The Effects of Price Filing and Other Regulation on Auto Insurance Rates

Abstract

This paper tests the effects of different types of regulation in different states on the prices of auto insurance. Much of the paper examines the effects of price filing regulation, but the effects of regulation in general are also examined. In terms of price filing regulation, the paper compares the average expenditure in states with each type of regulation, using data from multiple years and correcting for other factors. Additionally, the paper analyzes yearly changes in price from ’95-‘05, under the different types of filing regulation. Lastly, the paper tests the effects of an index on overall regulation on auto insurance expenditures. Overall, the paper finds that states with more regulation have higher rates. This result holds for both price filing regulation and regulation in general. Additionally, more regulation generally didn't lead to lower price increases, price increases were lower immediately after price filing regulation was reduced, and the states with the highest prices were the most likely to lower their regulations (suggesting they see the need to lower prices and believe that less, not more, regulation is the way to accomplish this goal).

I. Introduction

High auto insurance rates have long been a subject of great ire among drivers throughout the United States. With all of the recent attention on health insurance, and what many feel are unfairly high profits being earned by health insurance firms, it is surprising that auto insurance regulation has not also been a subject of debate. Surveys consistently show that Americans are unhappy with their auto insurance providers and believe their premiums are too high, with one survey revealing that the public ranked the property-liability business third to last among 24 industries (Maatan 1989, p. 518). While auto insurance regulation is not an issue on the national stage, not surprisingly state governments have been trying to regulate auto insurance prices for years.

To combat the perceived high costs of auto insurance, the different states have passed a variety of different types of legislation, with varying levels of success. While some states have taken an aggressive stance, and enacted onerous regulations, other states have taken a more hands off approach. These approaches manifest themselves in a number of different types of regulation, including price filing regulation, restrictions in the use of credit scores, institutional support for the residual market, and other laws and regulations. As price filing regulation plays a large role on the price of auto insurance in each state, it is the subject of analysis in much of this paper.

To determine the effects of price filing regulation on auto insurance rates, we use data that constructs a hierarchy of different types of auto insurance price regulation and categorizes each state by its type of regulation. This data will then be analyzed, along with additional controls, to determine whether states with more price filing regulation have higher or lower auto insurance prices. We will also examine the effects of these different types of price filing regulation on the changes in auto prices over the time period. This will allow us to see if price filing regulation was able to successfully hold down prices in the time period being examined. Additionally, we will look to see how auto insurance rates affect a state's likelihood to increase or decrease the severity of its price filing regulation, and if the states that changed regulations showed higher or lower price increases after the regulatory change.

In addition to price filing regulation, this paper will also examine the effects of all types of auto insurance regulation on auto insurance rates. To simplify this process, data is used that compiles all the different types of regulation into a single rating. The rating is a representation of both how free consumers are to choose their own auto insurance policies and how free auto insurance companies are to create their own policies and set their own prices (Lehrer 2008). All different types of regulation are accounted for in this manner and each state receives a final score, with higher scores corresponding to less regulation.

Here we hope to compare these scores with the prices of auto insurance in the corresponding states. Theoretically, if regulation is effective, the data should show that states with lower regulation scores (more regulation) will have lower auto insurance rates. Conversely, if regulation is ineffective, we should see lower auto insurance rates where there are higher scores (less regulation).

II. Background

While the effectiveness of regulation can be viewed in a number of different ways, the clearest barometer of effectiveness is the prices consumers pay for insurance. Four recent papers attempt to assess the impact of regulation on auto insurance prices (Harrington, 1987; Hunter, 2008; Lehrer 2008; and Lehrer and Minton 2009). However, the papers reach divergent conclusions regarding the impact of regulation on prices. Harrington (1987) attempted to compare loss ratios for auto insurance (expected losses/premiums collected), as a measure of the cost of insurance, in states with and without different types of auto insurance regulation. The study found that regulation slightly increased loss ratios, meaning companies paid out a higher percent of their premiums to its customers, and therefore that the costs of insurance decreased with regulation (Harrington 1987). Two possible shortcomings of this study are that it is outdated (published in 1987) and that loss ratios are more a measure of insurance company performance and profitability, and less a measure of the effect on consumers through changes in their prices.

A more recent study, Hunter (2008), examined insurance rates across the US and compared them to the type of price filing regulation in these states. This regulation was classified into 6 categories. In descending order from most severe regulation to least severe regulation these laws include: state set laws, where the state literally sets auto insurance rates; prior approval laws, where the auto insurers must receive prior approval on auto insurance rates before it can sell policies; a file and use system, in which rate changes must be filed with the government before they go into effect, but specific approval is not needed; a flexible system, in which small rate changes can be made without prior filing and/or approval, but large changes require prior filing and/or approval; a use and file system, in which rate changes can go into effect and be filed after the fact, but can then be disapproved; and finally a competitive system in which the government has virtually no control over rates (Hunter 2008).

The study found that states with less regulation had smaller increases in auto insurance expenditure from 1989 to 2005, and that states with more regulation had higher increases; in fact, the change in expenditure was higher and higher, on average, going from each level of regulatory intensity to a higher level (Hunter 2008). The study therefore seems to suggest that price filing regulation, in general, was a successful tool in keeping down auto insurance prices. This study, however, only looked at the change in insurance costs, and only accounted for current price filing legislation (assumed 2008 price filing regulation in each state was present for that state throughout the entire period, which was often untrue), not controlling for changes in price filing rules or any other variables which could have affected auto insurance rates over the time period. Further, these regulatory regimes may be correlated with unobserved variables that are the true cause of higher rates. That is, the regulation is a response to high auto insurance prices, not the cause.

Lehrer (2008) (as well as Lehrer and Minton (2009)) reviewed the entire regulatory environment for property and causality insurance and gave each state a rating based on how free insurers are to set policies and rates, and on how free consumers are to choose policies. They created indices for a number of different variables including the residual market for autos and homeowners, market volatility, rate regulation and other forms of regulation (Lehrer 2008). These variables were then combined into an overall regulatory score for each state, where higher scores corresponded to less regulation. Lehrer contends that regulation is bad for consumers and would likely lead to higher costs, but makes no effort to statistically test this claim.

The American Consumer Institute (2008), on the other hand, uses the data provided by Lehrer and models the sum of the average price of auto and homeowners insurance in each state against Lehrer's index. The study also controls for some common factors that affect insurance rates such as state income levels, crime and natural disasters. After controlling for these factors, the study found states with lower scores in Lehrer's index (more regulation) did in fact have higher insurance prices (*American Consumer Institute* 2008). These studies were not limited to the effects of regulation on auto insurance prices (they added homeowners and auto insurance prices together, and had control variables mostly geared towards homeowners insurance), however, and failed to account for many factors which have a large impacts on auto insurance costs, like population density. Furthermore, they only looked at data for one year in which Lehrer conducted his study.

III. Data and Methods

This study aims to take the data on auto insurance regulation and compare it to state auto insurance rates. It will use data similar to that gathered by Hunter and Lehrer, and add a series of controls for factors known to have an effect on auto insurance rates. In addition we implement additional econometric specifications designed to control for endogeneity.

The data for price filing regulation, used in the first general model, is compiled for every state during the period 1995-2005. The data is drawn from Grace and Phillips (2007), and is categorized in a similar way to that in Hunter, but is broken down into a few additional categories and shows changes in regulation over the time period (not showing these changes, we believe, is a huge weakness in Hunter's paper). These categories in descending order in terms of regulatory severity include state made rates, two separate types of prior approval provisions, one accounts for ordinary prior approval laws, while the other is prior approval laws with a deemer provision (which means that after a certain time period if the rates aren't rejected they are deemed approved), file and use laws, flex laws, use and file laws, file and use or use and file laws in a "competitive" market, and file only laws wherein insurers are only required to file rates but no time period to do so is specified (as it is in file and use or use and file regulations) (Grace 2007)[1].

The paper also takes the data gathered by Lehrer (2008) and Lehrer and Minton (2009) on the extent of auto insurance regulation in each state in 2006 and 2007 and uses it in the second general model. This data scores each state's regulatory burden on property and casualty insurance based on a number of different criteria and then derives an aggregate score for each state, with higher scores denoting less regulation (Lehrer 2008). The criteria used in generating the regulatory ratings include political oversight, regulatory clarity, residual automobile and homeowners markets (2 variables), market volatility, market concentration in auto and homeowners markets (2 variables), auto insurance market entry, rate regulation, form regulation, credit scoring and territorial rating[2]. A detailed description of each of these criteria is provided in Table 1.

The data for auto insurance premiums was provided by the National Association of Insurance Commissioners. The NAIC tracks the average combined auto insurance premiums, as well as other auto insurance information. This data was downloaded from the US census website.

To accurately compare these indices on government regulation with auto insurance rates, we must control for population density, state-level economic conditions and inflation. We control for population density because areas that are more urban or more densely populated will be likely to have more accidents. Population density data was calculated from US Census population data for 1995-2005 and the measurement of each state's land area from the 2000 census.

Another obvious difference across states and years is the difference in prices or economic conditions. To control for these factors, personal income per capita data, from the US census, is used for each state for each year. Residents of states with higher per capita incomes will likely have newer, more expensive cars. Holding the number of accidents constant, claims and consequently insurance rates should be higher. Additionally, auto mechanics may earn higher wages in states with higher incomes, which could also lead to higher insurance prices.

We also correct for inflation in the average expenditure on auto insurance and income variables using the GDP deflator for the years 1995-2005 (data for the second general model was not adjusted since each year is looked at separately). GDP deflator data was taken from the Bureau of Economic Analysis.

Finally, since the data showed that auto insurance rates throughout the country follow a cyclical pattern, with a few years of price increases followed by a few years of decreases, we normalized the inflation adjusted auto insurance data (for 1995-2005, data for the second general model did not need to be adjusted). This was done by finding the average expenditure across all states for each year and subtracting this value from each individual state's average expenditure value for that year. We first estimate models of the form:

(1) $\mathbf{normexp_{it} = \alpha + \beta x_{it} + \gamma z_{it} + \varepsilon_{it}}$ and $\mathbf{\varepsilon_{it} = u_i + v_{it}}$,

where x_{it} is a vector of control variables that includes population density and income, z_{it} is a vector of dummy variables designed to capture the nature of the auto insurance rate regulation, and ε_{it} is the error term composed of a cross-section-specific error term (u_i) and a random-error term (v_{it}). In some cases, we use normalized average expenditure on auto insurance as the dependant variable, as above, and in other cases we use the normalized change in average expenditure on auto insurance. Additionally, to help support the findings of this general model, we ran regressions looking at the normalized change in auto insurance expenditure in the year immediately before price filing regulation was decreased and in the year of the decrease (using only data from states where such changes occurred). Another regression was also run to see if states with higher or lower prices over the period were more or less likely to change their price filing regulation.

The second basic model uses data from 2006 and 2007 (regulatory rating from the second report is actually compiled from data from 2007 or the newest that was available at the time) and regresses average expenditure on auto insurance against the regulatory rating for each state and control variables personal income and population density. Since the methodology in measuring the regulatory rating changed in the first and second studies (extra factors were added in calculating the regulatory rating in the second study and an unimportant factor was removed), the data for 2006 and 2007 are analyzed in two separate regressions. Since each regression spans only 1 year, there are no adjustments for inflation and the data is not normalized. The equations in this model are of the form:

$$\textbf{(2)}\quad \mathbf{avg\_exp_{it} = \alpha + \zeta y_i + \delta z_i + \varepsilon_i,}$$

where $\mathbf{y_i}$ is a vector of control variables and $\mathbf{z_i}$ is the regulatory rating measure.

IV. Results

For the regressions that analyze normalized expenditure over the period 1995-2005 we find that more regulation leads to higher auto insurance expenditure. Furthermore, most of the results follow the expected order, wherein progressively more regulation leads to progressively higher prices. Along these lines, with competitive regulation ("comp") used as the baseline since it is the least regulatory (arguably this may be file only regulation ("fileonly"), but comp has many more data points than file only) the regression (Equation 1 in Table 2) shows that file only regulation leads to $13 more in expenditures (though this was not significant, likely because the regulation itself is similar to comp and the difference in price is small, and because fileonly only has few data points), use and file ("uandf") leads to $60 dollars more in expenditures, file and use ("fandu") leads to $83 dollars more in expenditures, prior approval with a deemer provision ("padeemer") leads to $115 more in expenditures, prior approval ("pa") leads to $133 dollars more in expenditures, and state made rate regulation ("statemade") leads to $157 more in expenditures. A notable exception to the regulatory variables having the expected order is flex regulation ("flex") which was found to lead to $133 more in expenditures (arguably supposed to be between uandf and fandu, but not supposed to be as high as pa; the discrepancy likely comes from the fact that there are few data points from this type of law and many of them are either in the last few years, where even inflation adjusted prices are high, and/or from expensive states like NY and NJ).

All of the regulatory variables are significant except fileonly, uandf (with a t score of 1.54 this is not far from being significant, the insignificance is probably due to too few data points or the magnitude of the difference from comp simply not being large enough), and statemade (probably insignificant from having too few data points). It should also be noted that population density ("pop_dens") is very significant, and though income is not significant, it is correlated with pop_dens (correlation coefficient = .5801), and is significant when pop_dens is not included (shown in Equation 3 in Table 2). Since neither variable is correlated with any of the dummy variables, and therefore won't affect the dummy variables (the ones we actually are examining), and including both variables (pop_dens and income) produces the highest F and R-square values, we believe the first equation in Table 2 is superior to the second or third (where either income or pop_dens is excluded). It should be noted, however, that the correlation between these variables could cause their parameter estimates and/or t-scores to be unreliable in the first equation.

To clear up some of the discrepancies in the first versions of this model, establish a clear hierarchy wherein more regulation leads to higher prices and correct for some of the problems of certain variables having two few data points, variables were combined in the second form of the model. Since fileonly and comp are so similar and fileonly has few data points, these two variables were combined and established as the baseline with the least regulation ("focomp"). The two dummy variables in the regression therefore are, "ufflexfu", constituting the three next most similar variables and somewhat more regulation, and "padpastatemade", constituting the last three and strictest variables. Combining the variables in this way should correct for the fact that there are too few data points for fileonly, flex and statemade.

The results of this regression, which used the combined variables and the same control variables as before, were that all variables (other than income) were highly significant. Furthermore, the data showed that ufflexfu led to $95 higher expenditures, while padpastaemade led to $110 higher expenditures than focomp. This shows successively more regulation leads to successively higher prices.

While the data in the above model are compelling, there was not enough difference in the coefficients for the two dummy variables ($95 and $110) to draw a good conclusion about the difference between the two higher general levels of regulation (or in the differences between each individual type of regulation in the earlier models). Due to the unusually high parameter estimate for flex in the first version of this model, one can't help but speculate that this variable is pulling the value of ufflexfu higher than it should be. Since the data for flex is unusual, and likely from there being too few data points using flex, all of the data points where flex was the type of regulation were discarded for the fifth and sixth versions of this regression, and the variable ufflexfu was replaced with uffu to reflect that there were no longer any data points with flex.

In these regressions, all of the variables were still highly significant and the differences between the different types of regulation were much more satisfying. Here uffu increases average expenditure by $70 over focomp and padpastatemade increases it by $110. Income and population density increase expenditure in a similar way to the other versions of this model. The most compelling part of this version of this model is that when it is run with uffu as the baseline (as in Equation 6) the variables for both focomp and padpastatemade are still highly significant, showing that all three levels of regulation are significantly different from each other.

While this first series of regressions shows that states with more regulation have higher auto insurance prices, the next regressions look at the states that have changed price filing regulations over the time period to see if changing regulation significantly affected the rate of change of auto insurance rates. One could argue, after all, that high auto insurance prices caused states to enact the stricter regulations and not that the stricter regulations led to higher prices.

To see how a change in regulation affected the rate of change in auto insurance prices, we examined the normalized yearly percent change in auto insurance rates (as compared to the average of the value for that year and the year before), for the year before regulation was changed and the year that it was changed. The results are reported in Table 3. Only 8 states changed regulation over the time period, and one of them, New York, changed in 1996, meaning the yearly change in 1995 could not be gathered (since it would require 1994 data which was not available) and so New York was left out of the model. This left 7 states that changed regulation, and 14 data points (seven for each state before the change in regulation, and 7 more for each state the year of the change in regulation). The normalized yearly change values for these data points were then regressed against control variables for change in income and change in population density for the same states in the same years, calculated in the same way as change in auto insurance expenditure.

In addition, a dummy variable was added that was assigned a value of 0 for data from the years before the change in regulation and a 1 for data from the years after the change in regulation. Since all of the changes over this time period were to lower degrees of regulation, a negative value for this variable would indicate that lowering the regulation led to a slower increase of auto insurance prices, which would prove that less regulation leads to lower prices (and more regulation to higher prices) and not that the regulation was a product of higher prices to begin with.

The results of the basic form of this model are recorded as Equation 1 in Table 3. Here, the dummy variable for the difference before and after the regulatory change ("afterreg") is insignificant. However, an addition review revealed that only two states had a higher rate of increase in auto insurance prices after a decrease in regulation, and both of these involved switching from padeemer to fandu (and these were the only states that involved such a switch). Since there is very little difference between these two types of regulation (in padeemer rate changes are "deemed" approved if they are not rejected after a certain period and in file and use the rates must be filed ahead of time with the government, giving them time to reject the rate changes or the ability to let this option expire and the change be allowed), and we believe the values for these states are atypical and these changes are smaller than any of the other types of changes in regulation, these data points were excluded in Equation 2 in Table 3.

Here the value for afterreg is significant and thus we can see that after a state decreased its regulation there were slower increases in auto insurance prices. While we don't believe these models are as strong as those in Table 2, we believe there is a limitation on measuring these changes with only 8 states showing a regulatory change over the time period, and we believe that with more data the slower rate of increase in auto insurance prices would be even more clear after the decrease in regulation, even with unusual data points (like those that were removed) included.

In a further effort to show that higher regulation does not lead to lower price increases, the normalized yearly change in expenditure data was regressed against the change in population density and the change in income, as well as all of the regulatory dummy variables, for all states for all years. The results of the first form of this model, shown in Table 4, show that only a few types of regulation (fandu uandf and padeemer) had significantly lower price increases over the period than comp.

However, we noted that states with more regulation, in general, began with the highest prices. One must consider if there is a limit in how high prices can reasonably be raised, regardless of regulation, that would prevent these states with high prices (usually also more regulation) from raising their prices further. If such a limit existed, and we believed that it did, it could be skewing the data and overemphasizing the effects of regulation in causing further price reduction (in other words probably fewer variables were significant than in the Equation 1 in Table 4, and those that still were were probably less so than in the first form of this model).

To control for this, the initial value of expenditure (in 1995) was used for the states, as a control variable. The value for this variable would presumably take on a negative number (since states with lower initial expenditures, where in general there was less regulation, had higher increases) and help control for some of these higher increases in these states. As shown in the second regression in Table 4, when this highly significant variable ("startexp") was included, only fandu was weakly significant, and since this is the most similar type of regulation to comp, it is worth noting that none of the much more stringent types of regulation led to significantly lower price increases. While one might be worried that this startexp variable was correlated with some of the other variables in the model, additional tests show that it is not.

One final regression was run, pertaining to the first general model, to further dispute the idea that states with high insurance prices would be likely to respond by increasing regulation (we believe, rather, that the more stringent regulation led to the higher prices). This model, the results of which are included in Table 5, simply involved regressing a dummy variable that was equal to 1 if a state lowered its regulation over the period from 1995-2005, and a 0 if it didn't ("changeornot"), against the average expenditure for each state over that same time period ("stateaveexp"), using a probit regression. The results showed that the value for stateaveexp was positive, and highly significant (at the .01 level) meaning that states with higher expenditures were much more likely to reduce their auto insurance regulation. These states with high expenditures, would presumably see the most need to change their auto insurance regulation, and the fact that these states and not those with lower expenditure chose to lower their regulation, we believe, expresses a fundamental belief that lowering regulation will lead to lower prices (a move that politicians have confidence testing in the most desperate of situations, where there are already high prices). Overall, we believe the results of Tables 3, 4, and 5 thoroughly lay to rest any suggestion that severe regulation was simply the product of high prices, and add to our certainty, that more price filing regulation results in higher auto insurance prices (as suggested in Table 2), and cannot bring about lower increases in auto insurance prices.

The second general model, while not as extensive as the first, tries to clear up two potential shortcomings of the other model. Firstly, the second model looks at more recent data

(2006 and 2007) and secondly, it looks at the effects of all different types of regulation instead of just price filing regulation. In this model, since data on overall regulatory rating were derived in different ways for the two different years, data for the two years are regressed separately (because of this fact, income and expenditure on auto insurance were not adjusted for inflation or normalized). Each of these regressions involved regressing average expenditure against income, population density and regulatory rating.

In the first version of the model, for 2006, population density ("pop_dens") and regulatory rating ("reg_rating") are both significant, the model as a whole is significant and, while income isn't quite significant, it has a reasonably high t score of 1.19. Additionally, and most importantly, the significant reg_rating variable has the expected negative sign. In this way, since places with less regulation have a higher score, less regulation leads to lower premiums. Overall in this model, every point higher in regulatory rating a state is leads to $2.08 lower expenditure on auto insurance.

In the second version of this model, for 2007, reg_rating is much more significant (now at the .01 level), pop_dens is still significant and once again, while income isn't quite significant, it has a reasonable t value of 1.27. Also the model itself is even more significant. Once again reg_rating had the expected sign, here showing that each additional point in reg_rating leads to $3.47 lower expenditure on auto insurance. Also important to note here, is that as the methodology for measuring reg_rating got more precise in the second year, its significance and effect on average expenditure increased significantly. This means that either the significance of reg_rating was actually even higher in 2006 than the results show, or that over the course of the year (from 2006 to 2007) it has gotten more important to reduce regulations in order to have lower auto insurance expenditures. Either way this would be a positive sign for less regulation.

V. Conclusions

Overall, the results of the models show a number of interesting things. The first regressions clearly show that states with less price regulation have lower expenditures on auto insurance, almost in order with less and less regulation leading to lower and lower expenditures. While some variables with few data points, like flex, had unusual values, when these data points are removed and similar types of regulation are grouped, the effects are even clearer. States with high regulation have high expenditures on auto insurance, states with low regulation have low expenditures on auto insurance and states with medium regulation are somewhere in between.

The next series of regulations show that more regulation generally did not lead to lower increases in prices over the time period and that after regulation was decreased, excluding unusual values, prices decreased at a lower rate. Additionally, we found that states with the highest prices were the most likely to lower regulations, helping further put to rest the notion that states react to high prices by increasing regulations.

Finally, the third model shows that even more recently, when looking at the effects of all types of regulation taken together, states with less regulation have significantly lower expenditures on auto insurance. Taking all this data together, it is clear that in the long run having less regulation leads to lower auto insurance prices. There is also evidence that higher regulation generally did not lead to lower price increases, prices increases are likely lower after regulations are reduced, and states probably don't react to high prices by increasing regulations.

Footnotes

1. While the hierarchy of regulatory severity is clear for state made, prior approval, pa with a deemer provision, file and use, use and file and a competitive market, the location of flex and file only is somewhat less clear. Hunter placed flex between file and use and use and file, which seems to be a reasonable assumption, but judging by the order of the list in Grace and Phillips these authors seem less convinced. File only clearly is a very unrestrictive form of regulation, but where it ranks compared to a competitive system is debatable. The author of this paper operates under the assumption that it should be about equal in severity to a competitive system, perhaps slightly less severe.

2. Though the methodology on the whole is very similar, a few variables used in generating the regulatory rating changed between studies. Form regulation was dropped from the second study because it was found not to be relevant, while political oversight, regulatory clarity and market entry auto were added (these were not present the first year). These changes were made to make the data in the second study even more precise, but due to the change in methodology comparing or aggregating the data from the two years may be inappropriate.

Exhibits

Table 1: Criteria Used to Generate "reg_rating" Variable for Second Model

Criteria	Description
Political Oversight[2]	states are penalized for having elected insurance commissioners who could make decisions based on politics
Regulatory Clarity[2]	states are penalized for being unclear about certain rules which insurers could interpret differently
Residual Automobile and Homeowners Markets (2 variables)	states are penalized for having high percentages of customers in the residual markets since these markets are highly regulated by the government
Market Volatility	states with higher volatility are penalized since it may make insurers reluctant to lower prices to attract new consumers
Market Concentration in Auto and Homeowners Markets (2 variables)	states with high concentration are penalized since it is likely a sign of regulations and prevents competition which is beneficial to consumers
Auto Insurance Market Entry[2]	states were rewarded for companies entering their state and penalized for them leaving, since more companies increases competition
Rate Regulation	states with stricter rate filing regulations were penalized
Form Regulation[1]	states have strict regulation on what kinds of forms need to be filed and by when are penalized since regulators may not know the best way to design or file forms and them creating rules could create inefficiency
Credit Scoring	states that don't allow companies to use credit scores in setting rates are penalized since these scores help to set rates properly
Territorial Rating	states are penalized for not allowing companies to change customers in high risk areas higher rates

1 denotes only used in 2008 study; 2 denotes only used in 2009 study

Table 2: Random Effects Regression Results for Normalized Average Real Expenditure on Auto Insurance

	1		2		3		4		5		6	
income	0.00027	(0.00074)	-	-	0.0011881*	(0.00071)	0.0001576	(0.00075)	0.0001971	(0.00075)	0.0001971	(0.00075)
pop_dens	0.3070677***	(0.08038)	0.312914***	(0.07700)	-	-	0.32490***	(0.07648)	0.33198***	(0.08358)	0.33198***	(0.08358)
statemade	156.75960	(173.7713)	155.0688	(178.0257)	368.6634**	(181.9673)	-	-	-	-	-	-
pa	132.972***	(39.76452)	131.8025***	(40.83547)	169.0486***	(43.14636)	-	-	-	-	-	-
padeemer	115.2476***	(37.96418)	114.5866***	(38.95775)	150.2415***	(40.65704)	-	-	-	-	-	-
fandu	83.36904**	(38.55351)	83.87783**	(39.30169)	121.6411***	(40.90504)	-	-	-	-	-	-
uandf	59.99031	(39.17625)	59.7738	(39.84574)	60.05645	(42.00835)	-	-	-	-	-	-
fileonly	-8.43904	(101.3974)	-9.123505	(104.9034)	-28.34124	(104.0143)	-	-	-	-	-	-
flex	132.5735***	(42.92057)	132.4976***	(43.67873)	170.5521***	(43.62475)	-	-	-	-	-	-
focomp	-	-	-	-	-	-	-	-	-	-	-77.204**	(35.8344)
ufflexfu	-	-	-	-	-	-	94.89159**	(37.1919)	-	-	-	-
uffu	-	-	-	-	-	-	-	-	77.204**	(35.8344)	-	-
padpastate~e	-	-	-	-	-	-	109.855***	(35.9239)	114.697***	(36.0170)	37.4929***	(9.54320)
_cons	-152.0376***	(37.98779)	-144.4444***	(32.60745)	-154.1062***	(39.76893)	-151.146***	(37.3128)	-152.840***	(37.0822)	-75.63689**	(30.6723)
N	550		550		550		550		529		529	
R-sq: within	0.0018		0.0014		0.0094		0.0014		0.0011		0.0011	
R-sq: between	0.5433		0.5413		0.2651		0.5161		0.5324		0.5324	
R-sq: overall	0.5164		0.5146		0.2526		0.4901		0.492		0.492	
chi2	56.47***		53.72***		38.11***		39.40***		39.17***		39.17***	

Dependent variable: normexpit = Normalized real average expenditure on auto insurance (2005 dollars) for state i in year t
Equations 4, 5, and 6 group similar types of regulation; Equations 5 and 6 remove all data points where regulation is flex
Standard errors (adjusted for clustering by state) are in parentheses
* = significant at 0.1
** = significant at 0.05
*** = significant at 0.01

Table 3: Regression Results for Normalized Change in Real Expenditure on Auto Insurance
(only including states that changed regulation and data years before and after change in regulation)

	1		2	
afterreg	-0.0189427	(0.02172)	-0.0593371*	(0.02633)
changeinc	0.1640963	(0.60738)	1.098734	(0.73104)
changepopd~s	-0.2016246	(1.17731)	-3.063028	(1.87262)
_cons	0.0071592	(0.01518)	0.0402646*	(0.02057)
N	14		10	
R-sq	0.082		0.5297	
Adjusted R-sq	-0.1934		0.2945	
F	0.3		2.25	

Dependent variable: $normchange_{it}$ = Normalized change in real average expenditure on auto insurance (2005 dollars) for state i in year t
Equation 2 removes states that changed from padeemer to fandu
Standard errors are in parentheses
* = significant at 0.1
** = significant at 0.05
*** = significant at 0.01

Table 4: Random Effects Regression Results for Normalized Change in Real Expenditure on Auto Insurance

	1		2	
changeinc	0.0277557	(0.05875)	0.017979	(0.05777)
changepopd~s	0.1087099	(0.08457)	0.1255061	(0.08539)
startexp	-	-	-0.0000277***	(0.00001)
statemade	-0.0089798	(0.01985)	0.0040527	(0.01951)
pa	-0.0096466	(0.00603)	-0.0009886	(0.00633)
padeemer	-0.0080568**	(0.00372)	-0.003996	(0.00372)
fandu	-0.0075339*	(0.00427)	-0.0039206	(0.00436)
uandf	-0.0092052**	(0.00386)	-0.0073833*	(0.00379)
fileonly	0.0074762	(0.00559)	0.006159	(0.00532)
flex	-0.0076525	(0.00713)	0.0019934	(0.00834)
_cons	0.0049316	(0.00379)	0.0220235	(0.00688)
N	500		500	
R-sq: within	0.0038		0.0027	
R-sq: between	0.1559		0.3935	
R-sq: overall	0.0205		0.0457	
chi2	18.03*		26.55***	

Dependent variable: $normchange_{it}$ = Normalized change in real average expenditure on auto insurance (2005 dollars) for state i in year t
Standard errors (adjusted for clustering by state) are in parentheses
* = significant at 0.1
** = significant at 0.05
*** = significant at 0.01

Table 5: Probit Regression Results for Change in Regulation

stateaveexp	.0049521***	(.0017292)
_cons	-5.076726***	(1.492883)
N	50	
Log likelihood	-16.566169	
Psuedo R-sq	.2464	
LR chi2	10.83***	

Dependent variable: changeornot = 1 if level of price filing regulation was reduced from 1995-2005, else 0
Independent variable: stateaveexp= average expenditure on auto insurance from 1995-2005 in each state
Standard errors are in parentheses
* = significant at 0.1
** = significant at 0.05
*** = significant at 0.01

Table 6: Regression Results for Average Expenditure on Auto Insurance

	1		2	
income	0.0054	(0.00453)	0.0048414	(0.00382)
pop_dens	0.3137841***	(0.09564)	0.2610313***	(0.08783)
reg_rating	-2.072986*	(1.18465)	-3.469213***	(1.10851)
_cons	518.6663***	(155.73860)	519.4442***	(137.18010)
N	50		50	
R-sq	0.4706		0.5118	
Adjusted R-sq	0.4361		0.48	
F	13.63***		16.08***	

Dependent variable: ave_exp_t = Average expenditure on auto insurance in state t
Equation 1 includes data for 2006; Equation 2 includes data for 2007
Standard errors are in parentheses
* = significant at 0.1
** = significant at 0.05
*** = significant at 0.01

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