Rates (per 100 million vmt):

NO-FAULT STATE	YEAR OF NO-FAULT INTRODUCTION	PRE/POST RATIO	MEAN PRE/POST RATIO FOR TORT STATES	STANDARD DEVIATION	STATE'S DIFFERENCE FROM MEAN	NUMBER OF STANDARD DEVIATIONS AWAY
COLORADO	1974	1.034	1.030	.137	.003	.024
CONNECTICUT	1973	.946	1.065	.146	-.119	-.818
FLORIDA	1972	1.158	1.086	.171	.072	.422
GEORGIA	1975	.836	.997	.083	-.161	-1.935
HAWAII	1974	1.114	1.030	.137	.084	.614
KANSAS	1974	1.035	1.030	.137	.005	.034
KENTUCKY	1975	.727	.997	.083	-.270	-3.252
MASSACHUSETTS	1971	1.663	1.120	.193	.544	2.815
MICHIGAN	1973	1.110	1.065	.146	-.045	-.400
MINNESOTA	1975	1.041	.997	.083	.044	.536
NEVADA	1974	1.034	1.030	.137	.004	.030
NEW JERSEY	1973	1.012	1.065	.146	-.053	-.364
NEW YORK	1974	1.029	1.030	.137	-.001	-.007
NORTH DAKOTA	1976	1.033	1.008	.103	.025	.243
PENNSYLVANIA	1975	1.018	.997	.083	.021	.254
UTAH	1974	1.120	1.030	.137	.090	.658

$\overline{D} = +.01519$ $\sigma_d = .16999$

$\sigma_{\overline{D}} = .04250$ $2.03\sigma_{\overline{D}} = .08627$

95% Confidence Interval = -.07108 to +.10146

Subsequent to the analysis comparing the mean no-fault accident rate with the mean tort-state accident rate, a further analysis comparing each individual no-fault state with the mean of the tort states was also conducted. This comparison yields a larger measure of standard error (approximately ±10) than the group statistical test, but it is helpful in determing if accident rates have gone in opposing directions in the sixteen no-fault states. In this analysis, if no-fault insurance affects individual state fatal and injury accident rates by approximately ±20% (2.03 standard errors), the finding is statistically significant at the 95% confidence level.

For 33 degrees of freedom (34 tort states), findings greater than or equal to ±2.03 standard deviations from the mean of the tort states' ratio are significant at the 95% confidence level. (See Tables 1 and 2 for the pre/post ratios, the appropriate mean, differences from the mean, and the number of standard deviations away from the mean for each no-fault test state.) For these observations, 2.03 standard deviations are about 20% of the mean. Thus, if the introduction of no-fault insurance affected fatal accident rates by less than 20% in either direction, the effect could not be judged significant. It is important to note that fatal and injury accident rates, over the period being discussed (1967 - 1981), have generally declined in all states. Pre/post test ratios are therefore greater than one in most cases. States have varied, however, in the extent of the decline in accident rates. If no-fault insurance had a significant effect it could change the amount of decline, (i.e., a smaller drop in fatal and/or injury accident rates than the mean of the tort states over the period being discussed), but this would not necessarily register as an actual increase in accident rates.

The only no-fault state found to have a fatal accident pre/post ratio significantly different from the mean of the tort states was Georgia, at +2.126 standard deviations from the mean (see Table 1). During the four years immediately after the introduction of no-fault insurance in Georgia, fatal accident rates **declined significantly more** than the average. Two other states, Massachusetts and Hawaii, were found to have marginally significant differences from the mean ratio. They were -1.994 and -1.942 standard deviations from the mean,

respectively. Fatal accident rates declined less than average, and these findings were found to be of marginal significance. It is evident from Table 1 that the other no-fault states exhibit very small differences from the mean. For example, Kansas' pre/post ratio is almost exactly on the mean of the tort states' ratio.

One out of sixteen significant findings at the 95% confidence level (2-tailed test) would occur randomly 56% of the time. Therefore, pure chance could account for pre/post ratios significantly different from the mean of the tort states. Georgia's test ratio could have occurred by normal variation. In addition, six states with tort liability motor vehicle insurance show significant differences from the mean, which clearly demonstrates that factors other than no-fault insurance can cause substantial variation in the pre/post ratio. Some examples of these factors are individual state efforts, during the period being discussed, at reducing accident rates, and factors which occurred during this period which are only relevant to an individual state. It is also important to note that Georgia, Massachusetts, and Hawaii exhibited differences from the mean in opposing directions. Since all three are no-fault states, this information suggests that other, more powerful influences may be at work.

Injury accident tests showed similar results (see Table 2). Using a 2-tailed test, only Kentucky and Massachusetts have ratios which are significantly different from the mean. Once again, the significant findings suggest different directions for the effect of no-fault. The Kentucky injury accident rate declined significantly less than the average of the tort states, while the Massachusetts rate declined significantly more than the average. If no-fault is causing this variation, it has diametrically opposite influences in different states. It is interesting to note that fatal and injury accident rates have gone in different directions in Massachusetts, Georgia, and Kentucky, suggesting a fatal/injury trade-off. The other no-fault test states exhibit only minor variation from the mean. At a 95% confidence interval (2-tailed test), two out of sixteen significant findings would occur randomly 19% of the time. In addition, many tort states exhibit significant differences from the mean. The evidence suggests that factors other than the introduction of no-fault insurance are responsible for the Massachusetts and Kentucky pre/post ratios.

Some of the limitations of this study are evident. Since we combine all the tort states into one group, and do not explicitly account for other factors which influence accident rates, we compute a relatively large standard deviation (approximately ±10%). This makes small differences impossible to detect. No-fault may have an effect on accident rates, but it is not large enough for this study to verify. In addition, any event which individually affects a no-fault state will show up as a difference from the mean of the tort states. This may or may not be the result of no-fault, because there are other factors which influence state accident rates and are not controlled in this study. Some examples of these factors are: changes in traffic enforcement patterns; changes in state motor vehicle safety efforts (e.g., new safety campaigns); and changes in state laws that would affect accident rates (e.g., drinking age). It is important to point out that this study tends to control for any event which would affect accident rates throughout the country (e.g., the introduction of the nationwide 55 mile per hour speed limit). Pre/post accident ratios would be affected similarly in the test states and the mean of the tort states. In addition, use of the pre/post ratio eliminates much of the effect of normal state to state variation on the measure of mean and standard deviation. Factors which are peculiar to an individual state, but do not change over the period being discussed, are represented in the numerator and the denominator of the pre/post ratio.

4.0 Conclusions:

The data do not support the hypotheses that no-fault insurance influences fatal and injury accident rates. Calculated differences from the mean do not vary systematically in one direction, and no-fault states with pre/post ratios significantly different from the mean tort ratio are too few to justify the conclusion that no-fault influences individual state accident rates. The data suggest that the few statistically significant findings are the result of statistical noise or factors unrelated to no-fault insurance. A group comparison, which yields a much smaller measure of standard error, indicates that there is no significant difference between the pre/post ratios of the group of no-fault states and the group of tort states. This test can verify differences of 7-8% as

statistically significant findings. We conclude that if no-fault insurance has an effect on fatal and injury accident rates, it is less than 7%. Since the effect is so small it is impossible to distinguish the effects of no-fault insurance from the effects of other influences.

5.0 Appendix

Data for fatal and injury accident rates for the 50 states were obtained from an annual United States Department of Transportation publication "Fatal and Injury Accident Rates," published under the auspices of the Federal Highway Administration, Office of Highway Planning. Consistently reported data were available for 1967 to 1981. The fatal and injury accident rates reported in these publications were calculated for each state per 100 million vehicle miles travelled (vmt). Fatal accident rate data were complete for all years and states. Injury accident rate data were generally available. There were occasional non-reported rates, but this is of minor significance to this report. (Note that years of missing injury data were marked with a -1, and negative rates for no-fault states mark the year no-fault was introduced.)

Table 3: Complete Fatal Accident Data Set:

NO-FAULT STATES	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
COLORADO	4.6	5.17	4.56	4.45	4.06	3.98	3.56	-3.33	3.12	3.14	3.33	3.11	3.14	2.79	3.02
CONNECTICUT	2.86	2.58	2.38	2.43	2.45	2.37	-2.55	2.04	2.01	1.97	2.16	2.26	2.61	2.64	2.47
FLORIDA	4.72	5.07	4.97	4.57	4.25	-3.95	3.9	3.2	2.99	2.73	2.76	2.92	3.17	3.19	3.64
GEORGIA	5.45	5.45	5.31	5.07	4.77	4.74	4.51	3.79	-3.04	2.77	2.95	2.94	3.04	3.11	2.8
HAWAII	4.3	4.51	3.76	3.99	3.58	3.35	2.93	-3.04	3.14	3.18	3.04	3.69	3.84	2.95	2.32
KANSAS	4.39	4.25	4.76	4.09	3.98	3.8	3.36	-2.91	2.84	2.87	2.92	2.92	2.58	2.93	2.92
KENTUCKY	5.26	4.98	4.82	4.51	4.1	4.12	3.98	2.97	-3.11	2.91	2.98	2.79	2.9	2.96	2.86
MASSACHUSETTS	3.48	3.53	3.21	3.18	-2.95	3.07	3.18	3.05	2.77	2.39	2.02	2.25	2.44	2.29	1.9
MICHIGAN	4.07	4.19	4.23	3.51	3.39	3.45	-3.33	2.96	2.77	2.8	2.75	2.72	2.56	2.52	2.3
MINNESOTA	4.32	4.25	4.03	3.65	3.6	3.47	3.49	2.98	-2.64	2.67	2.64	2.94	2.82	2.6	2.31
NEVADA	5.26	6.07	6.62	6.1	6.35	5.81	5.47	-4.46	4.35	3.93	4.27	4.71	5.14	4.95	3.96
NEW JERSEY	2.92	3.19	2.92	2.9	2.75	2.55	-2.49	2.18	1.98	1.89	1.97	2.02	2.09	1.98	2.03
NEW YORK	4.27	4.4	4.34	4.11	4.04	3.92	4.12	-3.68	3.4	3.12	3.11	3.07	2.78	3.05	2.88
NORTH DAKOTA	4.67	4.42	4.13	3.74	4.6	4.2	3.88	3.09	3.07	-3.16	3.12	2.86	2.18	2.52	2.86
PENNSYLVANIA	3.89	3.73	3.77	3.47	3.32	3.11	3.28	2.85	-2.94	2.56	2.57	2.58	2.8	2.63	2.54
UTAH	4.39	4.64	4.34	4.52	4.28	4.48	4.18	-2.74	3.08	2.67	3.42	3.22	2.93	2.69	2.99
FAULT STATES															
ALABAMA	6.11	6.41	5.95	5.34	5.74	5.54	5.18	3.41	3.28	3.2	3.47	3.37	3.02	2.91	2.99
ALASKA	4.81	7.38	5.38	5.48	3.81	3.4	3.93	3.63	3.59	3.88	4.42	4.06	3.21	2.96	3.4
ARIZONA	5.45	5.97	5.28	5.27	4.81	4.8	5.04	4.19	3.71	3.75	4.43	4.69	4.47	4.42	4.47
ARKANSAS	5.23	5.52	4.49	4.55	4.67	4.73	4.13	3.32	3.45	3.06	3.19	2.99	2.92	2.99	2.88
CALIFORNIA	4.06	3.98	3.96	3.66	3.35	3.5	3.33	2.78	2.83	2.85	2.96	2.9	3.09	3.16	2.92
DELAWARE	4.55	5.33	4.19	4.12	3.15	3.45	3.22	2.91	3.01	2.88	2.65	2.67	2.71	3.19	2.31
IDAHO	5.79	5.89	6.32	5.82	5.52	5.65	5.11	4.97	4.05	3.69	4.17	3.64	3.77	4.12	3.67
ILLINOIS	4.22	4.01	3.92	3.65	3.52	3.26	3.36	2.98	3.05	2.82	2.85	2.88	2.77	2.72	2.49
INDIANA	4.82	4.65	4.62	4.1	3.95	3.64	3.44	2.85	2.63	2.73	2.63	2.69	2.86	2.69	2.54
IOWA	5.01	5.21	4.14	4.13	3.61	3.76	3.48	3.06	2.94	3.21	2.66	2.89	2.99	2.85	2.77
LOUISIANA	6.59	6.36	5.04	5.55	5.46	4.95	4.9	3.91	3.99	3.89	3.98	4.21	4.43	4.24	4.43
MAINE	4.21	3.57	3.96	3.81	3.57	3.3	3.22	2.86	2.95	2.68	2.57	2.63	2.73	3.13	2.54
MARYLAND	3.97	4.02	3.6	3.5	3.22	3.01	2.82	2.77	2.46	2.29	2.25	2.36	2.26	2.45	2.41
MISSISSIPPI	7.48	6.08	6.24	6.14	6.27	5.64	5.51	3.95	3.66	3.73	3.62	3.98	3.68	3.67	3.74
MISSOURI	4.59	5.02	4.9	4.82	4.39	4.26	3.93	3.06	3	3.2	3.1	3.06	2.87	3.01	2.63
MONTANA	6.37	5.86	6.33	5.18	5.41	5.83	4.8	4.22	4.33	4.06	3.87	3.33	4.1	4.17	4.13
NEBRASKA	4.19	4.14	3.9	3.48	3.94	3.75	3.34	3	2.88	2.84	2.42	2.39	2.4	2.99	2.79
NEW HAMPSHIRE	3.75	4.1	4.11	3.81	3.66	3.07	2.43	2.82	2.61	2.63	2.31	2.36	2.5	2.72	1.99
NEW MEXICO	6.11	6.24	6.68	6.34	5.59	5.51	5.58	4.68	4.83	4.4	5.15	5.04	5.01	4.62	4.18
NORTH CAROLINA	6.02	6.06	5.5	5.13	5.02	5.06	4.45	3.95	3.71	3.4	3.13	3.17	3.21	3.21	3.17
OHIO	4.41	4.19	4.27	3.96	3.36	3.38	3.22	2.74	2.55	2.54	2.38	2.5	2.75	2.51	2.19
OKLAHOMA	4.76	4.16	4.42	3.82	4.46	3.6	3.15	3.05	2.89	2.85	2.87	2.9	2.78	2.99	2.98
OREGON	4.8	4.55	4.78	4.34	4.26	4.25	3.49	3.93	3.19	3.31	3.25	3.22	3.05	3.06	2.9
RHODE ISLAND	2.31	3.1	2.6	2.8	2.34	2.07	2.21	1.68	1.8	1.98	2.01	1.69	1.78	2.18	1.96
SOUTH CAROLINA	5.68	5.74	5.41	5.11	4.92	4.64	4.08	3.69	3.47	3.22	3.61	3.25	3.3	3.31	3.33
SOUTH DAKOTA	4.36	4.99	5.02	4.01	4.36	4.66	4.44	3.99	3.22	3.42	3.13	2.88	3.01	3.03	2.69
TENNESSEE	5.79	5.55	5.85	5.56	4.61	4.38	4.2	3.51	3.08	2.88	3.02	2.96	3.14	3.03	2.82
TEXAS	4.71	4.67	4.41	4.36	4.23	4.04	3.81	3.34	3.48	3.02	3.25	3.16	3.31	3.34	3.41
VERMONT	5.17	4.85	4.89	4.09	4.11	4.13	4.35	3.47	3.62	3.04	2.96	3.07	3.55	3.36	2.74
VIRGINIA	4.44	4.22	4.14	3.75	3.46	3.36	3.02	2.72	2.59	2.45	2.62	2.44	2.39	2.43	2.25
WASHINGTON	4.29	3.96	3.61	3.57	3.35	3.23	2.8	2.96	2.82	2.74	2.95	3	3.12	2.91	2.55
WEST VIRGINIA	5.94	5.11	5.27	5.38	4.64	4.85	4.2	3.84	4.05	3.9	4.06	3.68	3.99	4.5	3.44
WISCONSIN	4.62	4.45	4.02	3.94	3.67	3.65	3.45	2.82	2.85	2.71	2.56	2.5	2.63	2.71	2.39
WYOMING	4.61	4.68	6.17	5.45	4.63	4.9	4.8	4.66	4.73	5.03	4.78	4.28	4.14	4.09	4.44

Table 4: Complete Injury Accident Data Set:

NO-FAULT STATES	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
COLORADO	148.29	156.37	144.75	144.33	146.88	143.04	127.38	-119.1	123.23	120.67	128.22	124.29	127.2	112.65	126.3
CONNECTICUT	169.21	164.77	169.99	153.17	118.94	197.64	-193.1	173.2	161.52	153.14	-1	166.83	164.19	162.13	169.62
FOLORIDA	193.07	196.14	209.88	163.49	186.76	-165.2	173.87	150.72	159.2	148.33	151.52	160.69	162.15	-1	-1
GEORGIA	46.01	52.22	53.69	61.49	75.1	63.89	70.59	67.32	-67.75	80.52	85.14	87.16	93.18	91.41	89.75
HAWAII	210.4	229.58	218.33	223.97	200.46	197.45	196.62	-176.5	176.44	181.8	185.12	196.88	201.05	162.06	142.6
KANSAS	144.88	157.39	153.54	146.62	138.59	134.46	154.77	-141.4	149.54	146.33	138.73	137.7	132.91	130.06	127.05
KENTUCKY	108.9	103.33	110.03	100.86	98.64	93.17	89.1	78.16	-90.68	107.56	105.52	103.26	107.27	107.13	107.41
MASSACHUSETTS	234.34	358.47	333.85	346.39	-220.1	192.85	191.59	190.24	190.66	176.72	162.34	161.65	150.56	142.15	-1
MICHIGAN	215.61	208.64	214.2	191.82	180.8	196.61	-188.6	171.08	168.88	173.19	172.99	166.62	167.29	155.95	14.19
MINNESOTA	182.52	147.22	150.08	111.43	107.77	109.07	110.99	105.89	-107.8	101.68	98.87	116.9	119.68	107.69	97.84
NEVADA	116.56	133.41	155.51	142.83	138.89	137	138.85	-135.3	134.22	132	134.52	154.52	160.66	142.39	127.81
NEW JERSEY	235.64	240.64	239.47	213.25	200.57	188.1	-189.4	191.12	192.94	192.23	177.08	178.31	176.39	160.67	163.47
NEW YORK	352.88	346.12	336.03	319.89	297.55	295.71	307.74	-285.0	298.96	274.22	259.82	239.81	224.64	222.36	220.11
NORTH DAKOTA	83.77	83.21	100.93	104.21	100.83	82.43	75.56	73.58	85.43	-85.03	82.71	78.12	81.56	72.77	77.52
PENNSYLVANIA	150.02	146.38	161.7	155.69	134.72	132.89	144.42	130.27	-139.3	127.97	136.93	129.09	136.99	125.25	122.11
UTAH	165.95	168.55	169.77	175.54	174.19	166.88	160.98	-141.6	143.68	138.78	146.18	136.61	137.08	107.89	110.18
FAULT STATES															
ALABAMA	108.94	111.79	105	93.54	86.54	95.53	93.95	75.02	77.94	75.48	-1	80.95	81.66	78.63	78.28
ALASKA	196.91	186.12	150.61	134.68	137.58	121.2	124.63	108.11	120.74	131.11	116.22	118.22	130	125.4	148.09
ARIZONA	149.1	165.82	159.26	160.75	157.59	155.73	148.16	139.91	142.31	146.17	152.85	167.31	166.61	166.45	165.87
ARKANSAS	60.16	86.08	102.86	101.79	106.68	106.5	105.85	107.66	105.16	107.11	111.11	110.12	104.79	95.88	95.91
CALIFORNIA	146.72	147.59	143.12	135.39	135.72	136.14	132.24	125.68	126.51	126.38	128.59	130.03	131.81	127.12	121.81
DELAWARE	136.86	147.28	102.89	126.06	118.49	113.84	110.11	118.73	125.08	113.69	-1	107.84	115.78	115.78	105.56
IDAHO	159.72	170.22	170.28	157.79	164.73	153.56	138.04	127.22	125.29	118.56	112.29	116	110.09	112.62	108.68
ILLINOIS	187.12	179.22	185.18	183.93	167.07	169.29	182.45	180.16	188.07	186.07	194.89	199.34	193.54	171.92	167.51
INDIANA	172.62	176.49	165.43	155.62	146.15	134.15	127.22	125.37	127.82	120.76	122.55	123.25	127.86	120.06	113.38
IOWA	156.48	158.28	143.16	122.45	113.4	124.17	126.13	119.84	117.57	-1	105.86	111.22	109.33	106.9	104.37
LOUISIANA	117.64	115.9	108	111.17	110.83	188.59	198.95	188.4	205.41	211.7	-1	219.46	219.37	210.07	205.12
MAINE	128.94	118.23	123.43	124.97	126.22	117.42	115.7	118.58	116.77	120.15	117.08	122.61	6.96	124.12	119.02
MARYLAND	173.15	169.29	183.36	172.78	166.27	172.23	179.12	166.13	159.53	166.93	167.08	177.94	183.44	-1	-1
MISSISSIPPI	75.68	68.43	75.73	66.06	65.12	64.36	61.66	52.62	39.91	40.56	52.66	51.13	49.66	43.9	-1
MISSOURI	127.65	126.83	112.17	123.89	99.4	77.23	73.6	70.98	78.7	-1	57.33	-1	-1	-1	-1
MONTANA	122.92	125.98	119.1	115.61	117.39	108.78	99.88	95.62	104.51	101.68	-1	94.97	101.52	94.32	100.81
NEBRASKA	137.85	141.03	129.51	149.09	140.23	140.21	136.41	122.64	125.39	124.76	130.33	130.93	128.7	125.13	115.63
NEW HAMPSHIRE	172.55	170.78	162.81	148.35	139.5	135.48	135.53	120.82	121.25	127.59	127.84	117.11	121.73	135.9	135.56
NEW MEXICO	113.89	117.13	121.1	115.61	120.45	118.07	117.83	109.96	116.98	121.94	121.2	133.78	137	128.51	128.53
NORTH CAROLINA	134.86	128.55	128.99	122.43	121.38	119.75	125.26	122.93	126.25	126.29	127.17	127.21	129.49	127.98	125.14
OHIO	134.73	109.58	104.41	101.3	88.95	101.88	112.3	157.41	158.56	159.59	159.09	155.77	160.04	148.07	136.97
OKLAHOMA	138.7	83.49	78.55	75.26	92.64	70.97	70.39	63.73	59.8	65.54	60.61	58.9	63.04	58.63	80.24
OREGON	161.33	153.31	158.2	162.56	158.49	145.68	135.3	135.93	149.92	129.32	124.5	117.92	118.14	122.52	122.78
RHODE ISLAND	168.06	172.94	159.96	175.01	148.55	193.13	170.42	157.58	144.19	142.02	132.98	-1	-1	-1	-1
SOUTH CAROLINA	88.97	95.05	80.98	75.18	68.49	67.05	65.17	62.71	62.74	63.84	62.48	63.83	66.15	67.47	65.79
SOUTH DAKOTA	77.16	78.49	82.18	72.42	86.18	84.7	84.07	99.05	86.92	87.95	87.12	90.27	85.96	77	76.33
TENNESSEE	105.32	112.97	123.16	118.74	108.15	108.98	106.44	85.69	89.66	88.93	90.15	92.14	105.46	104.43	100.45
TEXAS	118.01	117.64	113.48	112.65	111.3	109.02	108.7	105.91	109.37	104.77	107.71	107.89	111.76	108.27	114.12
VERMONT	144.15	145.96	140.16	139.23	135.85	126.52	116.38	125	120.4	123.51	121.47	120.19	132.68	128.7	-1
VIRGINIA	126.95	122.81	118.16	113.64	110.07	108.81	104.06	100.24	101.8	100.7	104.27	105.25	103.26	102.46	100.97
WASHINGTON	171.1	172.21	157.21	169.3	166.27	162.96	163.38	170.36	175.85	168.84	171	148.83	153.38	144.45	137.18
WEST VIRGINIA	112.5	108.69	97.44	108.87	118.05	110.86	110.15	110.91	130.26	129.81	149.6	145.32	151.54	153.82	122.12
WISCONSIN	201.53	147.64	175.87	142.56	139.12	141.71	133.27	131.9	134.92	131.59	134.25	129.22	137.55	132.48	117.79
WYOMING	104.88	110.08	113.82	114.02	104.69	109.97	103.56	97.91	98.67	87.19	99.35	97.74	98.29	88.22	90.64

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