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The Media Attention Hypothesis[§]

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This paper presents a model of interaction between media attention and corporate behavior. The model predicts that greater media attention will reduce prices on the markets, and that greater prices on the markets will increase media attention. I test this Media Attention Hypothesis using quarterly data on liability insurance premiums for 48 states from 1985 to 1993. The empirical results support the model's predictions.

Keywords: Regulation, Voluntary Price Restraints, Automobile Insurance, Media Attention.

1. Introduction

In our so-called sound-bite age individuals caught in the limelight criticize the news media for being too focused on ratings to tell the *real story*. We hear politicians complain that today's public opinion is too easily swayed by news media reports and editorials. We could even argue that survival in the media spotlight depends on one's investment on public relations. Although studies by Iyengar et al (1982) and Behr and Iyengar (1985) have shown that the media can hardly sway public opinion, the perception that the media holds that kind of power is well entrenched in the mind of the public and of public officials. For example, Dalton et al. (1998) show that the media may play a significant role in providing voters influencing cues.

Corporations should not be impervious to this spotlight because they have, presumably, many possible conflicts with society. Public relations should then also be an important issue for them; which means that corporations should pay a great deal of attention to the manner in which they are portrayed in the media.

A good example occurred in the United States and in Canada in early 2000 when gasoline prices had increased by roughly 80% in the United States over a year, and by 40% in Canada.[1] Given the important increase in oil prices in late 1999 and early 2000, oil companies were urged by President Clinton to keep gasoline prices to a reasonable level. We saw in the middle of 2000 mounting pressure in the United States (especially in the Midwest) on gasoline producers to reduce their prices. In Canada, the government agreed

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[1] The difference in price increases are due to excise taxes (not sales tax) that are larger in Canada than in the United States. The duty-free price of gasoline is basically the same in the United States as in Canada.

to investigate allegations of price collusion in the oil industry even though a few months earlier another enquiry had found no reason to believe there was any.

This paper presents a model of interaction between the pricing behavior of corporations and media attention. I test the model using data related to automobile liability insurance pricing. I find strong empirical evidence that media attention had a significant impact on the pricing behavior of insurers. More to the point, I find that media attention toward liability insurance rate regulation reduced the proportion of the total automobile insurance premium paid toward liability insurance.

The reason I want to test my model on the liability insurance industry is that rate-regulation issues were important news topics during the so-called liability-insurance crisis. This crisis occurred in the late eighties. It reached a culminating point in November 1988 when a referendum (Proposition 103) in California mandated a cutback in liability insurance rates in that state (amongst other things). This referendum shocked the stock market as evidenced by the negative abnormal return stock insurance companies experienced in the few days after its passage (see Fields et al., 1990).

What was surprising in the results presented by Fields et al. (1990) was that the stock market value of some insurers that did no business in California also decreased as a result of the referendum. This decrease could not be due to a reduction in expected future cash flows originating from California, since those companies did not operate in California. A possible explanation is that investors may have anticipated similar cash flow reductions in states other than California because other states could enact liability insurance rate-suppressing regulation. Obviously not all states were targets of rate-reducing legislation, and not all at the same moment in time. We thus need to document is what states were targets and when. A good indicator of the public agenda and of public opinion seems to be the coverage of a given issue in the media.

The news media's influence on the public agenda is well documented. Behr and Iyengar (1985) and Iyengar, Peters and Kinder (1982) have shown that although the media cannot tell the public what to think, it can tell the public what to think about. This is in-line with what I call the *Media Attention Hypothesis*: As the media intensifies its coverage of a given topic, more people start talking about it. This may bring pressure to change the political agenda, as in Behr and Iyengar. Edwards and Wood (1999) study this media effect in setting the presidential agenda (see also Dalton et al., 1998). They find that regarding foreign policy the president reacts most of the time to fluctuations in media attention. On the other hand, for domestic policy media attention seems to follow the president's lead.

Erfle and McMillan (1990) used a similar approach to test their *Regulatory Threat Hypothesis* on the oil industry during the oil crisis of the seventies. They find whenever the media intensified its coverage of oil-pricing problems that firms reduced the price of the most visible type of oil compared to the less visible type. This work followed earlier work by Erfle, McMillan and Grofman (1989) who find similar results. In these two papers media attention is considered as the best possible approximation for regulatory threats. Glazer and McMillan (1992) present a more complete model of how firms price their product when they are at risk of being regulated.[2]

In all these papers, the underlying assumption is that it is always the media that has an impact on prices. My paper innovates by modeling the interaction between media coverage and a firm's pricing behavior.

My model makes two predictions: 1- Higher prices lead to more attention; and 2- More attention lead to lower prices. This model is presented in the following section. I then test the model using data from the automobile liability insurance market for the years 1984-1993. The methodology used, the hypotheses to be tested and the data used in the testable model are presented in section 3 of the paper. Because media attention and pricing behavior are jointly determined, I need to use a two-step estimator approach to

[2] For early papers on the economics of regulation, see Stigler (1971), Posner (1974) and Pelzman (1976).

correctly estimate the complete model. In section 4 I present our main empirical results. I run robustness checks in section 5. Finally, section 6 concludes.

2. Model

My model complements Erfle and McMillan (1990) and Glazer and McMillan (1992). Suppose the value of the firm today depends on its expected value in the next period. The firm's next-period value is either V_u if the firm is unchallenged by the media, or V_m if the media challenges the firm's pricing behavior. In Erfle and McMillan (1990) the authors refer to the two possible values of the firm as *unregulated* and *regulated*. They start off by assuming that a firm is not regulated in the present period, and then argue that the firm's future value depends on whether or not it is regulated. A similar approach was used by Boyer (2000) who views V_u and V_m as the no-more regulated and more stringently regulated values.

2.1 Setup

Define p as the non-liability premium part of the total automobile insurance policy, which includes the comprehensive (p_1) and the collision premiums (p_2). Let p then be the liability insurance premium, and y be a vector of other exogenous events that may impact a firm's value. Let the unchallenged value of the firm be given by $V_u=V_u(p,p,y)$, and the challenged value by $V_m=V_m(p,y)$. Assume that $V_u > V_m$. Profits are increasing in both type of premiums so that $\frac{\partial}{\partial p} V_u(p,p,y) > 0$ and $\frac{\partial}{\partial p} V_u(p,p,y) > 0$.[3]

Since the corporation's profits are increasing in non-liability premiums even when liability premiums are no longer chosen, I have $\frac{\partial}{\partial p} V_m(p,y) \geq 0$. To guarantee an interior solution to the maximization problem, suppose that a firm's value is concave in the premiums. Finally, let **q** be the probability that the value of the firm is V_m, where **q** is the probability that the media pays attention to liability insurance rate regulation issues. If **q** is independent of **p** and **p**, the expected value of the firm is

$$EV = (1-q)V_u(p,p,y) + qV_m(p,y) \tag{1}$$

Suppose now that **q** depends on the liability-to-total premium ratio so that $q = q\left(\frac{p}{p+p}, x\right)$, where $\frac{p}{p+p}$ is the liability-to-total premium ratio and **x** is a vector of some outside parameters over which a firm has no control. The firm chooses both **p** and **p**. The program then becomes

$$\underset{p,p}{Max}\, EV = \left(1-q\left(\frac{p}{p+p}, x\right)\right)V_u(p,p,y) + q\left(\frac{p}{p+p}, x\right)V_m(p,y) \tag{2}$$

2.2 Predictions

The first order conditions of (2) are

[3] I assume here that media pressure only impacts liability insurance pricing so that firms no longer control those decisions. Assuming that media pressure induces an intervention on all automobile insurance market does not change the model much; only that $?V_u/ ?\mathbf{p} = 0$ in the first order conditions below.

$$\frac{\mathrm{dEV}}{\mathrm{d}p} = 0 = (1-q)\frac{\mathrm{dV_u}(p,p,y)}{\mathrm{dp}} + q\frac{\mathrm{dV_m}(p,y)}{\mathrm{dp}} - [\mathrm{V_u}(p,p,y) - \mathrm{V_m}(p,y)]\frac{dq\left(\frac{p}{p+p},x\right)}{dp} \quad (3)$$

$$\frac{\mathrm{dEV}}{\mathrm{d}p} = 0 = (1-q)\frac{\mathrm{dV_u}(p,p,y)}{\mathrm{d}p} - [\mathrm{V_u}(p,p,y) - \mathrm{V_m}(p,y)]\frac{dq\left(\frac{p}{p+p},x\right)}{dp} \quad (4)$$

It follows that

$$\frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}p} - \frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}p} = \frac{(1-q)\frac{\mathrm{dV_u}(p,p,y)}{\mathrm{d}p} - q\frac{\mathrm{dV_m}(p,y)}{\mathrm{dp}} - (1-q)\frac{\mathrm{dV_u}(p,p,y)}{\mathrm{dp}}}{\mathrm{V_u}(p,p,y) - \mathrm{V_m}(p,y)} \quad (5)$$

Because liability insurance has a longer tail than other types of automobile insurance,[4] a dollar paid for liability insurance has a greater income generating potential than a similar dollar in another insurance line. This means that for a given probability of media attention I find

$$(1-q)\frac{\mathrm{dV_u}(p,p,y)}{\mathrm{d}p} > (1-q)\frac{\mathrm{dV_u}(p,p,y)}{\mathrm{dp}} + q\frac{\mathrm{dV_m}(p,y)}{\mathrm{dp}} \quad (6)$$

It then follows that

$$\frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}p} > \frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{dp}} \quad (7)$$

This means that an increase in liability premiums has a greater effect on the probability of media attention than an increase in collision and/or comprehensive premiums. Expanding both terms in (7) yields

$$\frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}p} = \frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}\frac{p}{p+p}}\frac{p}{(p+p)^2} \quad \textit{and} \quad \frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{dp}} = \frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}\frac{p}{p+p}}\frac{p}{(p+p)^2} \quad (8)$$

Clearly,

$$sign\left(\frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}p}\right) = sign\left(\frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}\frac{p}{p+p}}\right) = -sign\left(\frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}p}\right) \quad (9)$$

From (7) it follows that

$$\frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}x} > 0 > \frac{\mathrm{dq}\left(\frac{p}{p+p},x\right)}{\mathrm{d}p} \quad (10)$$

so that

[4] A claim takes more time to settle in a long-tail line of insurance than in a short-tail line.

$$\frac{\mathrm{dq}\left(\frac{p}{p+p}, x\right)}{\mathrm{d}\frac{p}{p+p}} > 0 \tag{11}$$

This allows me to state my first proposition.

> ***Proposition 1***. The higher the proportion of the total premium paid for liability insurance, the higher the probability of seeing the media paying attention to rate regulation issues.

On the other side of the market, insurers react to media attention toward rate regulation issues. It is important to characterize the behavior of the insurance industry confronted by the media. Isolating dV_u/dp and dV_u/dp from the first order conditions yields

$$\frac{\mathrm{dV_u(p,}p\mathrm{, y)}}{\mathrm{dp}} = \frac{\mathrm{dq}\left(\frac{p}{p+p}, x\right)}{\mathrm{dp}}\left[\frac{\mathrm{V_u(p,}p\mathrm{, y) - V_m(p, y)}}{1 - \mathrm{q}\left(\frac{p}{p+p}, x\right)}\right] - \frac{q\left(\frac{p}{p+p}, x\right)}{1 - q\left(\frac{p}{p+p}, x\right)}\frac{d\mathrm{V_m(p, y)}}{dp} \tag{12}$$

and

$$\frac{\mathrm{dV_u(p,}p\mathrm{, y)}}{\mathrm{d}p} = \frac{\mathrm{dq}\left(\frac{p}{p+p}, x\right)}{\mathrm{d}p}\left[\frac{\mathrm{V_u(p,}p\mathrm{, y) - V_m(p, y)}}{1 - \mathrm{q}\left(\frac{p}{p+p}, x\right)}\right] \tag{13}$$

Since higher liability premiums lead to higher probability of media attention (we showed in equation 10 that $dq/dp>0$), it follows from (13) that $dV_u/dp>0$. Let p^* be the equilibrium liability premium if the pricing behavior has no impact on media attention. Since $dV_u/dp>0$ when $dq/dp>0$, then it must be that $p<p^*$. Therefore if the media increases its attention as liability premiums increase, then insurers will charge a lower premium than under no media scrutiny.

Similarly, let p^* be the equilibrium non-liability premium if the pricing behavior has no impact on media attention. From equation 12, $dV_u/dp<0$ when $dq/dp<0$ (I showed in equation 10 that $dq/dp<0$), it must then be that $p>p^*$. If the non-liability premium charged has a negative impact on the probability that the media focuses on automobile liability insurance rate regulation issues, then insurers will charge a higher premium for non-liability insurance services than under no media scrutiny. Combining these two effects yields the second proposition of the paper.

> ***Proposition 2.*** The greater the media's attention toward liability insurance rate regulation issues, the smaller the proportion of the total premium devoted to liability insurance.

My model of media attention and insurance pricing behavior mandates some that I control for the simultaneity of the two effects. This means that any empirical analysis will necessitate the use of a two-step estimator approach. Furthermore, other factors may affect the probability of media attention, and the liability-to-total premium ratio.

3. Testable Model

I use the National Association of Independent Insurers (NAII) Fast Track Data Tapes as my main source of automobile and homeowner insurance data. I have access to 10 years of quarterly data (1984-1993) by state.[5] The states of California and New Jersey have been removed from the final analysis because of omissions in the data,[6] and so has the District of Columbia. Because of the presence of lagged variables, I am left with a total of 1,764 observations (36 quarters, 48 states).

For any line, I calculate the average premium as the ratio of total earned premiums to total units insured. *LIAB* and *COCO* are then the average premiums in liability, and comprehensive & collision insurance respectively. Similarly, *HOME* is the average homeowner insurance premium. My dependent variable (*LIABILITY*) is constructed as the percentage of the total automobile premium paid for liability coverage:

$$LIABILITY = 100 * \frac{LIAB}{LIAB + COCO}$$

I approximate all the media's attention by the written media's attention. I used LEXIS/NEXIS to determine whether there was any media attention toward rate regulation issues.[7] I constructed the media attention variable (*MEDIA*) as a dummy variable as an approximation of all the different media's attention[8] toward liability rate regulation in a state in a quarter. Table 1 in the appendix presents the distribution of that variable by quarter and by state.

3.1 Methodology

Presumably, the media's attention toward liability insurance and the firms' liability pricing decisions are jointly determined. To correct for this endogeneity, I need to use a two-step estimator. Since one of my dependent variable, *MEDIA*, is a qualitative variable, I specify the problem as in Maddala (1983, chapter 8.8) with *LIABILITY* observed and *MEDIA* dichotomous. The methodology used follows Maddala (1983).

3.2 Hypotheses

3.2.1 Liability

[5] These ten years were an important time period in the liability insurance markets. This period was characterized by a sharp increase in liability premiums. The time period that spans the late eighties and early nineties is known as the liability crisis. This time period presents all the characteristics to test the theoretical model presented herein: Important price fluctuations, consumer activism, price ceilings, referendums to regulate more strigently premium increases, etc.

[6] The passage of Proposition 103 in California and the Fair Access to Insurance Reform Act of 1992 in New Jersey prohibited statistical agents from publishing information on California and New Jersey.

[7] The exact search on LEXIS/NEXIS was performed with the following parameters: *insurance* with *regulation* in the same sentence, and *rate* with *regulation* in the same paragraph, and *automobile*, and *date* between *1983* and *1994*. This search provided 2,134 hits. After eliminating the articles that were not relevant (for example, hits related to automobile credit insurance regulation), we were left with 154 usable hits. The LEXIS/NEXIS service includes around 130 newspaper and business journal titles.

[8] For example, news that appeared in newspapers not included in LEXIS/NEXIS, on the radio and on television. Erfle and McMillan (1990) used the number of minutes of national television news coverage (three major networks) as their approximation for media/regulatory attention of the oil industry. Their data was collected from the *Television News Index and Abstract* compiled at Vanderbilt University.

The two main hypotheses I want to test in this paper relate to the two propositions presented in section 2. Proposition 2 predicts that media's attention toward liability insurance issues (*MEDIA*) should reduce the liability-to-total insurance premium ratio (*LIABILITY*). The basic model used to determine *LIABILITY* is

$$\begin{aligned} LIABILITY_{it} = {} & Intercept + MEDIA_{it} + LIABHOME_{it} + REGULATION_{it} \\ & + TREND_t + TREND103_t + PROP103_t + Q1_t + Q2_t + Q3_t \\ & + TBILL_t + CORPBOND_t + SNP500_t + CPI_t + UNIT_{i,t-1} + e_{it} \end{aligned}$$

My prediction is that *MEDIA* should have a negative sign. The summary statistics of these variables are presented in Table 2.

Table 2
Summary Statistics

Variable name	Mean	Standard deviation	Minimum	Maximum
LIABILITY	66.229	6.7722	31.039	79.719
LIABHOME	71.980	25.701	21.390	176.51
MEDIA	0.0654	0.2473	0	1
LIABPAID	138.99	66.930	35.341	726.80
TOTAUTO	503.21	511.15	191.71	6087.0[9]
LIABINC	1.6814	2.4615	-18.491	21.233
$UNIT_{t-1}$	1.1041	0.1593	0.5880	3.0666
TREND	4.5000	2.0783	1	8
PROP103	0.4444	0.4970	0	1
TREND103	2.8889	3.2888	0	8
REGULATION	0.5515	0.4975	0	1
TBILL (%)	4.0874	7.8904	-22.630	21.327
CORPBOND (%)	1.4616	0.4414	0.6980	2.1871
SNP500 (%)	3.3464	4.1185	-6.0700	12.327
CPI (%)	0.9087	0.4880	-0.4280	2.1556
ELECTION	0.1111	0.3144	0	1

The liability-to-homeowner premium ratio (*LIABHOME*) should have a positive impact on *LIABILITY*. We can view *LIABHOME* as a proxy for the insurers' operating costs such as salaries and advertising expenses. In that sense, general increases in operating costs should be picked up by this variable. Moreover, since *LIABILITY* is constructed as a ratio, its value may vary from quarter to quarter not because liability premiums vary (the numerator), but because comprehensive and/or collision premiums vary (the denominator). In that sense it becomes important to control for variations in *LIABILITY* that are not due to variations in automobile liability insurance premiums.

To control for a state's behavior toward regulating automobile liability insurance sector (*REGULATION*), I constructed a dummy variable that is equal to one when liability insurance is regulated, and zero otherwise. Although there are many level of state intervention, ranging from pure competition to premiums fixed by the insurance commissioner, we only use a zero-one approach. I expect regulation of liability insurance to have a negative impact on *LIABILITY* since liability premiums are kept below their equilibrium level.

The passage of Proposition 103 in California in November 1988 was a culminating point in consumer activism toward automobile liability insurance. Only the state of Florida had answered consumer concerns

[9] This maximum average premium is found in Massachusetts in the third quarter of 1990. Aside from Massachusetts, the maximum total average premium paid is 1100 dollars (in Connecticut and Hawaii).

up until then by mandating price reductions for liability insurance. The California initiative was more important in the sense that California is the largest U.S. market. This initiative prompted consumer groups all over the United States to petition for similar regulation. I therefore expect the impact of *PROP103* to be negative.

At the same time, the liability crisis reached its peak around 1988. In 1993 the proportion of the total insurance premium devoted to liability insurance was similar to its proportion in 1984. Liability insurance premiums being cyclical, we expect a positive trend prior to the passage of proposition 103, and a negative trend after. This means that *TREND* should be positive, and *TREND103* should be negative. Quarter dummies (*Q1*, *Q2* and *Q3*), for which I have no a priori, correct for seasonality.

As shown by Myers and Cohn (1987) and Cummins (1992), it is important to control for insurer investment opportunities in determining premiums. Premiums paid generate investment income for insurers up until the time a claim is paid (or a loss is incurred, depending on one's definition). The higher is the anticipated return on investment, the lower the premium should be. This means that premiums may be lower than expected claims without driving insurers into bankruptcy, provided investment income is large enough

This Discounted Cash Flow approach also means that more income is generated when premiums are invested for a longer period of time. Since liability insurance claims take more time to settle than collision and/or comprehensive insurance claims, liability insurance premiums should respond more to changes in anticipated returns. This means that we should expect the quarterly return on three-months treasury bill (*TBILL*), on long-term corporate bonds (*CORPBOND*) and on the Standard and Poor's 500 index (*SNP500*) to have negative signs, whereas quarterly inflation (*CPI*) should have a positive sign (since it increases expected indemnities). Table 3 presents the naive regressions used to obtain the predicted values of each variable. In each case, the current quarter's return is regressed on the last three quarters' return, a constant term and quarter dummies.

The last variable I want to include in the regression is the lagged unit price of insurance ($UNIT_{t-1}$), which is given by the ratio of earned premium to incurred losses. This gives us the cost of one unit of liability insurance. Assuming no change in expenses, the greater the unit price last period, the more surplus (also called *reserves*) insurers accumulated; which would allow to reduce premiums this period. This means that $UNIT_{t-1}$ should have a negative sign.

TABLE 3
Determinants of expected return
OLS regression in all cases.

Variable Name	Model 1 T-Bill	Model 2 Corp. Bond	Model 3 SNP 500	Model 4 CPI
Intercept	9.868** (0.619)	0.202** (0.021)	5.605** (0.342)	0.143** (0.045)
LAG1	-0.171** (0.024)	1.158** (0.024)	-0.004 (0.024)	0.099** (0.024)
LAG2	-0.227** (0.023)	-0.092* (0.036)	-0.047* (0.023)	0.195** (0.024)
LAG3	-0.191** (0.023)	-0.193** (0.023)	0.212** (0.021)	0.180** (0.024)
TREND	-0.812** (0.086)	-0.016** (0.002)	-0.239** (0.047)	-0.008 (0.005)
Q1	3.096**	-0.111**	2.272**	0.514**

	(0.500)	(0.009)	(0.279)	(0.031)
Q2	0.748 (0.526)	0.194** (0.010)	-1.029** (0.264)	0.430** (0.031)
Q3	-2.484** (0.502)	0.063** (0.011)	-3.761 (0.273)	0.512** (0.032)
R^2	**0.205**	**0.917**	**0.146**	**0.235**
Value of the coefficient, standard error in parentheses. **, * are significant at the 1% and the 5% level respectively.				

3.2.2 Media

With respect to the media's attention of liability insurance pricing issues, the basic model is

$$MEDIA_{it} = Intercept + LIABILITY_{it} + LIABINC_{it} + TOTAUTO_{it} + LIABPAID_{it} + TREND_t + TREND103_t + PROP103_t + ELECTION_t + e_{it}$$

I expect that the greater the liability-to-total premium ratio, the greater the media will pay attention to the issue of liability insurance pricing. *LIABILITY* should therefore have a positive sign.

Also, the media should pay more attention to liability insurance pricing when liability insurance premium increases are high (*LIABINC*) and when the total automobile premium is high (*TOTAUTO*). On the other hand, when more money comes back to policyholders after liability claims (*LIABPAID*), then the media should not be so attentive to rate regulation issues since *insurance is working as it should*.

Similarly to the model that explains *LIABILITY*, we expect *TREND* to be positive and *TREND103* to be negative. *TREND* should be positive because of the build-up in rate-regulation interest prior to the passage of Proposition 103. After the passage of Proposition 103 media interest should diminish as time passes since liability problems are less important; thus explaining the negative sign of *TREND103*. Because of Proposition 103, I expect more media attention toward automobile liability pricing issues in subsequent quarters. This means that *PROP103* should be positive. I expect no real seasonality in the data, except for the national election quarter. I want to control for the election quarter for two reasons: 1-Politicians may use insurance regulation as a platform to get elected; and 2-Liability insurance issues may be flooded by other issues. If the politician platform hypothesis is right, *ELECTION* should have a negative sign. If the flood hypothesis is correct, *ELECTION* should be positive.

3.3 Data

Quarterly insurance data was obtained from the National Association of Independent Insurers (NAII) Fast Track tapes. These tapes allow us to find *LIABINC*, *TOTAUTO*, *LIABPAID*, *LIABHOME*, $UNIT_{t-1}$, and *LIABILITY*. These variables are constructed[10] as

$$LIABINC = 100 * \frac{LIAB - LIAB_{t-1}}{LIAB_{t-1}}$$

$$TOTAUTO = LIAB + COCO$$

$$LIABPAID = \frac{PAID}{UNIT}(Liability) + \frac{PAID}{UNIT}(C\&C)$$

$$LIABHOME = \frac{LIAB}{HOME}$$

[10] C&C refers to Comprehensive and Collision insurance. To simplify notation, *Paid* is means paid losses, *Units* means exposure units, *Earned* means earned premiums and *Incurred* means incurred losses

$$UNIT = \frac{Earned\ premiums}{Incurred\ losses}$$

$$LIABILITY = 100 * \frac{LIAB}{LIAB + COCO}$$

where

$$LIAB = \frac{Earned}{Units}(Liability)$$

$$COCO = \frac{Earned}{Units}(C\ \&\ C)$$

$$HOME = \frac{Earned}{Units}(Home)$$

Data related to an insurer's investment opportunity (*TBILL*, *CORPBOND*, *SNP500* and *CPI*) were obtained from the Compustat. Finally, *Q1*, *Q2*, *Q3*, *TREND*, *TREND103*, *PROP103* and *ELECTION* are time dummies equal to one when we are in the first quarter, second quarter, third quarter, after 1988 and in the third quarter of even years respectively, and zero otherwise.

4. Results: Main Model

4.1 Ordinary Least Squares: Table 4A

I present in Table 4A the simple OLS regression with the basic structural forms used in the remainder of the paper. We see that the media attention variable does not seem to influence significantly the liability-to-total premium ratio. The liability-to-homeowner premium ratio is positive and significant as expected. The lagged unit price ($UNIT_{t-1}$) does not have the expected sign. This result would suggest that the higher the unit price of liability insurance (which allows insurers to have more in reserves), the higher will be the liability insurance part of the total premium. Although I was expecting the opposite, this result is not significant. A possible explanation for this positive sign is that the unit price is not the right instrument to represent an insurer's accumulated reserves because it does not take into account expenses explicitly. This means that $UNIT_{t-1}$ may increase not because more reserves are accumulated, but because expenses are greater. It would then be logical to observe greater liability insurance premiums. We then have two approximations for an insurer's expenses: *LIABHOME* and $UNIT_{t-1}$.[11] Whether liability insurance is regulated does not seem to affect the liability-to-total premium ratio.

Surprisingly, none of the investment opportunity variables (*TBILL*, *CORPBOND*, *SNP500*, *CPI*) are significant in the regression presented in Table 4A. This would suggest that investment income opportunities have no effect on the pricing of liability insurance compared to total automobile insurance. Similarly, none of the quarter dummies are significant, which suggest that there is no seasonality in the data. Finally, the *TREND*, TREND103 and *PROP103* variables are significant. Only *PROP103* is of the expected sign, however. This would suggest that the liability-to-total premium ratio decreased from 1985 to 1988 and then increased from 1989 to 1993. Because of the size of the coefficient of *TREND103*, the discreet jump in 1989 due to *PROP103* is positive, although *PROP103* is itself negative. This OLS regression explains about 46.7% of the variation in *LIABILITY*, as measured by the adjusted R-square.

[11] Removing $UNIT_{t-1}$ from the analysis does not change significantly the main results of the paper.

TABLE 4A: Simple model regressions without two-step estimator. Probit regression when MEDIA is the dependent variable. OLS regression when LIABILITY is the dependent variable.		
Variable name	Media	Liability
Intercept	-7.268** (0.774)	54.24** (1.918)
Media		-0.079 (0.499)
Liability	0.051** (0.010)	
LIIABHOME		0.186** (0.005)
LIABINC	-0.014 (0.019)	
TOTAUTO (‘000)	0.428* (0.197)	
LIABPAID (‘000)	2.651 (1.615)	
$UNIT_{t-1}$		1.328 (0.793)
TREND (‘000)	0.527** (0.085)	-0.669** (0.174)
TREND103 (‘000)	-0.797** (0.119)	1.026** (0.346)
PROP103	3.248** (0.628)	-5.359** (1.947)
ELECTION	-0.428* (0.213)	
REGULATION		-0.009 (0.242)
Q1		-0.056 (0.751)
Q2		-0.292 (0.578)
Q3		-0.434 (0.795)
TBILL		-0.022 (0.060)
CORPBOND		-0.479 (0.607)
SNP500		0.002 (0.144)
CPI		0.584 (1.369)
Goodness of Fit	LL=-333.3	R^2=.467
Value of the coefficient, standard error in parentheses. **, * are significant at the 1% and 5% levels respectively.		

When we look at what determines the probability that the media pays attention to liability insurance prices, most of my variables are of the expected sign and significant. The liability-to-total premium is positive, which tells us that the greater the ratio, the more the media finds itself interested in liability rate-regulation issues. Also, the total automobile premium (*TOTAUTO*) is positive and significant. The liability premium increase (*LIABINC*) and the average liability loss paid (*LIABPAID*) are not significant, and not of the correct sign. Finally, *ELECTION* is negative and significant at the five-percent level, which suggests that the politician-platform hypothesis seems to hold to the detriment of the flood hypothesis. Our *TREND*, *TREND103* and *PROP103* variables are of the expected sign.

Of course, these results are biased since *MEDIA* and *LIABILITY* are determined jointly. This means that a two-step estimator must be used.

4.2 Two-Step Estimator: Table 4B

I present in Table 4B the two-step estimator regressions. Column 1 presents the reduced-form equation for *MEDIA* using a probit maximum likelihood. This predicted probability is used in the *LIABILITY* regression in column 4. Column 2 presents the reduced-form equation for *LIABILITY*. I use the predicted value of *LIABILITY* derived from the regression in column 2 in the structural equation of MEDIA in column 3.

TABLE 4B: Two-step estimator regressions. Probit regression when MEDIA is the dependent variable. OLS regression when LIABILITY is the dependent variable.				
Variable Name	Reduced Equation MEDIA	Reduced Equation LIABILITY	Structural Equation MEDIA	Structural Equation LIABILITY
Intercept	-4.080** (0.989)	48.43** (0.152)	-5.716** (0.859)	46.96** (1.864)
MEDIA (PROBIT)				-27.87** (1.865)
LIABILITY (OLS)			0.028* (0.013)	
LIABHOME	0.005* (0.002)	0.162** (0.004)		0.219** (0.005)
LIABINC	-0.003 (0.020)	0.199** (0.040)	-0.007 (0.019)	
TOTAUTO ('000)	-0.087 (0.155)	-11.86** (0.343)	0.186 (0.238)	
LIABPAID ('000)	5.114** (1.552)	67.22** (2.999)	3.778* (1.904)	
$UNIT_{t-1}$	0.045 (0.377)	4.723** (0.612)		1.081 (0.746)
TREND	0.402** (0.099)	-0.885** (0.134)	0.507** (0.084)	0.722** (0.187)
TREND103	-0.443* (0.207)	0.792** (0.266)	-0.752** (0.116)	0.286 (0.329)
PROP103	1.485 (1.078)	-3.861** (1.501)	3.052** (0.614)	-4.942** (1.831)
ELECTION	0.124 (0.298)	0.012 (0.399)	-0.381 (0.206)	
REGULATION	-0.048 (0.114)	0.448* (0.187)		0.466* (0.230)
Q1	0.198 (0.349)	0.308 (0.564)		0.901 (0.709)
Q2	0.054 (0.266)	0.452 (0.438)		-0.292 (0.544)
Q3	-0.597 (0.466)	0.684 (0.703)		-2.048** (0.755)
TBILL (%)	-0.029 (0.032)	0.017 (0.049)		-0.150** (0.057)
CORPBOND (%)	0.528 (0.307)	-0.869 (0.454)		2.576** (0.605)
SNP500 (%)	-0.068 (0.082)	0.046 (0.111)		-0.086 (0.136)
CPI (%)	-0.349 (0.698)	1.111 (1.041)		-0.564 (1.291)
Goodness of Fit	LL=-338.9	R^2=.702	LL=-343.5	R^2=.528
Value of the coefficient, standard error in parentheses. **, * are significant at the 1% and 5% levels respectively .				

The variables used to instrument the media's attention toward liability insurance rate regulation are then the percentage increase in automobile liability insurance (*LIABINC*), the total automobile premium (*TOTAUTO*), the average liability loss paid to policyholders (*LIABPAID*) and the election quarter (*ELECTION*). To instrument the liability-to-total premium ratio in determining the probability the media is concerned about liability insurance issues, we use the liability-to-homeowner premium ratio (*LIABHOME*), the lagged unit price ($UNIT_{t-1}$), the predicted financial variables (*TBILL*, *SNP500*, *CORPBOND*, *CPI*) and the seasonality dummies (*Q1*, *Q2*, *Q3*).

In column 3 we see that there is a higher probability that the media will pay attention to liability rate regulation issues when the liability-to-total premium ratio is higher. Even though the significance of the *LIABILITY* variable in column 3 is less than in Table 4A, the result remains significant at the five-percent level. My two-step estimator results seem to validate Proposition 1.

I also find that *ELECTION* is negative, although not significant. This suggests that politicians may use the liability insurance rate regulation issue to get elected. *TREND*, *TREND103* and *PROP103* are significant and of the expected sign. This suggests that there was a build-up in the probability of media attention up until the passage of Proposition 103. The passage of Proposition 103 in California increased media attention after

1989, although this attention got smaller with time. The net impact of these three variables was basically the same at the beginning as at the end of the period. Neither the average liability loss paid (*LIABPAID*) nor the average liability premium increase (*LIABINC*) are of the expected sign, but they are not significant. The average total premium (*TOTAUTO*) is not significant either, although it is of the expected sign.

I test Proposition 2 in the last column of Table 4B. By controlling for the simultaneity between *LIABILITY* and *MEDIA* we see that media's attention toward liability insurance rate regulation reduces the liability-to-total premium ratio. Although the *MEDIA* variable was not significant in the straight *OLS* regression (Table 4A), by using a two-step estimator we have that it is now significant at the one-percent level. This supports Proposition 2.

As for the other explanatory variables, my predictions do not seem to be supported completely. For example, the lagged unit price of liability insurance ($UNIT_{t-1}$) and *TREND103* have positive signs, although they are not significant. Of the financial market variables, only the expected return of the treasury bills (*TBILL*) is of the expected sign and significant. *CORPBOND* is significant, but of the opposite sign. The *CORPBOND* result suggests that the expected return on long-term corporate debt does not represent the expected return of investing premiums in this type of financial instrument. Rather, *CORPBOND* could represent the insurer's cost of borrowing capital from the financial markets. In this sense, a higher expected return on long-term corporate debt would lead to higher premium to reimburse the higher interest payments on the debt. The regulation dummy is positive, which is opposite to what we expected.

The liability-to-homeowner premium ratio is positive as expected. This means that *LIABHOME* may be playing the role of controlling for all exogenous insurer costs. The positive signs of *TREND* and *TREND103* suggest that the proportion of the total automobile premium paid by policyholder for liability insurance increased from 1985 to 1993. This seems to contradict my initial hypothesis that the liability portion should go down after the passage of Proposition 103. The negative sign of *PROP103* supports that hypothesis, however. The trend coefficients should therefore be seen as determinants of the slope rather than level.

In short, the empirical results presented in Table 4B seem to support Propositions 1 and 2 of the model.

I used other model specifications to verify the robustness of my model. The results of these regressions are discussed in Section 5. I still find that an increase in *MEDIA* reduces significantly *LIABILITY* (Table 5) whatever the model used. On the other hand, *LIABILITY* does not have a consistently significant impact on *MEDIA* (Table 6). State fixed effects are introduced in Table 7.

5. Results: Robustness

I present in Tables 5, 6 and 7 robustness checks for explaining the relationship between media attention and the automobile liability-to-total premium ratio. Using the base regression of Table 4B, I added secondary variables to control for geographic location, and other demographic, political and insurance market conditions. Tables 5 and 6 present the results using a two-step estimator approach. Table 5 presents the determinants of the automobile liability-to-total premium ratio, whereas Tables 6 presents the determinants of media attention toward liability insurance pricing. Although I do not present every individual result,[12] I present the different variables used and their expected impact on *LIABILITY* and *MEDIA*. I first present the secondary data and their hypothesized impact. I then move to the analysis.

[12] To save space, I do not present the reduced form regressions. Only the structural forms are presented. The complete results are available from the author upon request.

5.1 Secondary Data and Hypotheses

We regrouped the variables[13] under different headings to lighten the presentation: *Insrmkt, Quarter, Trends, Region, Stkmkt, Economic, Politic, Demog1, Demog2* and *Prices.*

Variables in *Insrmkt* were presented before. They are the instruments used to determine *MEDIA* in the two-step procedure: *LIABINC, LIABPAID, TOTAUTO* and *ELECTION*.

The instruments used to determine *LIABILITY* in the two-step procedures are grouped under the headings **Quarter** (*Q1, Q2* and *Q3*), **Stkmkt** (*TBILL, CORPBOND, SNP500* and *CPI*), $UNIT_{t-1}$ and *LIABHOME.* To conclude on the variables already presented, **Trends** includes *TREND, TREND103* and *PROP103*.

I divided the United States into six regions: *NorthEast, MidEast, SouthEast, NorthWest, MidWest* and *SouthWest*.[14] These variables are grouped under the heading *Region*. I have no a priori regarding the sign of the different regions on either *MEDIA* or *LIABILITY*. I include regional dummies to control for conditions (weather, market, political, race) that may be specific for some regions.

In **Economic**, I include liability insurance market characteristics (*RESIDUAL, HERFINDAHL, NUMCOS, DWSHARE* and *AGENTS*) of each state by year. *RESIDUAL* is the percentage of automobile drivers insured through the residual market in a state. I expect this percentage to have a positive impact on *MEDIA* and an ambiguous impact on *LIABILITY*. The residual market works as a fallback position for an agent who is not able to find a company willing to sell him liability insurance. The agent is then sent to the residual insurance market where the state insurance commissioner will typically mandate an insurer to sell a policy to the residual agent. The media may then be more willing to discuss the plight of these agents confronted with the impossibility to buy any kind of insurance. The impact on *LIABILITY* is not as clear. If prices in the residual market act as an effective price ceiling for the voluntary market then consumers can opt for the residual market coverage, and thus *LIABILITY* should be smaller. On the other hand, a positive sign is expected if the residual market runs a deficit that must be compensated by larger premiums on the voluntary market.

HERFINDAHL is the Herfindahl index of market concentration in automobile liability insurance. I expect a positive sign for explaining both *MEDIA* and *LIABILITY*. A more concentrated market means that the media may want to be more of a watch dog of the industry. Moreover, a more concentrated liability insurance market means that liability premiums are higher, and the liability-to-total premium ratio should be greater. At the opposite, the number of insurance companies that sell automobile liability in the state (*NUMCOS*) should be negatively related to *MEDIA* and *LIABILITY*. The reason is that more companies increase competition, and thus reduce the media's role as a watchdog and reduces the opportunity for profits. Both measures of competitiveness are included in the regression to control for different aspects of it: The Herfindahl index is slightly biased toward larger companies, whereas the straight number of companies is biased toward smaller ones. It is important to control for those two aspects of the supply of insurance given the large-size bias of the NAII fast-track data.

DWSHARE is the market share of insurance companies that operate through exclusive agents or direct sales in automobile liability. Insurance companies have two main ways to distribute their products: Independent

[13] Many of the economic and demographic variables used in this section of the paper were borrowed from Suponcic and Tennyson (1995).

[14] States in the *NorthEast* (8) are: CT, ME, MA, NH, NJ, NY, PA, RI, VT. States in the *MidEast* (6) are: DE, DC, KY, MD, TN, VA, WV. States in the *SouthEast* (8) are: AL, AR, FL, GA, LA, MS, NC, SC. States in the *NorthWest* (10) are: AK, CO, ID, MT, ND, OR, UT, SD, WA, WY. States in the *MidWest* (9) are: IL, IN, IA, MI, MN MO, NE, OH, WI. States in the *SouthWest* (7) are: AZ, CA, HI, KS, NV, NM, OK, TX. California, New Jersey and the District of Columbia have been omitted in the final data set. We omit *MidWest* in the analysis.

agents and Exclusive agents (and the special case of Direct Writers). Independent agents are allowed to sell the policies of any insurer for which he receives a commission. Exclusive agents on the other hand are allowed to sell only the product of an unique insurer. These exclusive agents may work for a commission, or they may receive a salary. It has been argued that insurance companies who sell their product through an exclusive agent have better cost efficiency than independent agencies (see Cummins and Vanderhei, 1979, and Barrese and Nelson, 1992). This is often attributed to the greater fixed investment that exclusive agencies (and especially direct writers) make in establishing an office in a given state and lower marginal cost. Since they have a greater proportion of their assets invested in fixed assets, I expect them to have greater exposure to liability insurance regulation risk since it is relatively more costly for them to exit a market than it is for independent agents. Therefore direct writers and other exclusive agents should be more willing to appease the population and regulators. This means that *DWSHARE* should have a negative impact on *MEDIA*. The impact on *LIABILITY* should be the same since more efficient insurers should bring down the price of liability insurance, and thus reduce the liability-to-total premium ratio. *AGENTS* is the number of insurance agents in the state.[15] I have no a priori regarding the impact of this variable.

Variables grouped under **Politic** are related to the political system of a state: *ELECTED*, *GOVDEM*, *HOUSEDEM*, and *BUDPOP*. *ELECTED* is the variable that represents whether the insurance commissioner is elected in a state (value of 1) or not (value of 0). Presumably, an insurance commissioner elected by the general population should be more inclined to campaign for his job, thus increase media coverage of the issue. *ELECTED* should then have a positive impact on *MEDIA*. On the other hand *ELECTED* should have a negative impact on *LIABILITY*, since an elected insurance commissioner who wants to please the people who elected him may be more willing to apply pressure on insurance companies to keep liability premiums to a decent level.

The *GOVDEM* dummy takes the value one if the governor is Democrat, and zero otherwise, and the *HOUSEDEM* variable is equal to the number of Democrats minus the number of Republicans in the state's lower house, divided by the sum of the two. Because Democrats are argued to be more willing to intervene in the economy than Republicans, they may be more willing to apply pressure on insurance companies to reduce liability insurance premiums. Thus, both these variables should have a negative impact on *LIABILITY*. I have no a priori regarding the impact of either variable on *MEDIA*. Finally, *BUDPOP* is equal to the total state budget divided by the state's population. A greater state budget means more money to oversee insurance practices. This means that *BUDPOP* should have a negative impact on *LIABILITY*. *BUDPOP* should have a positive impact on *MEDIA*, however. When the government handles more of the people's money (greater government budget per head), the media may scrutinize more closely its actions.

Demog1 includes demographic and state variables that change from year to year, whereas variables included in *Demog2* do not change for the eight years of the data. *INCOME* is the average per capita income of a state. *URBAN* is the percentage of total miles driven in urban areas. *YOUNG* is the percentage of the population between the ages of 18 and 24. *RAUTODPW* is equal to the ratio of the state's automobile liability direct premiums written to the country's as a whole; it is in fact a variable that represents the size of the state. *TOTMILES* is the total miles driven in a state. *FATALITIES* represents the fatalities in car accidents. HOSPDAY is the average cost of one day of hospital stay. *URBAN*, *YOUNG*, *TOTMILES*, *FATALITIES* and *HOSPDAY* should all have positive impact on *LIABILITY* since they are all factors that increase the cost of liability insurance. We have no a priori regarding the impact of a state's size, as measured by *RAUTODPW* on *LIABILITY*.

I include in **Demog2** the following variables: *COLLEGE*, *MIGRANTS*, *EDUCATION* and *NOFAULT*. The first three variables are not available by year, and the fourth one has not changed for the sample years in any state. *COLLEGE* is the percentage of the population with a college degree in 1990, whereas *EDUCATION* is

[15] This number is not available for Connecticut and Rhode Island in 1987. We therefore assigned the numbers corresponding to the averages of 1986 and 1988.

the average number of years of education of the population in 1990. Both variables are expected to have a positive impact on *THREAT*, and a negative impact on *LIABILITY* because a more highly educated population will induce more media attention as it is more likely to read newspapers and be involved in the local economy and political debates. On the other hand, a more educated population should be more aware of the dangers of the road, and thus drive more carefully; thus the negative impact on *LIABILITY*.

MIGRANTS is the percentage of the population new to the state in 1990 compared with 1980. I have no a priori concerning this variable on either the probability of media attention or the liability-to-total premium ratio. *NOFAULT* is the variable that represents whether a state has no-fault regulation (value of 1) or not (value of 0). *NOFAULT* should have a negative impact on both *MEDIA* and *LIABILITY*. Liability premiums should represent a lower proportion of the total premium in no-fault states because no-fault limits the use of this type of insurance. It also means that the media should pay less attention to these issues since liability insurance is not as important in states that have no-fault laws as in states that do not.

All price indices variables are found under **Prices**.[16] All of them are national consumer price indices. *NEWCAR* is the price index of new automobiles; *NEWTRUCK* is the price index of new trucks; *ENERGY* is the price index of all forms of energy (electricity, natural gas, heating gas); *PUBTRAN* is the price index of public transportation (city buses, subways); *PRIVTRAN* is the price index of private transportation (taxis); *HOSPITAL* is the price index of hospital services; *PREMGAS* if the price index of premium gasoline; *USEDCAR* is the price index of used automobiles; *TRANSERV* is the price index of transportation services; *TRANSPORT* is the price index of all types of transport; *FUELOIL* is the price index of fuel oil; *NEWVEH* is the price index of all new vehicles (automobiles and trucks); *MTRFUEL* is the price index of motor fuel; *DGAS* is the price index of all type of gasoline.

The price indices of new automobiles (*NEWCAR*) and new trucks (*NEWTRUCK*) should have a negative impact on *LIABILITY* since the comprehensive and collision part of the premium should be higher, and the liability part should not be affected. The same should be expected from the used car price index (*USEDCAR*). The cost of energy (*ENERGY*) and the cost of premium gasoline (*PREMGAS*) should also reduce the liability-to-total premium ratio since it becomes relatively more costly to drive an automobile. Thus, these price increases should reduce a policyholder's chance of being liable for an accident since he is less likely to drive his automobile. On the other hand, a higher cost of public transport (*PUBTRAN*) and of private transport (*PRIVTRAN*) should increase a policyholder's willingness to use his automobile, and therefore his probability of an accident. This means that *PUBTRAN* and *PRIVTRAN* should have a positive impact on *LIABILITY*. Finally, the price index for hospital services (*HOSPITAL*) should have a positive impact on the liability-to-total premium ratio because it will cost more to insurers to indemnify victims of automobile accidents for their injuries.

I formulate no hypothesis regarding the impact of the different price indices on *MEDIA*.

5.2 Analysis

The results are presented in Tables 5 and 6. In Table 5, *LIABILITY* is the dependent variable. We see that *MEDIA* is consistently negative, as expected, and always significant at the one-percent level.[17] This convincingly suggests that media attention toward automobile insurance liability pricing issues reduces the proportion of the total premium devoted to liability insurance. The level of significance is not as high as in Table 4B however. Nevertheless the results robust enough to argue that media attention reduces automobile liability insurance premiums as a ratio of the total automobile insurance premium.

[16] See United States Department of Commerce (http://www.doc.gov/).
[17] We could not test for state fixed effects since the reduced form probit would not converge. We answer this concern in section 5.3.

Table 5: Determinants of the automobile liability-to-total insurance premium ration (LIABILITY)
Structural equation of Two-step analysis; Robustness of the model.
The reduced equation for MEDIA is a probit regression.

Variable	Model 5A	Model 5B	Model 5C	Model 5D	Model 5E	Model 5F
Intercept	31.74 (80.93)	43.08** (3.305)	31.77** (2.936)	42.68** (3.147)	49.97** (1.366)	51.09** (1.255)
MEDIA (PROBIT)	-11.54** (1.048)	-12.25** (1.078)	-13.27** (1.087)	-9.432** (1.061)	-6.393** (1.143)	-3.025** (1.111)
LIABHOME	0.171** (0.006)	0.171** (0.006)	0.168** (0.005)	0.200** (0.006)	0.205** (0.006)	0.189** (0.005)
$UNIT_{t-1}$	-0.588 (0.599)	-0.666 (0.606)	-0.442 (0.623)	-0.574 (0.633)	1.411 (0.793)	1.224* (0.807)
INSRMKT						
QUARTERS	YES					
TRENDS	YES					
REGION	YES	YES		YES	YES	
STKMKT	YES					
ECONOMIC	YES	YES	YES	YES		
POLITIC	YES	YES	YES	YES		
DEMOG1	YES	YES	YES	YES		
DEMOG2	YES	YES	YES		YES	
PRICES	YES					
TIME FIXED		YES	YES	YES	YES	YES
Goodness of fit	$adjR^2$=0.728	$adjR^2$=0.728	$adjR^2$=0.698	$adjR^2$=0.698	$adjR^2$=0.504	$adjR^2$=0.950

Value of the coefficient, standard error in parentheses.
**, * are significant at the 1% and 5% levels respectively

Variables in each category:
INSRMKT: LIABINC, LIABPAID, TOTAUTO, ELECTION;
QUARTER: Q1, Q2, Q3; **TRENDS**: TREND, TREND103, PROP103;
REGION: NorthEast, MidEast, SouthEast, NorthWest, SouthWest;
STKMKT: TBILL, CORPBOND, SNP500, CPI;
ECONOMIC: RESIDUAL, HERFINDAHL, DWSHARE, NUMCOS, AGENTS;
POLITIC: REGULATION, ELECTED, BUDPOP, GOVDEM, HOUSEDEM;
DEMOG1: INCOME, URBAN, YOUNG, RAUTODPW, TOTMILES, FATALITIES, HOSPDAY;
DEMOG2: COLLEGE MIGRANTS, EDUCATION, NOFAULT;
PRICES: NEWCAR, NEWTRK, ENERGY, PUBTRAN, PRIVTRAN, HOSP, PREMGAS, USED.

In Table 6, *MEDIA* is the dependent variable. We see that, more often than not, *LIABILITY* increases significantly the probability that the media will pay attention to liability insurance issues. In fact, with the exception of models 6A and 6C, *LIABILITY* increases *MEDIA* significantly at the five-percent level in the other four model specifications. This evidence supports our Proposition 1, although not as convincingly as the evidence in favor of Proposition 2 presented in Table 5.

Table 6: Determinants of the likelihood that MEDIA=1: Probit Regression.
Structural equation of Two-Step analysis; Robustness of the model.
The reduced equation for LIABILITY is an OLS regression.

Variable	Model 6A	Model 6B	Model 6C	Model 6D	Model 6E	Model 6F
Intercept	-197.0** (66.47)	-13.18** (3.949)	-6.574* (2.730)	-12.43** (3.390)	-7.945** (1.082)	-6.684** (0.891)
LIABILITY (OLS)	0.063# (0.037)	0.079* (0.040)	0.009 (0.028)	0.097** (0.029)	0.083** (0.014)	0.057** (0.012)
INSRMKT	YES	YES	YES	YES	YES	YES
QUARTERS						
TRENDS	YES					
REGION	YES	YES		YES	YES	
STKMKT						
ECONOMIC	YES	YES	YES	YES		
POLITIC	YES	YES	YES	YES		
DEMOG1	YES	YES	YES	YES		
DEMOG2	YES	YES	YES		YES	
PRICES	YES					
TIME FIXED		YES	YES	YES	YES	YES
Goodness of fit	LL = -267.7	LL = -241.2	LL = -245.6	LL = -251.6	LL = -274.7	LL = -295.4

Value of the coefficient, standard error in parentheses.
**, * are significant at the 1% and 5% levels respectively

Variables in each category:
INSRMKT: LIABINC, LIABPAID, TOTAUTO, ELECTION;
QUARTER: Q1, Q2, Q3; **TRENDS**: TREND, TREND103, PROP103;
REGION: NorthEast, MidEast, SouthEast, NorthWest, SouthWest;
STKMKT: TBILL, CORPBOND, SNP500, CPI;
ECONOMIC: RESIDUAL, HERFINDAHL, DWSHARE, NUMCOS, AGENTS;
POLITIC: REGULATION, ELECTED, BUDPOP, GOVDEM, HOUSEDEM;
DEMOG1: INCOME, URBAN, YOUNG, RAUTODPW, TOTMILES, FATALITIES, HOSPDAY;
DEMOG2: COLLEGE MIGRANTS, EDUCATION, NOFAULT;
PRICES: NEWCAR, NEWTRK, ENERGY, PUBTRAN, PRIVTRAN, HOSP, PREMGAS, USED.

5.3 State Fixed Effects

State fixed effects cause a problem in this paper. In many states no media attention was ever observed for the entire time period. One way to remedy this problem is to remove from the data all states where the media did not pay attention to liability insurance pricing issues for the entire 9 years.[18] By doing so, the size of the sample is reduced from 1728 state-quarter observations to 1080 state-quarter observations. I present the results of the second-step regressions in Table 7, where *LIABILITY* no longer has any significant impact on *MEDIA* although the impact of *MEDIA* on *LIABILITY* remains significant. This would suggest that Proposition 1 is not supported by the results presented in Table 7, but that Proposition 2 is.

[18] These states are AL, AK, AR, CO, DE, KS, KY, MI, MN, MS, NE, ND, OK, SD, TN, UT, VT and WY.

Table 7: Determinants of the likelihood that MEDIA = 1, Probit regression.
Determinants of the value of LIABILITY, OLS regression.
Structural equation of Two-step analysis; Robustness of the model.
State fixed effects used. State eliminated from the analysis:
AL, AK, AR, CO, DE, KS, KY, MI, MN, MS, NE, ND, OK, SD, TN, UT, VT, WY

Variable	Model 7A	Model 7B	Model 7C	Model 7D	Model 7E	Model 7F
Intercept	-6.835 (6.828)	-241.5** (77.31)	-4.809 (12.16)	58.94** (1.019)	61.94 (50.94)	36.90** (5.432)
LIABILITY (OLS)	0.060 (0.097)	0.079 (0.104)	0.066 (0.120)			
MEDIA (PROBIT)				-4.045** (0.718)	-1.974** (0.486)	-3.977** (0.645)
INSRMKT	YES	YES	YES	YES	YES	YES
QUARTERS					YES	
TRENDS		YES			YES	
REGION						
STKMKT					YES	
ECONOMIC		YES	YES		YES	YES
POLITIC		YES	YES		YES	YES
DEMOG1		YES	YES		YES	YES
DEMOG2						
PRICES		YES			YES	
STATE FIXED	YES	YES	YES	YES	YES	YES
TIME FIXED	YES		YES	YES		YES
Goodness of fit	LL = -222.8	LL = -240.4	LL = -211.5	AdjR^2= 0.899	AdjR^2= 0.931	AdjR^2= 0.932

Value of the coefficient, standard error in parentheses.
**, * are significant at the 1% and 5% levels respectively

Variables in each category:
INSRMKT: LIABINC, LIABPAID, TOTAUTO, ELECTION;
QUARTER: Q1, Q2, Q3; **TRENDS**: TREND, TREND103, PROP103;
REGION: NorthEast, MidEast, SouthEast, NorthWest, SouthWest;
STKMKT: TBILL, CORPBOND, SNP500, CPI;
ECONOMIC: RESIDUAL, HERFINDAHL, DWSHARE, NUMCOS, AGENTS;
POLITIC: REGULATION, ELECTED, BUDPOP, GOVDEM, HOUSEDEM;
DEMOG1: INCOME, URBAN, YOUNG, RAUTODPW, TOTMILES, FATALITIES, HOSPDAY;
DEMOG2: COLLEGE MIGRANTS, EDUCATION, NOFAULT;
PRICES: NEWCAR, NEWTRK, ENERGY, PUBTRAN, PRIVTRAN, HOSPITAL, PREMGAS, USED.

6. Conclusion

I presented in this paper a simple model to show the interaction between media attention toward a firm's pricing behavior and that firm's pricing behavior. From this simple model I was able to draw two testable propositions, one regarding media attention and one regarding a firm's pricing behavior. I applied this model to the case of automobile liability insurance pricing.

In the first proposition of the model I predict that the percentage of the total automobile insurance premium devoted to liability insurance increases the probability that the media pays attention to such an issue. In the

second proposition I predict that media attention toward liability insurance pricing issues reduced the percentage of the total automobile insurance premium devoted to liability insurance. Using a two-step estimator approach, I tested this Media Attention Hypothesis using state quarterly data from 1984 to 1993 provided by the National Association of Independent Insurers.

My first proposition seems to be validated in most model specifications. These results suggest that an increase in the percentage of automobile insurance premium paid toward liability insurance increases the probability that the media will pay attention to liability pricing issues. This is true whether we use a straight probit approach (Tables 4A), or a two-step probit approach (Table 4B and 6). When we include state fixed effects into the regression model, however, these results are not robust (Table 7).

Proposition 2 is supported in every two-step estimator approach. Media attention toward liability insurance rate regulation issues seems to reduce the proportion of the total premium devoted to liability insurance. After controlling for the simultaneity between our two dependent variables (Table 4B), I find that the percentage of the premium devoted to liability insurance was over 27 percentage points smaller when the media paid attention to pricing issues. This impact is greatly reduced when we control for other factors. Nonetheless, we see in Table 5 that media attention reduced liability insurance prices by at least three percentage points after controlling for simultaneity issues. This impact is significant at the one-percent level. In Table 7, I confirm this relationship using state-fixed effects.

My results show strong evidence that, in the presence of media attention toward liability insurance rate regulation issues, insurance companies reduced their automobile liability insurance premiums compared to the total automobile insurance premium. Moreover, keeping in mind the limitation of the model when state fixed effects are included, it appears that a greater liability-to-total premium ratio increases the probability that the written media will devote space to automobile liability insurance pricing issues.

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Table 1

Regulatory Threat Dummy by State and by Quarter

	84,1	84,2	84,3	84,4	85,1	85,2	85,3	85,4	86,1	86,2	86,3	86,4	87,1	87,2	87,3	87,4	88,1	88,2	88,3	88,4	89,1	89,2	89,3	89,4	90,1	90,2	90,3	90,4	91,1	91,2	91,3	91,4	92,1	92,2	92,3	92,4	93,1	93,2	93,3	93,4	sum
AL																																									0
AK																																										0
AZ																					1	1		1	1	1	1	1								1	1		1	1	11
AR																																									0
CO																																									0
CT																	1				1																				2
DE																																									0
FL										1						1				1	1	1					1	1									1				8
GA																										1	1				1					1					4
HI																																				1					1
ID																									1																1
IL										1								1		1	1	1	1	1	1																8
IN																					1																				1
IA																				1		1																				2
KS																																									0
KY																																									0
LA																																					1				1
ME																					1	1																			2
MD	1																			1	1	1																			4
MA																1				1		1			1	1	1	1				1					1		1	1	11
MI																																									0
MN																																									0
MS																																									0
MO																								1	1			1														3
MT								1																																	1
NE																																									0
NV																						1	1	1	1	1										1	1				7
NH																					1											1									2
NM																						1		1																	2
NY																																						1			1
NC																								1										1		1					3
ND																																									0
OH																				1	1	1																			3
OK																																									0
OR										1										1	1																				3
PA														1						1	1	1	1		1	1				1				1		1					10
RI															1																1									2
SC																						1		1							1					1					4
SD																																									0
TN																																									0
TX																						1	1	1		1	1		1			1				1	1				9
UT																																									0
VT																																									0
VA																			1	1	1			1																	4
WA																						1																			1
WV																					1																				1
WI																					1	1																			2
WY																																									0
	1	0	0	0	0	0	0	1	0	3	0	0	0	1	1	2	1	1	1	9	14	15	4	9	7	6	5	4	1	1	2	3	1	2	0	10	3	1	3	2	
				1				1				3				4				12				42				22				7				13				9	114