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REGULATORY STRINGENCY AND MARKET PERFORMANCE
IN PRIVATE PASSENGER AUTOMOBILE INSURANCE

By

Robert Warren Klein

A DISSERTATION

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in partial fulfillment of the requirements
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ABSTRACT

REGULATORY STRINGENCY AND MARKET PERFORMANCE IN PRIVATE PASSENGER AUTOMOBILE INSURANCE

By

Robert Warren Klein

The primary objective of the dissertation is to investigate the role of regulatory stringency in state regulation of private passenger automobile insurance rates and determine its differential effect on market performance. Previous studies on the effects of rate regulation in automobile insurance have tended to group all states that actively regulate rates together and treat their regulatory policies uniformly. These studies have generally found that rate regulation has had no effect on market performance but there are serious questions as to whether their measurement of regulation is adequate and the time period they have examined is typical. In contrast to previous research, this study explicitly controls for varying regulatory stringency among states and over time so as to determine its differential impact on performance.

In order to determine whether more stringent regulation affects market performance, a direct and unambiguous measure

of regulatory stringency is incorporated into regression equations seeking to explain interstate differences in the ratio of losses incurred to premiums earned over the period 1973-1982. By utilizing a state regulatory requirement that insurers discount their rates to reflect investment income as an indicator of stringent regulation and a longer time period, this study determines that greater regulatory stringency does increase the ratio of losses to premiums. Therefore, contrary to the general finding of previous research, rate regulation does have a significant impact on market performance in private passenger automobile insurance. The study also concludes that the positive effect of regulation on the loss ratio increased in liability insurance and decreased in physical damage insurance over the period 1973-1982, consistent with predicted shifts in the stringency of regulation of these two lines. In addition, the study finds that cost exaggeration has worked somewhat successfully as a counter-regulation strategy for insurers in liability insurance at lower levels of stringency.

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CHAPTER ONE

INTRODUCTION

The role of government regulation in the economy has been the subject of considerable theoretical and empirical study. Very few subjects probably spark as much intense debate among economists as the question of who regulation serves and how it affects market performance. Those who subscribe to the public interest theory of regulation contend that regulation protects consumers' interests and promotes economic efficiency. Capture theorists, on the other hand, argue that regulation serves only producers' interests and results in economic inefficiency. Lastly, a pluralistic or coalition-building theory of regulation suggests that the bias of regulation between consumers and producers and its impact on performance will vary depending upon economic and political conditions. Given the continual stream of proposals for either regulation or deregulation of various industries, it is critically important to expand our understanding of how regulation affects the economy.

One industry attracting considerable empirical study regarding the effect of price regulation on market performance is the private passenger automobile insurance industry. The automobile insurance industry provides a good opportunity to isolate the effects of price regulation because it is actively regulated by some states but not by others, yet, at the same time, its basic characteristics are

fairly uniform across states. Previous studies of state automobile insurance regulation have generally tested either the public interest or capture theories of regulation. (1) Their objective has been to determine how the existence of rate regulation has affected premium levels or profitability. These studies have essentially found that rate regulation has had no discernible impact on premiums or profitability. Hence, no support has been found for either the public interest or capture theories of regulation. However, this research suffers from a significant shortcoming which limits the scope of its findings.

To date, no study has properly considered the significance of the application of different levels of regulatory stringency among states where stringency would be measured by the proximity of the regulated rate to what regulators perceive or accept marginal cost to be. There is considerable evidence of varying stringency across states and over time in automobile insurance rate regulation. It seems that the effect of regulation on performance might be quite different if regulators attempted to keep rates very close to marginal cost than if they established rates considerably exceeding marginal cost. Yet, the typical approach is to effectively lump all states together that actively regulate rates and treat their regulatory policies

1) A good survey of these studies is provided by Scott Harrington, "The Impact of Rate Regulation on Prices and Underwriting Results in the Property-Liability Insurance Industry: A Survey," Journal of Risk and Insurance 51 (December 1984): 577-623.

uniformly. These studies have also tended to draw their data from relatively short periods of time. This approach only permits estimation of how rate regulation, on average, has affected performance over a relatively short period of time. It is possible that, by lumping all regulating states together, the negative effect of particularly stringent regulation on rates in some states is obscured or offset by the effect of less stringent regulation in other states. In addition, the use of a relatively short sample period might cause one to incorrectly extrapolate the effect of regulation during that period to other periods.

The question emerges: what is the differential effect of greater regulatory stringency on performance? Does greater regulatory stringency result in lower premiums and profits? Does rate regulation only lower profits in those states which have particularly stringent regulation? Has the effect of regulation on performance shifted over time due to changing stringency? It should be pointed out that there is no assurance that more stringent regulation will decrease profits if insurers can mislead regulators into permitting them higher rates by exaggerating their costs.

Previous research leaves the above questions unanswered. Even studies which have attempted to account for regulatory stringency in some fashion have done so inadequately by using ambiguous or implicit measures of regulatory stringency which do not permit a sure test of its significance. Consequently, despite the evidence of varying

regulatory stringency across states and over time, there is no clear understanding of how it affects performance.

The failure to account for regulatory stringency in previous studies is important because of the erroneous implication that is drawn from the typical finding that prior approval regulation has had no measurable effect on market performance. That implication is that rate regulation has had no effect in any state, or more significantly, that rate regulation cannot affect performance. (2) These conclusions are unwarranted if it can be shown that greater regulatory stringency among states that regulate rates has reduced profitability. An understanding of how regulatory stringency affects performance is critical to an understanding of how rate regulation might potentially affect performance in any given state.

The primary objective of the dissertation is to investigate the role of regulatory stringency in state regulation of private passenger automobile insurance rates and determine its differential effect on market performance. Contrary to the typical approach, this investigation will not assume that states which regulate automobile insurance rates do so with the same degree of stringency. Rather, this study will explicitly control for different degrees of regulatory stringency among states using an unambiguous and direct measure of regulatory stringency.

2) See for example, Mark Nadel, "Auto Insurance: The Irrelevance of Regulation," Regulation 6 (March/April 1982): 37-42.

It will be demonstrated that the degree of regulatory stringency does make a difference in how rate regulation affects market performance. Specifically, it will be shown that greater stringency results in reduced profitability as indicated by a higher ratio of claims incurred to premiums earned. This implies that rate regulation is a relevant factor in automobile insurance and that its potential impact on market performance cannot be determined without consideration of how stringent it will be.

Regulation and Regulatory Stringency

Under the traditional public interest theory, regulation maximizes social welfare by correcting the unfortunate allocative consequences of market failures, principally natural monopoly. (3) In the case of natural monopoly, it is more efficient to have one producer achieve maximum economies of scale than several producers competing for business. However, if left on his own, the monopolist, to maximize profits, would choose a level of output below and a price above that which would be considered optimal for society. Regulation can force the monopolist to produce at a socially optimal output level and enforce prices which permit a rate of return just sufficient to attract the amount of capital needed for the optimal output.

3) See, for example, James C. Bonbright, Principles of Public Utility Rates (New York: Columbia University Press, 1961).

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In the 1950s, political scientists such as Bernstein and Kolko postulated an alternative view of regulation characterized as capture theory. (4) Under this theory, based on observation of industries such as trucking and railroads, regulation is initiated or acquired by the regulated industry to serve its own interests rather than consumers'. This means that regulation will be used to raise profits rather than maximize consumer welfare. Thus, regulation promotes inefficiency and makes consumers worse off. Later theoretical work by Jordan, Posner, and Stigler gave analytical content to the capture hypothesis by postulating an economic theory of regulation in which the concentrated interests of producers tend to prevail over the diffused interests of consumers in the transfer of wealth through regulation. (5)

Peltzman subsequently formalized Stigler's model, effectively modifying the capture position in an attempt to develop a more general theory of regulation. (6) He showed

4) Marver H. Bernstein, Regulating Business by Independent Commission (Princeton, N.J.: Princeton University Press, 1955); and Gabriel Kolko, Railroads and Regulation, 1887-1916 (Princeton, N.J.: Princeton University Press, 1965).

5) William Jordan, "Producer Protection, Prior Market Structure and the Effects of Government Regulation," Journal of Law and Economics 15 (April 1972): 151-176; Richard Posner, "Theories of Economic Regulation," Bell Journal of Economics 5 (Autumn 1974): 335-352; George Stigler, "The Theory of Economic Regulation," Bell Journal of Economics 2 (Spring 1971): 3-21.

6) Sam Peltzman, "Toward a More General Theory of Regulation," Journal of Law and Economics 19 (August 1976): 211-240.

that, if there is positive consumer political opposition to higher prices, regulators will not enforce a price-output solution which will maximize industry profits. Rather, regulators will set a price somewhere between the competitive price and the profit-maximizing price. Where the market price will be set between these two bounds will depend upon cost and demand conditions and the relative political sensitivities of consumers to price and producers to profits.

Peltzman's work introduced a new consideration into the study of regulation, the possibility that the bias of regulation between consumers and producers might vary between markets depending upon specific conditions within those markets. This is really not a consideration in either the public interest or capture theories. Under the public interest theory, regulation is as pro-consumer as possible, enforcing prices as low as possible without impairing service or driving capital out of the industry. Under a pure version of the capture theory, regulation would presumably be as pro-producer as possible, restricting output and raising price to the point of maximizing industry profits. In Peltzman's model, however, the bias of regulation is not fixed but is dependent upon economic and political conditions.

A significant implication of Peltzman's work is that the bias of regulation potentially becomes an important factor in how regulation affects performance. In the public

interest and capture frameworks, where the bias of regulation is essentially fixed or predetermined, the only undetermined variable which make a difference in how regulation will affect performance is where the market output and price would be set in the absence of regulation.

Under the public interest theory, the effect of regulation on the market rate will be determined by how far the market price would exceed the socially optimal price in the absence of regulation. Regulation should have no impact on the market price in a structurally competitive market because competitive pressures in the absence of regulation would establish the socially optimal price. The less competitive is the industry and the greater the market price that would be established in the absence of regulation, the greater the negative impact regulation will have on the market price and profits.

Analagously, under a capture view of regulation, where we would assume that producer protection is at a maximum, the effect of regulation on the market price is determined by how far it would fall below the industry profit-maximizing price in the absence of regulation. The more competitive is an industry and the lower the market price that firms could sustain on their own, the greater the positive effect regulation will have on price and profits.

In Peltzman's model, where the bias of regulation is not given but is itself a variable subject to conditions within the market, it is necessary to establish where both

the regulated price will be set and the unregulated price would be set in order to determine the effect of regulation on performance. In a competitive market, for instance, the effect of regulation will be different if regulators choose to set the market price near the competitive price than if they set it near the monopoly price. Consequently, Peltzman's model implies that the bias of regulation is an important consideration in predicting the effect of regulation on market performance in any given industry.

One could alternatively refer to the relative bias of regulation between consumers and producers as the degree of regulatory stringency where a greater bias towards consumers would be equated with greater stringency. Under a strict interpretation, the degree of regulatory stringency could be measured in terms of the proximity of the regulated price to the socially optimal price - the closer this proximity, the more stringent regulation would be considered. In the case of an industry with essentially constant costs, such as property-casualty insurance, regulatory stringency could thus be measured in terms of the proximity of the regulated price to long-run marginal and average cost. (7)

Of course, if stringency is defined in this manner then it would be tautological to talk about the effect of regulatory stringency on market performance since stringency

7) Joskow has found evidence of constant costs in property-liability insurance. Paul L. Joskow, "Cartels, Competition, and Regulation in the Property-Liability Insurance Industry," Bell Journal of Economics 4 (Autumn 1973): 384-388.

would be essentially defined in terms of performance. Alternatively, in this study, regulatory stringency is measured in terms of the proximity of the regulated price to what regulators perceive marginal cost to be (or at least officially accept it to be). This is, arguably, a more relevant definition of regulatory stringency in a world of imperfect information in which regulators have to rely on producers for estimates of costs.

When insurers submit rate filings which contain estimates of their costs, regulators have to make some judgement as to what costs actually are based on the estimates provided. Regulators, in turn, determine what they will accept as a reasonable rate based on what they perceive costs to be. Since regulators are not as intimately familiar with insurers' operations and the factors that affect their costs as are insurers themselves, regulators are at a disadvantage in terms of determining the actual level of costs. Consequently, regulators could be led to believe or at least be forced to accept cost inflated estimates from insurers within reasonable limits because they are not in a position to know or determine the true level of costs with precise certainty. If regulators are led to believe that costs are higher than they are, they will be inclined to permit insurers a higher rate than they would if they knew the actual level of costs.

Insurers might also offset the effect of regulation by reducing their costs by reducing their quality of service.

Specifically, insurers can reduce their service by restricting claims settlement. The cost estimates that regulators use to determine the allowable rate will assume the current or historical level of quality associated with those costs, unless other assumptions are explicitly made. Once rates are approved, insurers will be able to increase their profits by lowering their costs through reducing the number of claims accepted. This will result in higher profits than regulators intended as well as a lower ratio of claims incurred to premiums earned.

Hence, the distinction between the actual level of costs and what regulators perceive them to be becomes significant if the possibilities of misinformation about costs and quality reduction exist. Measuring regulatory stringency by the difference between the regulated price and what regulators perceive marginal cost to be conceptualizes it in terms of what regulators seek to accomplish rather than what they actually do accomplish.

Defining regulatory stringency in this manner leaves open the possibility that greater stringency will not have a differential effect on performance. It will be demonstrated that insurers will be induced to file inflated cost estimates if they can obtain a higher rate and higher profits from regulators by doing so. Insurers might also increase their profits at a given rate level by reducing costs through reducing quality of service. In both cases, actual costs turn out to be less and profits higher than

what regulators thought they would be. Under the first strategy, insurers seek to get a higher rate and higher profits by exaggerating what their costs are based on their current level of quality. Under the second strategy, insurers seek to increase profits at a given rate by subsequently lowering their quality and costs below levels assumed by regulators when they approved that rate.

The possibility of either of these events means that regulators may not be able to achieve the desired relationship between rates and actual costs. In other words, greater regulatory stringency may not affect performance if it can be offset by inflated rate filings or reduced quality of service. The objective of this study is to determine whether greater regulatory stringency in automobile insurance has, indeed, affected performance or not. This study, then, is ultimately a study of whether insurance regulators can achieve their intended objectives.

Unfortunately, for empirical purposes, good data is not available on the actual difference between the regulated rate and the regulatory perception of marginal cost in each state. However, a reasonable indicator for stringent regulation - the existence of a state regulatory requirement that insurers discount their rates for investment income - is available. It will be demonstrated that imposing such a requirement on insurers implies more stringent regulation, all else equal. Since some regulating states have such a requirement and others do not, it can be used to distinguish

greater regulatory stringency in order to determine its differential impact on market performance.

Study Design

The dissertation is developed in the following manner. Chapter Two reviews various aspects of the automobile insurance product and the structure of the industry relevant to the study. Chapter Three examines the historical development of state regulatory institutions in property-liability insurance, discusses the movement towards more stringent regulation in some states, and looks at the relationship between stringency and regulatory policies toward inclusion of investment income in rate making which is useful for empirical purposes. Chapter Four examines, in greater depth, anecdotal evidence of particularly stringent regulation in several states over the last decade. Chapter Five reviews previous studies of automobile insurance regulation and shows how these studies have failed to adequately measure the differential impact of greater regulatory stringency on market performance.

Chapter Six presents a theoretical model of the automobile insurance market under regulation which analyzes the role of regulatory stringency in determining market performance. This analysis, which adopts Peltzman's model to automobile insurance, demonstrates that rate regulation will reduce profits only if that regulation is relatively

stringent and is not offset by insurers filing inflated cost estimates or reducing their quality of service.

Chapter Seven presents an empirical estimation of the model which tests the hypothesis that greater regulatory stringency reduces profitability. The ratio of losses incurred to premiums earned serves as an indicator of profitability. The existence of a state regulatory requirement that insurers discount rates for investment income is used to indicate higher stringency. The empirical evidence presented here supports the hypothesis that greater regulatory stringency has generally raised the loss ratio. Further analysis indicates that the positive effect of rate regulation on the loss ratio has increased in automobile liability insurance and decreased in automobile physical damage insurance over the last decade, consistent with a predicted shift in the relative stringency of regulation of these two lines.

Chapter Eight offers conclusions and discusses policy implications and areas for further research. We now turn to a basic review of the automobile insurance industry.

CHAPTER TWO
THE PRIVATE PASSENGER AUTOMOBILE INSURANCE INDUSTRY

Private passenger automobile insurance is the preeminent property-casualty insurance line with direct written premiums of \$43.5 billion in 1984 which represented roughly 36 percent of total premiums written in the property-casualty insurance industry. (1) Commercial automobile insurance accounted for an additional \$9.1 billion in written premiums in 1984. (2) Automobile insurance is further divided into two sublines or major coverages -- liability and physical damage insurance. In 1984, private passenger liability insurance premiums came to \$25 billion and private passenger physical damage premiums were \$18.5 billion. (3)

The Product

Liability coverage indemnifies the insured against any legal liability he may incur for personal injury or property damage caused by the negligent operation of his

1) "Property-Casualty Insurance - 1985." Best's Review Property/Casualty Edition, July 1985, p. 15.

2) Ibid.

3) Ibid.

automobile.(4) Liability coverage will also cover any bodily injury or property damage (excluding damage to his automobile) that the insured may suffer through his own negligence. Liability coverage is typically sold with some sort of financial limits on the total indemnity undertaken by the insurer.

Some states have modified the tort law relating to the negligent operation of an automobile by enacting no-fault statutes. A no-fault law makes drivers responsible for their own damages in the event of an accident regardless of who is at fault. A "true" no-fault law allows injured drivers to sue for medical costs and for "pain and suffering" only after a certain threshold has been reached. Some states have "add-on" systems in which drivers are responsible for their own damages but there is no threshold on tort suits. Liability coverage in no-fault states is modified to reflect the different system. The objective of a no-fault law is to reduce costs by restricting the ability to sue for damages. The belief is that restricting the ability to sue for damages reduces the amount of litigation expense and expedites the process of settling claims. (5)

4) For further background information on private passenger automobile insurance see J.D. Long and D.W. Gregg, eds., Property and Liability Insurance Handbook (Homewood, Ill: Richard D. Irwin, Inc., 1965).

5) See U.S. Department of Transportation, Office of the Secretary of Transportation, Compensating Auto Accident Victims: A Follow-up Report on No-Fault Auto Insurance Experiences (Washington, DC: Government Printing Office, 1985).

Physical damage insurance compensates the insured for losses suffered due to physical damage to his automobile, regardless of who is at fault. Collision insurance covers the damage caused by collisions with other vehicles or objects. Comprehensive insurance covers damage not caused by a collision but damage caused from other events such as vandalism, theft, fire, and weather. Both collision and comprehensive coverages can be purchased with deductibles which is some stated dollar amount of any loss that the insured must bear. Deductibles can range from \$50 to \$500 and can substantially lower premiums by relieving insurers of the expense of handling small claims.

The quality of service that an insured will receive from an insurer on a given policy can vary several different ways. One important variable is the way in which an insurer handles first-party claims. Insurers can choose to closely scrutinize claims or be somewhat lax. Greater laxity will tend to result in more marginal claims being accepted or higher settlements being paid. Insurers can also vary the speed with which claims are settled. Lastly, insurers can provide or withhold additional services to policyholders such as delivery of policies, low-cost financing of premiums, and special informational services.

Automobile insurance policies are typically written for six-month or one-year terms. In most states, insurers are severely restricted in their ability to cancel existing policies. Insurers generally do have relatively wide

discretion when it comes to renewing expired policies, or writing new policies, however. Michigan is somewhat of an exception in this case in that automobile insurers are required to accept applicants unless they have particularly bad driving records or have been convicted of fraud.

Insurers are somewhat selective in who they will write coverage for when they are allowed to be. In some cases insurers will refuse to write coverage for a particular individual who is felt to be too risky because of a particularly bad driving record or some other undesirable characteristic. Understandably, insurers will not find it profitable to underwrite risks where the rate generated by their existing rating system will not cover the expected cost. Persons who are unable to find coverage in the "voluntary market" must either remain uninsured, forgo owning an automobile, or resort to the "residual market." Every state has some sort of mechanism such as an assigned risk plan or joint underwriting association through which drivers, unable to get coverage in the voluntary market, can be "assigned" to a specific carrier or insured through a pooling arrangement among all the carriers in the state.

Costs of Production

The expected cost of an automobile insurance policy is equal to the expected loss on the policy plus provisions for selling, loss adjustment, and general administrative expenses and profit. The expected loss on a policy should

be the primary component of the total expected cost. The expected loss is a function of the probability that an accident claim will be made and the expected severity of that claim. The probability of an accident and its expected severity is a function of many factors, some under the control of the insured, others not. The individual's own driving habits are a very important factor affecting his expected loss. Where a person drives can also have a significant impact on loss experience, reflecting such factors as traffic density, road conditions, and traffic law enforcement.

The expected severity of a claim in dollar terms will be influenced by the cost of associated goods and services. Bodily injury claim costs are affected by the level of physicians' fees and hospital room rates. Collision and comprehensive claim costs are affected by the cost of replacing or repairing damaged vehicles. The expected loss for a policy will also be affected by various terms and restrictions put on the policy such as financial limits, whether medical benefits are coordinated with the insured's health insurance policy, and deductibles.

The expenses involved with selling and servicing an automobile insurance policy can be split roughly into three components -- selling expense, loss adjustment expense, and general expense. Selling expense refers to the cost of those services directly associated with selling a policy. This involves basic paperwork, validation of the applicant's

driving record, advertising, and agents' commissions or salaries. Loss adjustment expense refers to those costs incurred in processing claims. Processing claims involves such activities as basic paperwork, investigation, negotiation, and litigation. Any expense which is not directly associated with selling policies or settling claims is lumped into the category of general administrative expense. This would include costs associated with basic administration of the company, taxes, fees, and depreciation or rental of buildings and equipment.

The expense incurred on a given policy has both fixed and variable components with respect to the expected loss. A certain amount of paperwork is required in selling a policy regardless of the size of the expected loss or premium. On the other hand, agents' commissions are generally paid as a flat percentage rate of the premium. Similarly, a certain amount of paperwork is required with every claim, no matter how small. However, some loss adjustment expense will vary with the size of the claim -- more expensive claims will tend to generate more investigation and litigation. Because certain components of expenses are fixed for a given policy or claim, expenses will increase less than proportionately with the expected loss on a given policy. Consequently, the ratio of expense

costs to lost costs should decrease for a policy as the loss cost increases. (6)

Other factors can affect the ratio of expenses to losses besides the size of the average loss. As mentioned earlier, the existence of a no-fault statute can reduce litigation expense. The type of marketing system that an insurer uses can also affect their expenses.

Automobile insurance is essentially marketed under two different systems. Some insurers use the independent agency system to sell their policies. An independent agent can have contracts with a number of different carriers to sell their policies and provide associated services in return for a commission on premiums. Other insurers are direct writers. Direct writers sell policies through the mail or employ agents that sell policies exclusively for them. Studies indicate that direct writing offers certain cost savings over the agency system in terms of lower commissions and greater efficiency in recordkeeping and claims service.(7) For this reason, the expenses on a given policy will be lower for a direct writer than for an agency company. This also means that the greater the share of a market held by direct writers, the lower total market

6) M. Pauly, H. Kunreuther, and P. Kleindorfer, "Regulation and Quality Competition in the U.S. Insurance Industry." April 1984.

7) J.D. Cummins and J. VanDerhei, "A Note on the Relative Efficiency on Property-Liability Insurance Distribution Systems," Bell Journal of Economics 10 (Autumn 1979): 709-19.

expense costs will be in relation to total market loss costs.

With their relative cost advantage, the market share of direct writers has increased gradually. In 1984, direct writers accounted for 60.7 percent of total automobile insurance premiums written nationally, compared with 45.1 percent in 1970. (8) The question which emerges here is why direct writing has not completely replaced the agency system, given the greater cost efficiency of direct writing. It may be that agency companies are somewhat protected from price competition from direct writers because consumers are reluctant to transfer their business from their independent agent and their agency insurer. (9) There are several possible factors behind this. Some consumers may simply prefer to stay with an independent agent with whom they have had a long personal association. They may or may not be aware that they could save money by insuring with a lower-price direct writer. There is evidence that many consumers lack good information about the market and are unaware that there are price differences among insurers. (10) Some consumers also fear that a new carrier, with whom they have

8) A.M. Best Company, Best's Insurance Management Reports Property/Casualty On-Line Reports, 17 (Oldwick, N.J.: A.M. Best Company, August, 15, 1985).

9) J.D. Cummins, D.M. McGill, H.E. Winklevoss, and R.A. Zelten, Consumer Attitudes Towards Auto and Homeowners Insurance (Philadelphia, P.A.: Univ. of Pennsylvania, 1974): 11-27.

10) Ibid., pp. 62-73.

not had a long association, will be more likely to cancel them if they submit a claim. (11)

Start-up costs appear to be relatively minimal in property-liability insurance. Unlike in manufacturing, the physical facilities needed to run an insurance company are relatively modest. Some insurers advertise a great deal but many do not. Many agency companies rely on agents to market their product for them. The minimal financial surplus requirements for licensing in most states are relatively low, ranging generally between \$500 thousand and \$3 million. Consistent with these facts, Joskow found scale economies within the property-casualty industry not to be significant either for agency companies or direct writers, implying that new firms can enter the industry at a relatively small scale and still be cost competitive with existing firms. (12)

Profitability and Investment Income

The premiums earned by an insurance company can be split into three components -- losses, expenses, and underwriting profits. Total underwriting profits are equal to premium minus losses and expenses,

$$(2.1) \quad Z_u = P - L - E,$$

where

11) Ibid., pp. 94-101.

12) Ibid., pp. 384-388.

P = total premiums,

L = total losses,

E = total expenses,

Z_u = total underwriting profit.

The loss ratio is equal to losses divided by premiums and serves as a reasonably good indicator of the overall efficiency of the market. It indicates the amount of loss protection received for a dollar of premiums paid. Smallwood, among others, has characterized the loss ratio as the inverse of the "actuarial" price of insurance. (13) A higher loss ratio indicates a higher return to consumers in terms of loss protection received for a dollar of premiums paid. The loss ratio is also inversely related to the underwriting profits. If expenses are fixed, a higher loss ratio indicates lower profitability from underwriting alone. Because some expenses are difficult to allocate on a by-line and by-state basis for companies which write insurance in more than one state and in more than one line (which most insurers do), it is virtually impossible to calculate meaningful standard profit measures (such as rate of return on net worth) on a by-line and by-state basis. Consequently, loss ratios are typically used as indicators of profitability and market performance at this level.

13) Dennis E. Smallwood, "Competition, Regulation and Product Quality in the Automobile Insurance Industry," in Promoting Competition in Regulated Markets, ed. Almarin Phillips (Washington, D.C.: Brookings, 1975): 285.

The expense ratio is equal to expenses divided by premiums. The underwriting profit margin is equal to underwriting profit divided by premiums and can be obtained by subtracting the loss and expense ratios from 1,

$$(2.2) \quad Z_u/P = 1 - L/P - E/P.$$

The lower are premiums in relation to loss costs, the higher the loss ratio will be. If savings in expenses are achieved through some efficiency and are passed on to consumers through lower premiums, the result will be a higher loss ratio.

The loss ratio is not a perfect measure of profitability, however. If the expense ratio is not the same in two different markets, then comparison of the loss ratios between these markets will not accurately reflect differences in profitability. Pauly, Kunreuther, and Kleindorfer have pointed out that the loss ratio will be higher for states with higher accident rates if underwriting expenses increase at a less than proportionate rate with a consumer's expected loss. (14) This means that the same loss ratio would leave a greater underwriting profit margin in a high loss state than in a low loss state. Consequently, the use of loss ratios to draw inferences about interstate differences in profitability will be flawed

14) Pauly, et.al., "Regulation and Quality Competition."

to the extent that there are differences in expenses between states unless these differences are controlled for.

Premiums are not the only source of revenue for insurers. Premiums held until losses are paid as well as any surplus can be invested which also yields income. Therefore, total profits are equal to premiums plus investment income minus losses and expenses,

$$(2.3) \quad Z_t = P + I - L - E,$$

$$(2.4) \quad Z_t = Z_u + I,$$

where

I = investment income,

Z_t = total profits.

Investment income reduces the profit margin that insurers need to earn on their underwriting alone to sustain a given rate of return on net worth. As the necessary underwriting profit is reduced, so too is the amount of premiums needed to generate that profit. As premiums are reduced in relation to loss costs, the ratio of losses to premiums will increase. Thus, greater investment income means that a higher loss ratio can be sustained without impairing overall profitability.

Investment income has been significant in the property-casualty insurance industry in recent years. In 1984, property-casualty insurers earned net investment income in

excess of \$19 billion, representing 16.4 percent of earned premiums. (15) Indeed, for the years 1980-83, the industry sustained losses and expenses that exceeded premium income, yet earned positive rates of return on net worth averaging 10.5 percent because of investment income. (16) Because of the importance of investment income in insurers' financial picture, a state's regulatory policy on inclusion of investment income in rate making formulas is potentially significant. The significance of state regulatory requirements with respect to investment income and their relationship to regulatory stringency is discussed in the next chapter.

Market Structure

In terms of its basic market structure, the automobile insurance industry appears to be relatively competitive. In excess of 860 independent companies or groups of affiliated companies sold private passenger automobile insurance in the U.S. in 1984. (17) Concentration in the industry on a national basis might be considered relatively moderate. The top four insurer groups accounted for 37.2 percent of the total premium written nationally in private passenger

15) Insurance Information Institute, 1984-85 Property/Casualty Fact Book (New York: Insurance Information Institute, 1984): 19.

16) Ibid., p. 32.

17) A.M. Best Company, Best's Aggregates and Averages Property/Casualty Edition (Oldwick, N.J.: A.M. Best Company, 1985): 2.

automobile insurance in 1984, while the top eight groups had a combined market share of 46.0 percent. (18) Concentration in the industry has been increasing over the last decade, however. In 1975, the four-firm and eight-firm concentration ratios were 31.9 percent and 43.7 percent, respectively. (19)

The relevant market for automobile insurance is more accurately delineated at the state level, however, given that there are barriers to the sale of automobile insurance across state boundaries. Each state imposes its own licensing and regulatory requirements and consumers must purchase coverage from an insurer licensed in their state, typically through a licensed agent who has contracted to sell insurance for that insurer.

Concentration runs higher on a statewide basis than on a national basis. A 1981 study showed that almost all states met Kaysen's and Turner's definition of structural oligopoly in private passenger automobile liability and physical damage insurance with four-firm concentration

18) Virginia Vogt, "Automobile Insurance Premium Distribution - 1984," Best's Review Property/Casualty Edition, August 1976, p. 10.

19) "Automobile Insurance In 1975," Best's Review Property/Casualty Edition, August 1976, p. 10.

ratios in excess of 50 percent and twenty-firm concentration ratios in excess of 75 percent. (20)

Entry barriers should be fairly low in automobile insurance, to the extent that start-up costs are minimal and scale economies are not significant. Still, even agency insurers have to make some minimal investment in order to write automobile insurance in a state which would not be recoverable upon exit from the market. Contracts have to be set up with agents, rating manuals distributed, central or regional office facilities may have to be expanded to handle the additional policies. Entry for direct writers into a particular state is more difficult than for agency companies since direct writers have to set up an agent network and undertake advertising.

Perhaps a more important barrier to entry for both agency companies and direct writers is an informational one, however. Some uncertainty will exist as to what an insurer's costs will be in different areas of a state until they acquire several years of experience. Insurers can elect to use the rates filed by the rating bureau but this also tends to support concerted pricing. Insurers will have some hesitation about entering a state if they are unfamiliar about conditions within that state. The required

20) J. W. Wilson and J. R. Hunter, Investment Income and Profitability in Property/Casualty Insurance Ratemaking (Washington, D.C.: J.W. Wilson and Associates, Inc., January 1983): appendix, 62-72; and C. Kaysen and D.F. Turner, Antitrust Policy: An Economic and Legal Analysis (Cambridge: Harvard University Press, 1959): 30.

investment in learning about a state's conditions will tend to dissuade short-term entry and exit.

These facts, along with the moderate level of concentration in every state, implies that automobile insurers may have some limited ability to charge supracompetitive prices and earn positive economic profits. (21) This means that there may be some opportunity for regulation to have a negative impact on rates and a positive effect on loss ratios without causing insurers to sustain losses. However, there is no evidence to indicate that concentration and entry barriers are sufficiently high for insurers to enable them to wield considerable market power in any state market. Hence, the potential effect of even highly stringent regulation on rates and loss ratios is probably limited unless rates are driven below costs.

With the basic product and structural characteristics of the automobile insurance industry now layed out, the next chapter reviews the historical evolution of regulatory institutions and policies in the industry.

21) See J.W. Wilson, "Competition in the Insurance Industry," testimony given before the Subcommittee on Monopolies and Commercial Law, Committee on the Judiciary, U.S. House of Representatives, Washington, D.C., September 13, 1984.

CHAPTER THREE

HISTORICAL DEVELOPMENT OF RATE REGULATION

This Chapter reviews the historical evolution of rate regulatory institutions and policy in the property-casualty insurance industry. This review serves two purposes. One, it familiarizes the reader with the basic regulatory institutions of the industry and provides a context for subsequent theoretical and empirical chapters on automobile insurance. Two, it presents a pattern of increasing regulatory stringency during the industry's history in at least several states and discusses several economic, political, and institutional aspects of this development which are useful in interpreting empirical evidence obtained in this study.

Early Attempts at Concerted Pricing

The evolution of property-casualty insurance regulation in the U.S. is intertwined with the industry's attempts at concerted pricing. Insurers argued that cooperative rating was necessary to eliminate destructive price competition that would result in inadequate rates and insolvency. Local associations of agents formed as early as the mid-1700s for the purpose of fixing rates and commissions for fire insurance which was the principal form of insurance at

that time. (1) Participation and compliance in these associations was poor, however, and they generally were unsuccessful in their attempt to stabilize rates. The first national association, the National Board of Fire Underwriters, was formed in 1866 with the stated objective of establishing and maintaining uniform rates and commissions to agents and brokers. (2) But, like its predecessors, membership in the NBFU was voluntary and it was difficult to force a large number of insurers to adhere to the Bureau rates. Consequently, the NBFU was temporarily disbanded in 1877.

The failure of the NBFU was followed by a shift in rate fixing efforts back to local and regional insurer associations. (3) Rating by schedules and daily reporting were among the devices used by these organizations to facilitate their control over rates. However, once again, several factors worked to undermine the effectiveness of these associations. Member companies lacked sufficient good faith to adhere to agreements voluntarily and the threat of fines and expulsions was not sufficient to bring about compliance. Competition from non-affiliated insurers further diminished the effectiveness of the associations and

1) Edwin W. Patterson, The Insurance Commissioner in the United States: A Study in Administrative Law and Practice (Cambridge: Harvard Univ. Press, 1927): 522.

2) Frederick G. Crane, Automobile Insurance Rate Regulation: The Public Control of Price Competition (Columbus, O.H.: The Ohio State University, 1962): 53-54.

3) Ibid., p. 54.

undermined their cohesion. Lastly, the fact that agents controlled the placement of business and the quoting of rates put upward pressure on commissions and downward pressure on rates. Agents had an incentive to quote low rates to increase their sales and the resultant commissions. Insurers, in turn, were induced to increase the commission rates paid in order to induce agents to place business with them. Eventually, each insurer began to internally control the quoting of its own rates which eliminated any potential for market failure that might have been present under this arrangement, however.

The insurer compacts encountered an additional threat in the late 1800s in the form of state anti-compact laws. This was a period of rising public concern about the concentration of economic power that led to the passage of the Sherman Act. This antitrust concern also focused on the insurer compacts. The insurance industry had been exempted from federal antitrust prosecution by the U.S. Supreme Court's decision in Paul v. Virginia in which it ruled that insurance was not commerce. (4) However, no such exemption existed at the state level. Between 1885 and 1913, 23 states enacted legislation which outlawed agreements between insurers or agents to set rates. (5) In return, insurance companies used a number of devices to evade the anti-compact laws and the conclusion is that the laws were generally

4) Paul V. Virginia, 8 Wall 168 (1869).

5) Crane, Automobile Insurance, pp. 54-55.

ineffective in stemming attempts to fix rates even if those attempts were not very successful. (6)

The failure of voluntary attempts at price fixing and the fear of the anti-compact laws caused insurers to look to state rate regulation as a means to sanction as well as enforce rate uniformity. At that time, insurance regulation was essentially confined to state licensing of insurers and the collection of premium taxes. (7) Legislative investigations into the need for rate regulation were conducted in New York, Wisconsin, and Illinois in the early 1900s. The New York investigation, conducted by a joint legislative commission known as the Merritt Committee, drew conclusions very similar to positions that had been taken by the insurance industry. The Committee concluded that cooperative rate making was essential to avoid the ruinous economic consequences of unbridled competition. (8)

The Committee advocated legislation permitting state supervised joint rate making. Based upon these recommendations, legislation was enacted in New York which prohibited unfair rate discrimination and rebates and permitted the fixing of fire insurance rates in concert

6) Ibid.

7) Patterson, Insurance Commissioner, pp. 57-268.

8) New York State Legislature, Report of the Joint Committee of the Senate and Assembly of the State of New York, Appointed to Investigate Corrupt Practices in Connection with Legislation and the Affairs of Insurance Companies, Other than Those Doing Life Insurance Business (Albany: New York State Legislature, 1911).

through rating bureaus. The concern about discrimination stemmed more from a concern about the use of selective discounts as a competitive device than a concern about actual fairness in pricing. Rating bureaus were required to file their rates with the superintendent of insurance who had the authority to order the removal of any discrimination. Although the superintendent of insurance could disapprove rates after they were filed, prior approval was not required at this time. Similar rate regulatory laws were soon passed in several other states.

Despite the pronouncements regarding the industry's tendency towards excessive competition and the public interest in cooperative rate making and rate regulation, little supporting evidence of this tendency was provided.

This landmark (the Merritt Committee) investigation in the development of insurance regulatory techniques resulted in legislation which clothed the rating bureaus with legal authority and made rate filings compulsory. While fire rate wars were characterized as fierce and open competition denounced as weakening to the companies, surprisingly little documentation to support the charges is found in the Report of the Committee itself. Further, while there appeared to be a natural disposition to blame all the industry's ills upon rate competition, there was surprisingly little consideration paid to other possible causes of insolvency, such as mismanagement of funds, inadequate loss statistics, or inadequate capital and surplus requirements. (9)

In 1914, the National Convention of Insurance Commissioners (which subsequently became the National

9) Donald P. McHugh, "The Role of Competition in Insurance Rate Making," address before the NAIC Zone II Meeting, April 3, 1959, p. 7.

Association of Insurance Commissioners) adopted four model bills which were recommended to the states for the development of a supervisory system for fire insurance rates. (10) A number of states drew upon these bills in the formulation of their own regulatory scheme. Bill No. 1 provided for the supervision of rate making bureaus, including the power to examine, and for the disclosure of information to the public. Bill No. 2 prohibited price discrimination by a company or a rating bureau. Bill No. 3 required every company to maintain or cooperate in a rating bureau. Bill No. 4 required that the rating bureau inspect every risk rated by it upon a schedule. Two additional bills which would have expanded the regulatory authority of the insurance commissioner were considered but not adopted. Bill No. 5 would have prohibited insurers or rating bureaus from agreeing as to rates unless such an agreement was in writing and was filed with the commissioner who could disapprove the agreement. Bill No. 6 would have authorized the commissioner to review any bureau rate as to whether it was discriminatory or unjust.

State rate regulation of property-casualty insurance, as it subsequently evolved in the various states, had two important features. First, the rating organizations were almost an adjunct of the regulatory mechanism. Some states

10) Jon S. Hanson, Robert E. Dineen, and Michael B. Johnson, Monitoring Competition: A Means of Regulating the Property and Liability Insurance Business (Milwaukee: National Association of Insurance Commissioners, 1974): 19.

mandated companies to become a member of or subscribe to a rating organization. The rates promulgated by the bureaus became the standard although some right of deviation was permitted. (11) A second feature of regulation was that concern centered upon whether rates were too low. The primary legal standard applied to rates was that of "adequacy." It was generally believed that competition should be limited to service and that all companies should charge the same rate. (12) Insurers essentially used regulatory assistance to maintain a floor under rates but little countervailing regulatory authority existed to ensure that rates did not become excessive. Joskow offers the following observation of state regulatory policy on insurance at that time:

The primary concern of both the insurance companies and their regulators was to guard against rates that were too low. Competition was viewed by the industry and its regulators as leading to instability and insolvencies among fire insurance firms. The regulatory agencies apparently did not view their jobs as guarding against monopolistic pricing resulting from rate making in concert, but rather as making sure that firms did not charge off-bureau rates that were too low. Competition in fire insurance rate making was viewed as being destructive and rating bureaus and regulatory agencies made sure that price competition became virtually nonexistent. No study seems to exist that shows that competition in fire insurance is any more 'destructive' than in any other industry, and it appears that the evolution of regulation of the fire

11) Ibid., p. 20.

12) Ibid.

insurance industry stems more from an effort to protect existing firms than the interests of consumers. (13)

The Institution of Prior Approval Rate Regulation

In the three decades following the publishing of the NCIC model bills, concerted pricing within the industry became well established in the absence of prosecution under state anti-compact statutes and federal antitrust laws. At the same time, effective public control over the rates set by the bureaus was very limited or nonexistent in most states, particularly for lines other than fire or workers compensation insurance. (14)

This situation changed drastically with the U.S. Supreme Court's decision in U.S. v. South-Eastern Underwriters Association in 1944. (15) The case involved a Justice Department indictment against the SEUA's 198 member companies operating in six southern states. The indictment charged that the SEUA had violated the Sherman Act by conspiring to fix rates and commissions and conspiring to monopolize trade and commerce in fire and allied lines of insurance in the six-state area. The SEUA was alleged to have used boycotts, coercion, and intimidation against non-member companies to force compliance with the SEUA rates.

13) Paul Joskow, "Cartels, Competition, and Regulation in the Property and Liability Insurance Industry," Bell Journal of Economics 4 (Fall 1973): 392-393.

14) Hanson, et al. Monitoring Competition, pp. 20-21.

15) U.S. v. South-Eastern Underwriters Association, 322 U.S. 533 (1944).

A district court had dismissed the indictment on the basis that insurance was not commerce and hence not within the scope of the Sherman Act. However, the Supreme Court, breaking the precedent set in Paul v. Virginia, ruled that insurance was commerce and, by implication, that combinations of insurance companies designed to fix rates were in violation of the Sherman Act. Quite understandably, the Court's decision created a crisis for insurers who had become accustomed to setting rates in concert.

Overnight, the entire legal basis for the immunity of combinations in rate-making, the cornerstone of the fire insurance business -- and hence, at that time, of the dominant segment of the property-liability insurance business -- was eliminated. Moreover, doubt was cast on the system of state regulation and taxation of the insurance business (as an unconstitutional burden on interstate commerce). The decision precipitated widespread controversy and dismay. Chaos was freely predicted. (16)

The industry was quick to respond to this new threat. The NAIC proposed federal legislation which would preserve the industry's antitrust exemption and reaffirm the preeminence of state regulation. The NAIC proposal, after some modification, was ultimately enacted into law in 1945 as the McCarran-Ferguson Act. (17) The McCarran-Ferguson Act declared the continued regulation and taxation of the insurance industry to be in the public interest and the

16) New York State Insurance Department, The Public Interest Now in Property and Liability Insurance (New York: New York Insurance Department, 1969): 69.

17) McCarran-Ferguson Act, 59 Stat. 33-34 (1945).

federal antitrust laws to be applicable to the insurance industry only to the extent that the insurance business was not regulated by the states.

Neither the act, nor its legislative history, specified exactly what was meant by regulation by the states. However, there was widespread concern that state regulation at the time was insufficient in many states to exempt the extensive cartel practices of insurers even with McCarran-Ferguson. The NAIC, with insurers' participation, went quickly about drafting model legislation for states which would establish sufficient regulation over rates to preclude federal antitrust suits against the rating bureaus under the exemption provided by McCarran-Ferguson.

The overriding concern of the framers of these All-industry model bills was to preserve the business and regulatory status quo and to demonstrate that rate-making, in particular, bureau rate-making, would be quite explicitly 'regulated' by the states. This approach was designed to provide a state regulatory umbrella under which cooperative rate-making by bureaus would be exempt from the Federal antitrust laws. (18)

The model bills which were ultimately adopted reflected a balancing of concern about having sufficient regulatory control to escape the federal antitrust statutes with the industry's interest in minimizing regulatory authority over rates. Bills for both casualty and fire insurance were drafted. The basic purpose of the acts is to regulate rates and to authorize and regulate cooperation among insurers.

18) New York State Insurance Department, Public Interest, p. 72.

The casualty bill, which covers automobile insurance, provides that in making rates consideration should be given to past and prospective loss experience within and outside the state, catastrophe hazards, a reasonable margin for profit and contingencies, and past and prospective expenses within and outside the state. Rates are required to not be excessive, inadequate, or unfairly discriminatory.

Insurers are required to file their rates and supporting material with the commissioner. Rates could not be put into effect until they had been approved. An insurer can satisfy its obligation to file by becoming a member of or a subscriber to a licensed rating organization which makes such filings but neither membership nor subscribership is mandatory. A filing is deemed approved unless disapproved by the commissioner within 15 days (or 30 days if notice of the need for extra time is given). The commissioner can disapprove a filing within the review period (up to 30 days). If the commissioner finds that a filing does not meet the requirements subsequent to the review period then he is required to hold a hearing. Any person or organization aggrieved concerning any filing which is in effect can apply to the commissioner for a hearing. If the filing fails to meet the requirements of the law, the commissioner shall state when the filing is to be no longer effective.

It is apparent that the original intent of the model bills was to promote uniform pricing. The laws authorize

rating bureaus to make and file rates, rate changes, rating schedules, etc. for their members and subscriber companies. Companies can opt not to use the bureau rates by filing deviations or making independent filings. However, a company filing for lower rates than those filed by the rating bureau has to justify its application by showing it has lower costs than the industry as a whole. Moreover, the rating bureaus can challenge deviations and independent filings as aggrieved parties in a rate hearing which can lead to protracted and costly proceedings which would tend to inhibit deviations and independent filings.

The model bills did represent something of a compromise for the industry in terms of the nature of the approval process. (19) The state insurance commissioners favored a prior approval system like New York's where rates had to be filed and approved before they could be implemented. In practical terms, a prior approval statute would provide regulators with considerably more authority over rates than other rating systems. The industry position on this issue varied depending on the type of company but for the most part insurers were for a less restrictive filing and approval arrangement. Only mutual companies supported a strict prior approval system, possibly because it would give them a competitive advantage over stock insurers who would not be able to use dividends as a means to discount rates.

19) Frederick G. Crane, "Insurance Rate Regulation: The Reasons Why," Journal of Risk and Insurance 39 (December 1972): 529-533.

The independent stock companies supported a no-filing system because of their past difficulty in obtaining approval for off-bureau rates in states where rates had been regulated. The stock bureau companies faced somewhat of a dilemma in that prior approval regulation could serve to support cartel pricing but at the same time they were wary of government control. Ultimately, the stock bureau insurers supported a file and use law where rates had to be filed but could immediately be put into use upon filing without waiting for approval. The commissioner then could only revoke the rates filed after holding a hearing. However, the NAIC ultimately rejected this option and decided in favor of a prior approval requirement with a deemer provision.

By 1951, 44 states enacted new laws or amended existing laws to conform to the NAIC model bills. The remaining states, except for California, also instituted some form of rate regulation. The enactment of these rating laws, for the first time, brought the pricing practices of the property-casualty insurance industry under regulatory control on a nationwide basis. This degree of regulation facilitated concerted pricing by protecting the rate bureaus from antitrust prosecution and making it difficult for independent companies to undercut the bureau rates. At the same time, it is clear that model bills did not give each insurer everything it might have wanted in terms of provisions for deviations and the type of approval system. The period that has followed McCarran-Ferguson is a very

interesting one in terms of controversies over independent pricing and growing pressures on regulators to restrict rate increases, particularly in automobile insurance which was quickly replacing fire insurance as the most prominent property-casualty line.

The Movement Towards Greater Regulatory Stringency

Several studies have concluded that the property-casualty industry has enjoyed excess profits and suffered from some inefficiency during the post-war period. (20) This would explain the significant competitive pressure that the industry experienced during this period from new entrants and independent companies, particularly those that were direct writers. The rating bureaus were only partially successful in opposing the numerous applications for deviations and the independent filings for lower rates that ensued. Over time, regulators, in at least some states, became more and more willing to approve the price cutting efforts of the independents.

By the late 1950s and early 1960s, data indicated the increasing tendency in several states to break from the bureau domination viewpoint. This period witnessed a

20) See Raymond Hill, "Profit Regulation in Property-Liability Insurance," Bell Journal of Economics 10 (Spring, 1979): 172-191; James Walter, "Regulated Firms Under Uncertain Price Change: The Case of Property and Liability Insurance Companies," Journal of Risk and Insurance 46 (June 1979): 5-21; and J.W. Wilson and J.R. Hunter, Investment Income and Profitability in Property/Casualty Insurance Ratemaking (Washington, D.C.: J.W. Wilson and Associates, Inc., January 1983).

discernible shift among industry and regulators toward a more flexible and independent pricing pattern(s).(21)

Regulators, at least in some states, also became more restrictive in terms of the rate increases granted to insurers.

During the 1960s the property and liability insurance industry consistently experienced adverse underwriting results. This, in turn, affected insurance company profitability. Management reacted in an expectable fashion. For example, several witnesses before the Gerber Subcommittee complained about inadequate rates. The test of adequacy was said to have been forgotten in the clamor for lower rates. Some claimed that the provision that rates shall consider prospective losses was overlooked, that inflation was not adequately considered, and that political resistance caused delays or precluded unpopular rate increases. (22)

In the early 1940s, for example, automobile insurance rates were relatively modest. As the number and cost of accidents mounted and inflation took its inexorable toll, insurance rates increased. During rate hearings, unions began to appear in opposition to rate increases. The prior approval system directly involved the insurance commissioner in the rate determination process. Thus, the commissioner in particular and the state administration in general were saddled in the public's mind with the onus for higher premium levels despite their lack of control over inflation which was largely influenced by national fiscal and monetary policy.

Under the prior approval approach, the insurance commissioner is caught in a squeeze between insurers clamoring for increased rates necessitated by worsening experience (primarily due to inflation) and insurance consumers who are unhappy about increasing premium levels. Insurance consumers resort to bringing political pressures to bear upon the commissioner who has become the man in the middle. (23)

21) Hanson, et al., Monitoring Competition, p. 40.

22) Ibid., p. 60.

23) Ibid., pp. 62-63.

Certainly there is no doubt that 'political' problems exist. In 1963, . . . Commissioner . . . was discharged by the Governor after he had approved increased rates for automobile liability insurance, rates later found to be proper. (In another state) . . . Commissioner . . . also was discharged for approving an automobile rate increase. In another state, the newspapers reported that when the incumbent Commissioner was appointed by the Governor early this year, he promised the Governor not to reconsider a rejected application for an automobile liability rate increase 'for at least a year.'

More recently, that Governor has been quoted by the newspapers as saying that approval of the re-filing currently pending would 'be a direct breach of our agreement.' After several years delay, regulatory authorities in another state finally granted in February of this year an increase in automobile liability insurance rates of about half of what was needed. In March, the Governor of another state ordered the Commissioner to disapprove automobile rate increases he had just approved and the Commissioner issued an order purporting to do so. The filers have obtained an injunction against the Commissioner, staying this action. (24)

These developments caused the bureau companies to become more disenchanted with prior approval regulation. Initially, after passage of McCarran-Ferguson, they might have hoped that prior approval regulation would help enforce the bureau rates among all companies. However, with regulatory tolerance of deviations and independent filings, they could charge higher rates only at the expense of losing significant business to independent direct writers. At the same time, industry executives felt that political considerations were causing regulators in some states to

24) National Association of Insurance Commissioners, "Report of Fire and Casualty Rating Laws and Regulations (K1) Subcommittee," NAIC Proceedings II (1965): 572.

constrain rates below levels they considered necessary for reasonable profits.

The politicized nature of prior approval rate regulation in several states increased industry support for an open competitive approach.

The insurance industry looks upon the open competition type rating law as a means to remove the commissioner from the rate approval process and thereby eliminate the most vulnerable fulcrum and leverage for the application of 'consumer-political' discontent. (25)

In 1961 the mutual bureaus, who had been staunch supporters of the all-industry or even more restrictive regulation, adopted a state-by-state philosophy under which they would support less restrictive regulation in those states where the 'total insurance environment' favored such an approach. (26)

Since the late 1960s, a number of states have enacted some form of an open competitive rating law for automobile insurance. The systems that states now employ for the regulation of automobile insurance rates fall into several categories: 1) state-made rates, 2) mandatory bureau rates, 3) prior approval, 4) file and use, 5) use and file, 6) no file, 7) no file, no rating standards. (27) Categories (1) through (3) are considered to be non-competitive regulatory systems. In these systems, either a state agency actually makes rates for insurers or insurers must get prior approval

25) Hanson, et al., Monitoring Competition, p. 63.

26) National Association of Insurance Commissioners, "Report of the Rates and Rating Organizations (F1) Subcommittee Report," NAIC Proceedings I (1969): 344.

27) See, Hanson, et al., Monitoring Competition, pp. 53-57.

from the insurance commissioner before rates can be put into effect. Regulatory systems in categories (4) through (7) allow insurers to put rates into effect before they are approved or do not require any filing or approval. The same regulatory requirements that rates not be inadequate, excessive, or discriminatory are used in all systems except (7). Generally, categories (4) through (7) are considered to be open competitive systems. Even though file and use and use and file states require filings to be made which could be disapproved, in practice this is rarely done. For all intents and purposes, regulators let the market set the rates in these states relying on competition to ensure that rates will meet the regulatory standards. In other words, in states that fall into categories (4) through (7), automobile insurance rates are essentially not actively regulated. As of 1983, 26 states employed an open competitive system for private passenger automobile insurance. Table 3.1 shows the regulatory system in effect in each state for private passenger automobile insurance in 1983.

In sum, regulatory stringency has apparently increased, at least in some states. The evidence indicates that some state insurance commissioners became much less willing to grant rate increases to automobile insurers in the face of rising costs.

TABLE 3.1: State Rate Regulatory Systems for Private Passenger Automobile Insurance in 1983

State	Type	State	Type
Alabama	prior approval	Nebraska	prior approval
Alaska	prior approval	Nevada	file and use
Arizona	use and file	New Hampshire	prior approval
Arkansas	file and use	New Jersey	prior approval
California	no filing	New Mexico	use and file
Colorado	no filing	New York	prior approval
Connecticut	prior approval (1)	North Carolina	mandatory bureau
Delaware	file and use	North Dakota	prior approval
Dist. of Col.	file and use	Ohio	file and use
Florida	use and file	Oklahoma	prior approval
Georgia	file and use	Oregon	file and use
Hawaii	file and use	Pennsylvania	prior approval
Idaho	no filing	Rhode Island	prior approval
Illinois	no law	South Carolina	prior approval
Indiana	file and use	South Dakota	file and use
Iowa	prior approval	Tennessee	prior approval
Kansas	prior approval	Texas	state-made rates
Kentucky	prior approval	Utah	use and file
Louisiana	prior approval	Vermont	prior approval(4)
Maine	file and use (2)	Virginia	file and use
Maryland	prior approval (3)	Washington	prior approval
Massachusetts	state-made rates (1)	West Virginia	prior approval
Michigan	file and use	Wisconsin	use and file
Minnesota	file and use	Wyoming	file and use
Mississippi	prior approval	Wyoming	file and use
Missouri	use and file		
Montana	file and use		

Notes:

- 1) Compulsory auto liability and no-fault (other coverages are file and use).
- 2) Administered as prior approval.
- 3) Rate reductions are use and file.
- 4) Auto liability rate increases exceeding 10 percent.

Source: National Association of Independent Insurers.

Investment Income and Regulatory Stringency

An important aspect of the movement towards greater regulatory stringency has been the evolution of regulatory policy on investment income. In essence, a regulatory requirement that insurers discount their rates to reflect investment income implies greater regulatory stringency because it lowers the allowed margin between price and perceived marginal cost. Exclusion of investment income as part of insurers' revenue base has been associated with the traditional, conservative, approach to rate regulation where the primary concern is rate adequacy. Requiring investment income to be treated as a source of revenue has been associated with a more activist, consumerist, approach where the primary concern is that rates not be excessive. Because the existence of a state requirement for investment income inclusion is used as an indicator of stringent regulation in the empirical analysis conducted in this study, a brief discussion of the investment income issue and its relationship to regulatory stringency follows.

A state requirement that insurers discount their rates for investment income implies greater stringency because it results in a lower targeted margin between the market rate and the costs projected by regulators and a higher targeted loss ratio. This can be illustrated by the following example. Assume an insurer writes just one automobile insurance policy for a one year period. The expected loss

incurred on the policy will amount to \$1000 payable at the end of the year. Expenses involved with servicing the policy are \$100 and are incurred at the beginning of the year. Any premium collected and held in reserve to pay losses can be invested at an annual rate of interest of 8 percent. The insurer has a beginning net worth of \$500.

Consider two scenarios. Under the first scenario, the insurer is permitted to charge a premium for the policy which will yield a 5 percent profit margin on total revenue excluding investment income. Under the second scenario, the insurer is allowed to charge a premium that will yield a 5 percent profit margin on total revenue including investment income.

Under the first scenario, the insurer is permitted to charge a total premium of \$1157.89 which yields an underwriting profit margin of 5 percent and a permissible loss ratio of .864. In addition, the insurer earns \$80 income on the loss reserves of \$1000 invested at 8 percent interest. Total revenue comes to \$1237.89. Total revenue minus expenses and paid losses of \$1100 leaves \$137.89 total profit. This yields a 27.6 percent rate of return on net worth.

Under the second scenario, the insurer is limited to a premium of \$1077.89 which yields a negative underwriting profit margin of 2 percent and a permissible loss ratio of .928. Total revenue amounts to \$1157.89. Total revenue minus expenses and loss costs leaves a total profit of

\$57.89. This amounts to a 11.6 percent rate of return on net worth. Hence, requiring investment income to be included in the revenue base lowers the premium that can be charged relative to the costs incurred which implies greater regulatory stringency and results in a higher loss ratio and lower profits.

There is no reason to believe that states which have investment income requirements systematically liberalize other rate making factors, such as the expense loading, in order to offset the negative effect on profits. Obviously, if this was the case, such a requirement would be pointless since the rates ultimately calculated would be the same. Rather, the purpose behind such a requirement is to establish a lower rate for a given level of costs in order to prevent insurers from receiving a windfall they would otherwise obtain from their investment income.

There are essentially two different views on what investment income should be included as revenue, the "policyholder-funds theory" and the "total-return theory." (28) The policyholder-funds theory holds that policyholders should be credited with the investment income on funds furnished by policyholders. Some states consider only the unearned premium reserve to be policyholder funds, while others include both the unearned premium and loss reserves as policyholder funds. The total-return theory

28) Bernard L. Webb, "Investment Income in Insurance Ratemaking," Journal of Insurance Regulation 1 (September 1982): 71-73.

holds that investment income from all sources should be considered in rate making, not merely investment income from policyholder funds. Under this theory, the investment income attributable to surplus would also be included in the rate making formula.

Traditionally, investment income has been excluded from consideration in property-casualty insurance rate making. Rates have been set so as to yield a particular rate of return on sales (premiums), generally 5 percent, as opposed to being set so as to allow a "fair" rate of return on invested capital. This formula specifically excludes from consideration income earned from invested unearned premiums and loss reserves, the so-called "banking end" of the business. The use of the 5 percent underwriting profit formula stems from a recommendation made by the NAIC in 1921 after it studied the issue. (29) Webb points out that the 5 percent figure has no apparent theoretical basis other than it was being advocated by the NBFU which strongly opposed the inclusion of investment income in the rate making process. (30)

29) Ibid., pp. 50-51.

30) There was apparently no attempt to link the 5 percent figure to any accepted or proposed theory on the rate of return on equity due a public utility or any other kind of enterprise. Subsequent regulatory studies and court decisions have concluded that the arbitrary use of the 5 percent return on premium target figure without consideration of investment income does result in excessive rates of return on equity. See Webb, "Investment Income," pp. 50-71.

The issue of investment income did not get much attention again until debates about the model rate regulatory bills began. In 1947, the New York insurance department submitted a report to the NAIC dealing with investment income. The report, referred to as the McCullough Report, recommended that the NAIC develop a revised rate making formula that would include investment income attributable to policyholders as part of the underwriting profit. (31) The NBFU attacked the McCullough Report, however, and the NAIC failed to adopt its recommendations.

The controversy over investment income died down after the issuance of the NAIC model bills but arose again in the 1960s. The American Insurance Association, a successor organization to the NBFU, commissioned a report by A.D. Little Inc. on the profitability and investment income issue. (32) Somewhat surprisingly, the ADL report concluded that it is appropriate to consider total industry profits -- underwriting and investment income -- in the rate setting process. The ADL report advocated considering not only investment income from loss reserves and unearned premiums as a revenue source but also any income earned from

31) National Association of Insurance Commissioners, "Second Report of the Special Subcommittee of the Fire and Marine Committee, National Association of Insurance Commissioners, Re Underwriting Profit or Loss, and the Commissioners' 1921 Standard Profit Formula," NAIC Proceedings (1948): 72-157.

32) Arthur D. Little, Inc., Prices and Profits in the Property and Liability Insurance Industry (New York: American Insurance Association, 1967).

policyholders' surplus and realized and unrealized capital gains. This broader definition of investment income is not necessarily beneficial to consumers in that unrealized capital gains can be substantially more volatile than the other sources. Although the AIA released the ADL report, it never officially embraced its position. Subsequently, in fact, the AIA once again voiced its opposition to the inclusion of investment income in rate making. (33)

Not long after the release of the ADL report, the state of New Jersey became involved in an important rate case in which the investment income issue played prominently. In February of 1967, the Insurance Rating Board applied to the New Jersey insurance department for rate increases for private passenger automobile liability and physical damage insurance. Commissioner Charles Howell disapproved the filing because it did not consider investment income. The IRB appealed Commissioner Howell's ruling and the case eventually made its way to the New Jersey supreme court which remanded the case back to the insurance commissioner with instructions to clarify certain aspects of the original findings.

Commissioner Robert J. Clifford, Commissioner Howell's successor, held extensive hearings on the issues of investment income and the amount an insurer should receive as a reasonable profit. Commissioner Clifford concluded that only investment income from loss reserves and unearned

33) See AIA advertisement in Fortune, May 31, 1982, p. 159.

premiums should be considered as a revenue source for rate making. Any investment income earned on stockholder supplied funds or capital gains from any source should be excluded for rate making purposes, according to Commissioner Clifford, who disapproved the IRB's rate filing.

After the New Jersey remand case, a number of states enacted statutes, issued regulations, or made rulings that required investment income to be considered in rate making. In 1981, the Louisiana Insurance Rating Commission surveyed the states to determine their positions regarding the inclusion of investment income in rate making. Forty-six states responded to the survey. Of the states that responded, 15 required consideration of investment income for automobile insurance, 27 allowed it to be considered, 7 did not allow it to be considered. The three states that did not respond to the survey all have statutes or court rulings requiring consideration of investment income. Of the 24 states with prior approval rating systems for automobile insurance at that time, 12 required the consideration of investment income in rate making. This is another indication of varying regulatory stringency among prior approval states. Table 3.2 shows state policies on investment income as of August 1981 based on the Louisiana survey.

In summary, the history of property-casualty insurance regulation suggests a changing pattern with respect to regulatory stringency. Prior to the adoption of the NAIC

TABLE 3.2: State Rate Regulatory Policies Towards Inclusion of Investment Income in Ratemaking for Private Passenger Automobile Insurance in 1981

<u>State</u>	<u>Policy</u>	<u>State</u>	<u>Policy</u>
Alabama	Allowed	Nebraska	Allowed
Alaska	Allowed	Nevada	Allowed
Arizona	Allowed	New Hampshire	Allowed
Arkansas	Required	New Jersey	Required
California	Allowed	New Mexico	Allowed
Colorado	Required	New York	Required
Connecticut	Allowed	North Carolina	Required
Delaware	Required	North Dakota	Not Allowed
Dist. of Col.	Allowed	Ohio	Allowed
Florida	Not Allowed	Oklahoma	Required
Georgia	Required	Oregon	Not Allowed
Hawaii	Allowed	Pennsylvania	Required
Idaho	Allowed	Rhode Island	Allowed
Illinois	Allowed	South Carolina	Required
Indiana	Allowed	South Dakota	Not Allowed
Iowa	Not Allowed	Tennessee	Allowed
Kansas	Allowed	Texas	Required
Kentucky	Required	Utah	Allowed
Louisiana	Required	Vermont	Required
Maine	Allowed	Virginia	Allowed
Maryland	Required	Washington	Not Allowed
Massachusetts	Required	West Virginia	Allowed
Michigan	Allowed	Wisconsin	Allowed
Minnesota	Required	Wyoming	Required
Mississippi	Required		
Missouri	Allowed		
Montana	Not Allowed		

Source: Louisiana Insurance Rating Commission

model bills, rate regulation may have facilitated bureau price fixing activities in those states where it existed but there were a number of states where rates were not regulated. However, there is no firm evidence of whether this actually happened or not. By the same token, the adoption of the NAIC model bills, at least initially, could have established pro-industry rate regulation in virtually every state. Subsequently, however, anecdotal evidence suggests that at least some states may have increased the stringency of their regulation. Among the indications of increased stringency in some states is the adoption of a requirement that insurers reflect investment income in their rate making.

The next chapter reviews anecdotal evidence on the practice of automobile insurance regulation in several states over the last decade which indicates that a high degree of regulatory stringency is practiced in some states relative to others.

CHAPTER FOUR

EVIDENCE OF VARYING REGULATORY STRINGENCY

This Chapter presents two types of anecdotal evidence of the application of varying degrees of regulatory stringency among states that regulate automobile insurance rates. First, the disposition of rate filings by the Insurance Services Offices (a rating bureau) in seven prior approval states are shown for the period 1976-84. This presentation reveals substantial differences among states in terms of the disparity between filed and approved rate increases. Subsequently, more detailed reviews of the application of particularly stringent regulation in four prior approval states are conducted. Incidents involved with the disapproval of insurer rate filings and reported in the trade press provide the major source of material for these reviews. Less stringent prior approval states are marked by the relative lack of these kinds of incidents as they approve rate filings with little or no modification. To illustrate this kind of situation, regulatory conduct in a fifth state with more moderate policies is also reviewed.

The basic indicator of regulatory stringency used in this Chapter is the frequency with which regulators disapprove insurers' original requests for rate increases. This is a less true measure of regulatory stringency than the actual margin between the regulated price and what

regulators perceive marginal cost to be. Since data is not available on this latter measure, however, the frequency of rate filing disapprovals is used as an alternative indicator of regulatory stringency. Although the frequency of filing disapprovals is not a perfect measure of regulatory stringency, it is reasonable to assume that there will be some positive association between the two. Presumably, insurers would prefer a higher rather than lower margin between their costs and the market rate up to that rate where industry profits are maximized. The higher the margin between price and marginal cost regulators effectively target or set as a constraint, the less likely they will be to disapprove an insurer's rate request. Conversely, the tighter the margin between price and cost regulators try to maintain, the more likely that margin would be exceeded by the rates filed by insurers which would result in a disapproval.

One might question whether the difference between requested and approved rate increases would be more closely related to the clarity of regulatory standards used to review rate filings rather than the stringency of those standards. In other words, why would insurers file rates that they know would be disapproved? Insurers will have an incentive to file for rate increases even if they know they will be disapproved. In effect, an insurer's rate filing constitutes an argument for what it contends to be a reasonable rate level based on its costs. Insurers may wish

to appeal a rate filing disapproval to a court in which case its rate filing provides the basis for its dispute with the insurance commissioner. Moreover, for political reasons, insurers will wish to continue to present their arguments for reasonable rates as embodied in their rate filings even if those arguments are not accepted by regulators or the courts. Insurers' rate filings will provide the basis for any claim that regulators are being too restrictive.

To the extent that it can be shown that states vary significantly in terms of the frequency of rate filing disapprovals, evidence of varying regulatory stringency is provided. This evidence is presented to corroborate the indication of varying regulatory stringency presented in Table 3.2 which showed that some states require rates to reflect investment income and others do not.

Rate Filing Evidence

Evidence of varying regulatory stringency is provided in this section using the frequency with which regulators disapprove ISO's requests for rate increases as an indicator of stringency. Table 4.1 shows filed and approved rate changes for the Insurance Services Office for private passenger automobile insurance. The data cover seven prior approval states over the period 1976 through 1984. The filed and approved rate changes are broken down by liability and physical damage coverages.

TABLE 4.1: Overall Percentage Change in Rate Level Filed by Insurance Services Office and Approved by Insurance Department in Selected States

<u>Date Approved</u>	<u>Liability</u>		<u>Physical Damage</u>		<u>Total</u>	
	<u>Filed</u>	<u>App.</u>	<u>Filed</u>	<u>App.</u>	<u>Filed</u>	<u>App.</u>
<u>Alaska</u>						
02/16/77	+56.5%	+56.5	+28.5%	+28.5	+43.8%	+43.8%
02/28/79	-3.5	-3.5	+34.5	+34.5	+14.0	+14.0
01/07/81	+0.1	+0.1	-16.5	-16.4	-7.4	-7.4
01/15/83	+10.9	+10.9	-2.4	-2.4	+7.4	+7.4
07/14/84	+12.2	+12.2	-5.7	-5.7	+3.9	+3.9
<u>Iowa</u>						
02/01/76	+8.4%	+8.4%	+43.5%	+43.5%	+22.6%	+22.6%
06/01/77	+27.5	+22.5	+51.5	+19.9	+38.3	+21.3
03/14/79	+15.2	+15.2	+21.1	+21.1	+17.8	+17.8
05/21/80	+8.9	+8.9	+23.1	+23.1	+14.8	+14.8
01/30/81	+8.6	+2.2	+3.3	+3.3	+6.2	+2.7
02/24/82	-6.6	-6.6	-13.8	-13.8	-10.0	-10.0
02/01/84	+13.8	+13.8	-6.9	-6.9	+4.4	+4.4
<u>Louisiana</u>						
01/28/76	+20.0%	+20.0%	+27.8%	+27.8%	+23.6%	+23.6%
03/23/77	+30.0	+30.0	+7.3	+7.3	+18.6	+18.6
08/01/80	+12.7	+12.7	+29.6	+29.6	+19.9	+19.9
10/01/81	+19.9	+15.6	+22.3	+16.2	+20.9	+15.9
06/01/84	+7.4	+4.1	+7.3	+7.3	+7.4	+5.5
<u>Maryland</u>						
02/21/79	+60.2%	+45.2%	+75.5%	+56.7%	+65.3%	+49.1%
07/07/80	+13.8	+13.8	+14.8	+14.8	+14.1	+14.1
07/17/81	+25.9	+25.9	+25.3	+25.3	+25.7	+25.7
09/10/82	+11.5	+11.5	+12.3	+12.3	+11.7	+11.7
09/12/83	+15.8	+15.8	+12.5	+12.5	+14.8	+14.8
10/01/84	+8.9	+8.9	-11.6	-11.6	+2.4	+2.4

(continued)

<u>Date Approved</u>	<u>Liability</u>		<u>Physical Damage</u>		<u>Total</u>	
	<u>Filed</u>	<u>App.</u>	<u>Filed</u>	<u>App.</u>	<u>Filed</u>	<u>App.</u>
<u>New Jersey</u>						
07/01/76	+25.1%	+21.5%	-	-	25.6%	+17.4%
09/01/77	+21.2	+11.1	+33.6%	+22.2%	+24.7	+14.4
12/29/78	+30.3	+15.6	+31.2	0.0	+30.6	+10.0
12/28/79	+22.9	+14.8	+25.5	+6.2	+23.5	+11.9
11/18/80	+23.3	+12.5	+27.7	+7.7	+24.2	+11.1
08/14/81	+32.8	+15.5	+26.9	+9.5	+31.7	+12.6
07/12/82	+35.8	+15.0	+22.4	+15.0	+32.3	+15.0
01/10/83	+18.1	+8.5	+6.4	+3.0	+15.0	+7.9
06/01/83	+4.1	+4.1	+7.9	+7.9	+5.1	+5.1

Pennsylvania

03/31/76	-	-	+46.4%	+46.4%	-	-
01/01/77	+25.4%	+25.4%	+8.7	+8.7	+16.4%	+16.4%
03/15/78	+45.4	+37.9	+17.7	+15.3	+32.9	+27.7
07/18/79	+12.7	+8.9	+0.6	0.0	+8.1	+5.5
10/01/80	+15.4	+14.8	+27.4	+12.4	+19.8	+13.9
10/01/81	+19.2	+14.7	+23.4	+7.0	+20.8	+11.8
10/01/82	+14.9	+13.9	+2.0	-4.6	+10.2	+7.2
11/22/83	+28.1	+23.2	+5.0	-1.2	+17.4	+15.4
10/01/84	+18.5	+14.7	-7.0	-7.0	+11.0	+8.2

Rhode Island

07/01/76	+29.7%	+24.1%	+29.6%	+18.5%	+29.7%	+22.0%
09/29/76	+19.4	+14.5	+42.3	+42.3	+27.8	+24.7
05/01/81	+8.1	+7.0	+30.0	+12.1	+16.9	+9.0
12/01/82	+24.7	+10.9	+29.8	+11.2	+26.9	+11.8
12/01/83	+56.4	+3.9	+12.2	+3.0	+37.2	+3.5

Source: Insurance Services Office.

In the first four states shown -- Alaska, Iowa, Louisiana, and Maryland -- there has been a high degree of unity between the rate changes filed by ISO and the rate changes approved by the insurance commissioner. In these states, only 5 of 20 requested overall rate increases were disapproved. In the last three states shown -- New Jersey, Pennsylvania, and Rhode Island -- approved rate increases have tended to be considerably below those requested by ISO. In these states, 20 out of 23 requested overall increases were disapproved. These figures suggest that automobile insurance rate regulation is considerably more stringent in Alaska, Iowa, Louisiana, and Maryland than it is in New Jersey, Pennsylvania, and Rhode Island.

It is worth noting that only two of the first four states -- Louisiana and Maryland -- currently have investment income requirements. Moreover, the same year in which Louisiana promulgated its investment income requirement, 1981, it approved a smaller rate increase than that requested by ISO which contrasts with its approval of ISO's three previous rate requests in their entirety. Louisiana also disapproved ISO's next rate request in 1984. By contrast, two of the remaining three states -- New Jersey and Pennsylvania -- have investment income requirements. This evidence does indicate a positive association between the existence of an investment income requirement and particularly stringent regulation as indicated by frequent disapproval of requested rate increases. Unfortunately,

these data are not available for a wider group of states. Otherwise, the frequency of rate disapprovals could be utilized as an alternative measure of regulatory stringency in regression analysis. The figures shown here were obtained from ISO on a special request basis.

Stringent Regulation Case Studies

Significant incidents in the administration of automobile insurance regulation in four prior approval states over the last decade are subsequently reviewed. The four states chosen -- Massachusetts, New Jersey, New York and North Carolina -- are generally considered by the industry as having particularly strict or undesirable regulatory environments for automobile insurance. The anecdotal evidence presented consists primarily of rulings by insurance commissioners on rate filings, statements by insurers, and statements by legislators. This evidence has been obtained primarily from articles in the industry trade press. For each of the four states, the evidence presents a pattern of significant and consistent conflict between insurers and regulators over the rates that insureds can be charged. Consistently, in each of these states, rate increases requested by insurers are either denied totally or substantially cut. In several instances, the state insurance commissioner actually ordered automobile insurers to decrease their rates despite insurers' requests for rate increases. The anecdotal evidence also reveals considerable

political pressure on regulators in these states to lower rates. All four of these states require insurers to discount their rates for investment income.

The experience in Michigan, prior to its enactment of open competition in 1981, is then offered as a contrasting example. In Michigan, the practice of automobile insurance rate regulation was somewhat less stringent than in the first four states. Rate filings in Michigan during the late 1970s were approved with much less controversy and closer to original requests than in these other states.

Massachusetts

Massachusetts began getting consistent, prominent attention in the trade press for its rate regulatory policies in automobile insurance in the mid-1970s. In September of 1975, the Massachusetts Automobile Rating Bureau, which files automobile rates for all insurers in Massachusetts, filed a request with the Massachusetts Insurance Department for an overall rate increase of 46 Percent for 1976, the largest requested rate increase in the state's history. This proposed rate increase was on top of automobile insurance rates which were already among the highest in the country. The request received considerable local media attention and reawakened legislative interest in an independent state sponsored rating bureau to review

industry rate filings. (1) The request also increased support for legislation that would change the state's rate regulatory system for automobile insurance to open competition. This support was predicated on the belief that competition would force rates down.

Massachusetts insurance commissioner James M. Stone ultimately approved only an 18 percent increase for the industry, less than half of their original request. A significant element in Stone's decision was his ruling that investment income should be considered in the calculation of automobile insurance rates. In practical terms, Stone required insurers to accept a 4 percent underwriting loss factor for bodily injury coverage, as opposed to the traditional 5 percent profit factor which the industry assumed in their filing, because of the offset of investment income. Insurers subsequently filed an appeal with the Massachusetts supreme court which upheld Commissioner Stone.

An extensive automobile insurance reform bill, backed by Commissioner Stone, was subsequently enacted which changed the state's rate regulatory system to open competition, effective January 1977. The bill allowed automobile insurers to file and use rates without prior approval. The rates filed were subject to subsequent disapproval by the commissioner if he determined that competition was insufficient to ensure that rates were not

1) "Largest Auto Rate Bid Ever Sparks Drive for Mass. Law Reform," National Underwriter Property & Casualty Insurance Edition, 26 September 1975, p. 1.

excessive. The industry was hopeful that the new system would finally allow it to set what it considered to be adequate rates, reversing the pattern of severe rate inadequacy which it alleged had occurred in previous years.(2) Ironically, politicians at the same time were promising voters that competition under the new law would bring lower rates after three years of significant rate increases. (3)

Consistent with their claims about previously inadequate rates, insurers responded to the first year of open competitive rating with sizeable rate increases, particularly for youthful and urban drivers. Public response to the rate increases was heated. Nearly 500 East Boston motorists met with Massachusetts House Speaker Thomas McGee over automobile insurance rates. McGee charged Commissioner Stone with "selling" Massachusetts motorists "down the river" for promoting open competitive rating and called for its removal. (4) Meanwhile, Massachusetts Governor Michael Dukakis labelled the rate hikes "outrageous and unacceptable." (5)

With the backing of Stone and Dukakis, legislation was enacted in July of 1977 which placed a 25 percent cap on

2) "Mass. Gets Major Auto Reform Bill," NUPC, 11 June 1976, p. 26.

3) Ibid.

4) "Auto Reform Breakdown in Mass," NUPC, 15 April 1977, p. 2.

5) Ibid.

increases in 1977 rates. The law also required insurers to refund to policyholders any premiums collected in excess of the 25 percent limit which amounted to some \$45 million. Thirty-seven insurance companies subsequently challenged the law's constitutionality in an appeal brought before the Massachusetts supreme court but their appeal was denied. In August of 1977, Commissioner Stone, with the support of Governor Dukakis, announced that he would fix and establish automobile insurance rates for 1978, effectively ending the state's experiment with open competitive rating. After holding hearings on the issue as required by the state's open competitive rating statute, Stone concluded "that the necessary market forces simply do not exist in automobile insurance." (6)

The MARB subsequently filed for a 14 percent increase in 1978 rates (taking the 1977 rebates into account), citing higher claim frequency, medical care costs, and loss payments as the basis for the increase. The state sponsored rating bureau proposed a 10.9 percent decrease from 1976 rates, a substantial difference from the industry filing. It cited significant declines in the number of fatalities and injuries due to accidents and the number of physical damage claims as the basis for their recommendation. Massachusetts Fair Share, a consumer group, proposed a 10-20 percent decrease in rates depending on the coverage.

6) "Auto Competitive Rating Killed in Massachusetts," NUPC, 12 August 1977, p. 1.

Commissioner Stone ultimately awarded the industry a 12 percent rate decrease over 1977 rates amounting to a \$100 million decrease in total premiums.

In September of 1978, the MARB filed a request for an increase of 24.3 percent in automobile rates for 1979. The state rating bureau recommended that rates be cut an average of 8 percent and Massachusetts Fair Share proposed that rates be frozen. The legal counsel for the MARB charged that the state rating bureau's methodology was "at best meaningless and at worst dangerous." (7) Commissioner Stone subsequently ordered a 2.4 percent reduction in rates. In his decision, he made the following observation about Massachusetts automobile insurance rates:

Our Commonwealth should no longer be used as the national example of runaway insurance costs. Boston's rates, once the highest in the nation, are now lower than those in at least three major cities. (8)

This was Commissioner Stone's last ruling on an automobile insurance rate filing. Governor Dukakis failed to be re-elected and Stone, an appointed official, accepted a federal post. The new governor, Edward King, appointed Stephen F. Clifford as insurance commissioner in January 1979. Commissioner Clifford resigned one month later in response to substantial criticism concerning his alleged

7) "Auto Factions Cross Swords Again in Mass," NUPC, 15 September 1978, p. 1.

8) "Stone's Farewell: 15M Auto Cut," NUPC, 1 December 1978, p. 1.

industry bias and improper business activities. Clifford was replaced by Michael J. Sabbagh who proved to be no greater friend to Massachusetts' insurers than Stone. In July of 1978, Commissioner Sabbagh announced that Massachusetts would not return to open competition for automobile insurance in 1980 and that he would set rates in the same manner as his predecessor. (9) Commissioner Sabbagh cited the lack of evidence that there was adequate competition in the market as the basis for his decision not to reinstitute open competition. He also noted that only insurance companies had spoken in favor of open competition in previous hearings.

The MARB filed for a 20.6 percent rate increase for 1980 arguing that the rates set for 1979 were far too low. The state rating bureau, however, recommended an increase of only 5 percent. Commissioner Sabbagh elected to give the industry a 5.7 percent increase. The MARB promptly appealed the commissioner's decision to the Massachusetts supreme Court contending that the rates set for 1980 would be inadequate by \$93 million. The court agreed with the MARB that profit provisions in the commissioner's decision were unreasonable and remanded the case back to the commissioner for recalculation of the profit factors. The profit factors were subsequently adjusted from a 13 percent to a 10.3 Percent underwriting loss factor for bodily injury coverage

9) "Mass. Open Rate Ban Extended," NUPC, 20 July 1979, p. 1.

and from a 2 percent underwriting loss to a 1.9 percent underwriting gain on physical damage coverage. The adjustments amounted to an additional 3.8 percent increase in 1980 rates.

In subsequent years the pattern of rate regulation in Massachusetts has stayed relatively consistent. The industry filed for an overall increase of 24.4 percent for 1981 but Commissioner Sabbagh approved only a 7 percent increase. For 1982, insurers requested a 24.5 percent increase but were granted only a 15 percent increase. The industry requested a 19.4 percent increase in rates for 1983 but were granted only a 3 percent increase. In 1983, Peter Hiam replaced Michael Sabbagh as commissioner and gave automobile insurers a 4.5 percent increase for 1984 instead of the 13.3 percent increase they requested. For 1985, the MARB requested an overall 7.9 percent increase in rates but Commissioner Hiam ordered a 2 percent decrease.

Over the last decade, industry spokesmen have continually attacked regulatory policy in Massachusetts. In 1980, an executive of the Kemper Group remarked publicly on the industry's extensive losses in Massachusetts because of regulatory decisions. (10) He noted the impact of "urban-based (consumer) activists with access to the media and their political representatives" on Commissioner Stone's decision to suspend open competition in 1978 and the

10) "Massachusetts Auto Insurance: Is There A Way Out," NUPC, 12 December 1980, p. 14.

legislature's mandated rebate of \$45 million on 1977 premiums. (11) Both insurance companies and agents have been strong supporters of a return to open competition in automobile insurance in Massachusetts, undoubtedly to break what they perceive to be a regulatory stranglehold on rates. To date, however, the insurance commissioner still sets private passenger automobile insurance rates in the face of heavy political opposition to any return to open competition.

New Jersey

As discussed earlier, New Jersey was one of the first states to require automobile insurers to include investment income as a source of revenue in rate making. As the 1967 rate case wound its way through the courts, the state of New Jersey strongly opposed rate increases by automobile insurers. In 1967, Governor Richard J. Hughes even appointed a public defender to challenge automobile insurers' requests for rate increases. Eventually, the New Jersey supreme court remanded the 1967 rate case back to Commissioner Clifford and a rate increase was granted, albeit considerably less than what the industry had requested.

During the 1970s, New Jersey developed the highest automobile insurance rates in the country. This can be attributed primarily to a very liberal no-fault automobile

11) Ibid.

insurance law, enacted in 1973. Until 1983, New Jersey's no-fault law permitted persons injured in an automobile accident to initiate a lawsuit and claim tort damages in addition to no-fault benefits already paid if their medical expenses exceeded a \$200 threshold. This was the lowest tort liability threshold of any no-fault law in the country. The result was spiraling claim costs which required insurers to increase premiums at a corresponding rate. In turn, high premiums, combined with the false promise of cost savings due to no-fault, placed heavy pressure on politicians and regulators to restrict rate increases.

New Jersey's rate history after 1973 is characterized by considerable divergence between the rate increases requested by automobile insurers and the increases actually approved by the commissioner. The significant gaps between the rate increases requested by ISO and the increases approved by the New Jersey insurance department, shown in Table 4.1, are illustrative of this severe regulatory climate.

New Jersey's high claim costs and restrictive rate regulation have apparently resulted in heavy losses for the industry. According to A.M. Best Co., New Jersey automobile insurers suffered losses of \$145.5 million in 1976, \$63.3 million in 1977, \$109.9 million in 1978, \$137.8 million in 1979, \$152.2 million in 1980, and \$316.1 million in

1981.(12) These losses occurred even after taking investment income into account. New Jersey auto insurers have pointed to these heavy losses as proof that the insurance commissioner was not allowing them to charge adequate rates in light of the state's liberal no-fault law. New Jersey's residual market also grew tremendously during this period as insurers refused to write new drivers voluntarily, causing them to be placed in the assigned risk plan. The proportion of automobiles insured in the assigned risk plan rose from 13.5 percent in 1973 to 36.6 percent in 1981. (13)

Commissioner James J. Sheeran's imposition of a rate freeze in 1976 and the ensuing battles with insurers is illustrative of the antagonistic relations that have existed between the industry and the New Jersey department. In 1976, Commissioner Sheeran, with the support of Governor Brendan T. Byrne, decided to put a moratorium on approving any requests for increases in automobile insurance rates. Commissioner Sheeran cited declining automobile accident and inflation rates as the basis for his decision. (14) The rate freeze attracted vehement denunciations and threats to

12) "Automobile Insurers Lose \$316.1 Million in '81," NUPC, 5 November 1982, p. 59.

13) Automobile Insurance Plans Service Office, AIPSO Insurance Facts (New York: AIPSO, 1976, 1983).

14) "Sheeran Freezes N.J. Auto Premiums," NUPC, 10 December 1976, p. 1.

stop writing automobile policies from insurers. (15) An executive vice president of Continental Insurance Company stated that, "We can no longer in good conscience continue to commit our shareholders' funds to what amounts to a subsidy of the motorists of New Jersey." (16)

In January of 1977, ISO, which represented 200 auto insurers in New Jersey, brought suit against Commissioner Sheeran in the appellate division of the New Jersey superior court. ISO sought to reverse the commissioner's denial of their request for a rate increase and to disqualify him from making any further decisions on their filing. ISO's general counsel contended that "Commissioner Sheeran is creating a situation in which woefully inadequate private passenger auto insurance rates will make it more difficult than ever for New Jersey motorists to obtain necessary auto insurance coverages." (17) ISO's appeal was eventually mooted by subsequent rate filings, however.

In the spring of 1978, Kemper Insurance Company filed for a 40.3 percent increase in its private passenger automobile insurance rates. After considerable delay, Commissioner Sheeran granted Kemper only a 8.9 percent rate increase. Kemper subsequently appealed this ruling to the state appellate court, challenging the commissioner's right

15) Ibid.

16) "N.J. Auto Rate Dispute Escalates As Continental Ins. Co. Quits Market," NUPC, 8 June 1979, p. 1.

17) "ISO Agents Court Sheeran," NUPC, 1 January 1977, p. 1.

to do more than accept or reject a filing and citing what the company called "unreasonably low rates which caused Kemper to lose almost \$4 million on auto insurance in New Jersey from 1973-77." (18) A company executive also commented at the time that the company's operations in New Jersey were a "disaster" and blamed the continuing failure of the state insurance department to provide adequate rate levels. (19) He pointed out that Kemper had submitted four filings for rate increases since 1975 and received action on none of them. The court, however, was not persuaded by Kemper's arguments and Commissioner Sheeran's ruling was upheld.

In 1981, the Motor Club of America Insurance Company brought suit against the State of New Jersey, the New Jersey Department of Insurance, and Commissioner Sheeran in the New Jersey superior court to recover losses it alleged it had sustained because of New Jersey's "confiscatory statutory and regulatory framework and the confiscatory regulatory policies and decisions" of Commissioner Sheeran. (20) MCAIC contended that Sheeran's policies constituted confiscation of its property for public use without just compensation in violation of the United States and New Jersey constitutions.

18) "Kemper New Jersey Dept. File Counter Suits," NUPC, 8 June 1979, p. 1.

19) "Kemper Files Suit Against N.J. Dept.," NUPC, 15 December 1978, p. 1.

20) Dennis Pillsbury, "Insurer Sues New Jersey To Recover Underwriting Losses," Best's Review Property/Casualty Edition, April 1981, pp. 10, 104-106.

Eighty percent of MCAIC's business was in New Jersey's automobile insurance market. At the end of 1973, it had a policyholders' surplus of \$21 million. At the end of 1979, its surplus was \$3 million. This was after its parent company, Motor Club of America, had made surplus contributions totaling \$10 million. The case was an interesting one in that the plaintiff contended that the state had illegally confiscated private property through its regulatory policies. The court dismissed the suit, however, on the basis that MCAIC had not attempted to appeal the commissioner's rulings on their rate filings.

With a bulging residual market, considerable losses, and pullouts by several automobile insurers it was becoming increasingly apparent that New Jersey regulators would have to grant large rate increases or there was going to have to be major reform of the state's no-fault law. Insurance companies and agents lobbied heavily for both. In 1982, Joseph F. Murphy replaced James Sheeran as commissioner of insurance and granted relatively large rate increases to New Jersey automobile insurers. For example, Aetna was given a 25 percent increase, Travelers was given a 27.1 percent increase, Prudential was given an 18.5 percent increase, and ISO companies were given a 15 percent increase. Subsequently in 1983, New Jersey enacted a no-fault reform bill which allows insureds to choose various options on their policy which would presumably lower its costs. One of the provisions of the act allows insureds to choose an

optional \$1500 tort liability threshold. Commissioner Murphy also granted insurers a 7 percent rate increase in 1983.

Commissioner Murphy's approval of automobile rate increases earned him considerable criticism from several state legislators who called for his resignation. Murphy did resign in April 1984, citing "demagogic behavior respecting automobile insurance" and "unwarranted legislative criticism and harassment" as the basis for his resignation. (21)

No filings for rate increases have been approved by the New Jersey department since 1983. Kenneth Merin was appointed interim commissioner by Governor Thomas Kean. Commissioner Merin subsequently disapproved ISO's request for a 9.9 percent rate increase in October 1984. Hazel Gluck was appointed commissioner by Governor Kean in January 1985 and has not granted automobile insurers a rate increase to date.

New York

New York enacted an open competitive rating law for private passenger automobile insurance in 1970. The law provided that it would automatically expire at the end of 1973 unless the legislature approved an extension. As it turned out, there was less than total satisfaction with the

21) "Interim Commission for New Jersey," NUPC, 30 March 1984, p. 71.

market's performance under the new law with complaints from various groups about increasing rates and declining availability of coverage. At an insurance department hearing, the New York state AFL-CIO charged that rates had increased more than twice the rate of inflation with disproportionate increases in urban areas and urged a return to prior approval rating. (22) However, in 1973, the insurance department issued a report which concluded that open competition was working well and recommended its continuation. (23) The legislature complied by extending the open competition law for two more years.

In February of 1973, New York enacted a no-fault automobile insurance law which became effective February 1, 1974. Prior to the effective date of the law, each insurer was required to receive prior approval on the rates they intended to charge for the required automobile liability and first party coverages under the new law. The law included a provision that required insurers to reduce their rates for liability and medical payments coverage at least 15 percent below what they charged on January 1, 1973 in anticipation of cost savings under no-fault. The law also required that insurers refund to policyholders any "excess" profits as determined by the superintendent of insurance. These provisions reflected legislative concern that insurers would

22) Insurance Advocate, 3 February 1973, p. 5.

23) New York State Insurance Department, Competition in Property/Casualty Insurance in New York State (New York: New York State Insurance Department, 1973).

reap windfall profits with the transition from a traditional tort liability system to a lower cost no-fault system. In effect, New York reinstituted prior approval rating with the enactment of its no-fault law which it has retained up until the present.

In the several years following the enactment of the no-fault law, it is apparent that a rift developed between Superintendent of Insurance Thomas Harnett and leading consumerist legislators over rate regulatory policy for automobile insurance. Beginning in mid-1975, Harnett began granting sizeable rate increases to automobile insurers when expected cost savings from no-fault did not materialize. In public statements Harnett commented on the need for a "balanced" rate regulatory policy which included attention to rate adequacy. (24) He also noted that continuing deteriorating loss experience for automobile insurers would probably necessitate further rate increases.

In September of 1976, a legislative hearing to investigate recent automobile insurance rate increases was called by the chairman of the New York Senate Insurance Committee, Senator John Dunne. Senator Dunne was critical of Superintendent Harnett's approval of automobile rate increases over the previous months. Senator Dunne contended

24) "N.Y. Supt. Cites Inadequate Rates; Urges Law Changes," NUPC, 10 September 1976, p. 1.

that the rate increases were unnecessary and resulted in excessive profits for insurers. (25)

Because of a legislative delay in extending the state's prior approval system for automobile no-fault rates, New York was actually without a prior approval rating law for a seventeen-day period in February 1977. A number of insurers took advantage of the regulatory window by raising their rates without getting approval from the superintendent. The state senate subsequently declared the increased rates to be exorbitant and passed a bill that ordered all insurers in the state to use the last set of rates approved by the insurance department. The bill clearly represented an usurpation of the superintendent's authority over rates. Superintendent Harnett had been actually seeking voluntary rollbacks from the companies that had raised their rates. Ultimately, the threatened legislative action did cause the offending companies to rollback their rate increases voluntarily.

In 1977, New York legislators enacted automobile no-fault reform legislation in an effort to reduce burgeoning claim costs. The reforms included replacing the existing \$500 tort liability threshold with a verbally defined threshold for serious injury, setting up medical and legal fee schedules, and elimination of duplicate medicare and wage continuation benefits.

25) "Dunne Challenges NY Auto Rate Increases, Hits At Club Atmosphere," IA, 9 October 1976, p. 5.

In November of 1977, Albert B. Lewis was appointed superintendent of insurance by Governor Hugh Carey. Lewis had been a state senator and a member of the Senate Insurance Committee for 12 years. He also took a much harder line against insurers than his predecessor. Superintendent Lewis promptly refused to grant any rate increases to automobile insurers, despite relatively high inflation at the time, on the basis of expected cost savings from the no-fault reforms.

In March of 1978, Superintendent Lewis threatened to mandate cuts in automobile insurance rates if insurers did not act on their own. The warning to cut rates was issued at a press conference to announce "voluntary" rate reductions of 2-15 percent by Prudential Property and Casualty Insurance Company for policyholders living in upstate New York. (26) Prudential had originally filed for an increase in downstate rates for an overall 1.9 percent rate increase. However, when the insurance department revealed that its filing would be help up pending review of the requested rate increases they were removed.

At a public hearing held in the Spring of 1978, Superintendent Lewis also supported continuation of prior approval rating for no-fault automobile insurance. (27) Not surprisingly, industry representatives at the hearing were

26) "N.Y. Regulator Threatens Mandated Auto Rate Cuts," NUPC, 10 March 1978, p. 1.

27) "Insurance And Assns. Back Open Auto Rating," NUPC, 3 April 1978, p. 36.

united in their support of open competitive rating for all property-casualty lines. (28) The legislature agreed with Superintendent Lewis, however, and elected to extend prior approval rating once again for automobile liability insurance.

In September of the same year, Superintendent Lewis announced the disapproval of roughly 100 private passenger automobile insurance rate increase applications that were pending before the department. He further announced public hearings to determine the justification of the companies' existing rate levels. Lewis cited improving loss experience and declining loss ratios under the state's reformed no-fault law as the basis for his decision. (29) It was not until the beginning of 1980, that rate increases, in the area of 5 to 10 percent, were granted to New York automobile insurers. Even then these increases appear to have been outpaced by increases in claim costs.

Since 1980, the New York department has approved automobile rate increases averaging 9.7 percent in 1981, 13.8 percent in 1982, 11.2 percent in 1983, and 5.5 percent in 1984 and 1985 with requested increases running roughly 50 percent higher than those approved. James Corcoran replaced Albert Lewis as Superintendent during this period in March 1983.

28) Ibid.

29) "N.Y. Rejects 100 Auto Filings; Cos. Must Justify Current Rates," NUPC, 29 September 1978, p. 1.

North Carolina

Unlike the insurance commissioners in the previous three states, the North Carolina commissioner is an elected official. John Ingram served as North Carolina insurance commissioner from 1973 to 1984. Relations between Commissioner Ingram and automobile insurers were very antagonistic. From the time he took office in 1973, up until 1981, Commissioner Ingram summarily rejected all requests by the North Carolina Rate Bureau for rate increases for automobile insurance. The rate bureau is a statutory rating office which files private passenger automobile insurance rates on behalf of all North Carolina insurers. The rate bureau appealed all of Commissioner Ingram's decisions to the state supreme court which in every case ruled against the commissioner and granted the rate increases.

Illustrative of Commissioner Ingram's disputes with the rate bureau was his rejection of bureau requests for overall rate increases for automobile liability insurance of 6 percent in 1977 and 5.6 percent in 1978. Commissioner Ingram rejected the filings on the basis that the rate bureau failed to supply audited data, failed to include investment income in their calculations, and failed to supply complete statistics. The rate bureau, in turn, appealed the decisions to the state court of appeals. In the meantime, the companies collected the premium increase

and placed it in escrow pending the outcome of their appeal as allowed by state law. In each of the cases, the state supreme court reversed and declared "null and void" Commissioner Ingram's rate rejection order. (30) The court ruled that Ingram had not given sufficient notice of the necessity for audited data. With respect to the commissioner's complaint about insufficient statistics, the court ruled that the law did not require all company data to be supplied. Most importantly, the court ruled that the law did not require that investment income be considered in an insurance rate making case.

Commissioner Ingram elected to negotiate an agreement with the rate bureau and the North Carolina Reinsurance Facility on their 1981 rate filings. The Facility provides liability coverage only for those persons unable to obtain it in the voluntary market. Ingram approved rate hikes for physical damage insurance of 19.7 percent for the voluntary market and 23.8 percent for the facility business (2 percent less than it had requested). The facility and rating bureau agreed not to appeal the order in return for the hikes.

For 1983, the rate bureau filed for a 12.4 percent rate increase for liability coverage and the facility filed for an 11.9 percent increase for liability. Commissioner Ingram disapproved the filing and the bureau and facility appealed the ruling to the state supreme court. Subsequently, while

30) "Premium Windfall For N.C. Insurers," NUPC, 25 June 1980, p. 1.

their appeal was being litigated, the facility and bureau filed for liability rate hikes of 5.6 percent and 12.6 percent respectively for 1984. Ultimately, a negotiated settlement was reached in which the bureau and facility rescinded 1984 liability rate requests in return for approval of their 1983 filings. In addition, the bureau received approval for a 1.6 percent rate decrease for physical damage insurance which they had proposed in their 1984 filing and also received a 1 percent increase for medical payments coverage.

Michigan

In order to provide a contrasting example to the above four cases, the practice of rate regulation in Michigan prior to its institution of open competition in 1981 was examined. Rate filings and correspondence for the period 1976 through 1980 were examined for ISO, Allstate, AAA, State Farm, and Progressive Casualty (a smaller substandard insurer) to determine the general disposition of rate regulation in Michigan at that time. While this evidence does not reveal complete agreement between regulators and insurers over necessary rate increases, it does appear that Michigan's regulation was more moderate than the above four states.

Of the sample companies, all but ISO filed for and received rate increases in 1976. Allstate filed for and received approval for an overall 10.3 percent rate increase

which became effective March 15, 1976. AAA filed for a 14.7 percent rate increase, but received approval for only a 14.3 percent rate increase which became effective September 1, 1976. State Farm Mutual Auto filed for and received a 22.7 percent increase effective October 1, 1976. Progressive Casualty filed for consecutive rate increases of 13 percent, 14.1 percent, and 23.4 percent, all in 1976. After negotiation, Progressive Casualty was given a 10.8 percent increase on their first filing and their entire requests on the subsequent filings. Initially, the Michigan Insurance Bureau opposed the last rate increase and Progressive Casualty requested a contested case hearing. After several preliminary procedural steps pursuant to the hearing took place, the Bureau approved the requested rate increase after receiving concessions on certain elements of Progressive Casualty's rate structure.

In 1977, only two insurers filed for rate increases. The Bureau took a somewhat stronger stance on these filings. AAA filed for a 20 percent rate increase effective September 1, 1977 but received approval for only a 9.1 percent increase. State Farm filed for a 15.3 percent increase, but after some negotiation accepted a 10.6 percent increase.

In 1978, insurers filed for more moderate rate increases which were granted in full. AAA filed for and received a 0.5 percent rate increase. Progressive Casualty filed for and received an 8.3 percent increase. A similar pattern is revealed for 1979. ISO filed for a 13.4 percent

rate increase for its member companies but after some negotiation it accepted approval for a 10.1 percent increase. Progressive Casualty filed for and received a 10 percent rate increase.

In 1980, there was somewhat greater rate filing activity among these companies. Allstate filed for two rate increases in 1980. First, they requested a 12.7 percent rate increase, effective March 10, 1980, but were granted approval for only a 8.7 percent increase. They subsequently filed for a 10.3 percent rate increase to become effective January 1, 1981, but received only a 8.7 percent increase. Progressive Casualty filed for and received a 16.9 percent rate increase which became effective January 1, 1980. State Farm filed two rate increases in 1980. They requested a 5.9 percent rate increase effective May 15, 1980 but accepted approval of a 3.9 percent increase. They subsequently filed for a 4.4 rate increase to take effect, January 1, 1981, but received only a 0.5 percent increase.

In general, Michigan apparently took a somewhat less stringent regulatory posture than the other states reviewed in this section. On many occasions, insurers received full approval of the rate increases contained in their original filing. On other occasions the Insurance Bureau opposed an insurer's initial filing, but gave approval to a somewhat smaller rate increase. Even in these cases, insurers often received a substantial portion of their original request. Only in one instance did a filing disapproval prompt a rate

hearing. This pattern contrasts with that revealed in the above four states where insurers often received either none or less than half of the rate increases requested.

Summary

The evidence presented in this Chapter reveals considerable disparity among the states studied in terms of the apparent stringency with which they regulate automobile insurance rates. Table 4.1 reveals that, in Alaska, Iowa, Louisiana, and Maryland, ISO received approval of most the automobile rate increases it has filed for since 1976. Alternatively, the insurance commissioner has approved rate increases considerably less than what ISO has requested in most instances in New Jersey, Pennsylvania and Rhode Island. This evidence together with other anecdotal evidence presented in this Chapter suggest that rate regulation has been more stringent in Massachusetts, New Jersey, New York, North Carolina, Pennsylvania, and Rhode Island than it has been in Alaska, Iowa, Louisiana, Maryland, Michigan, and many other states. The tendency of regulators in the first group of states to grant rate increases considerably less than industry requests or even order rate decreases reflects their intent to maintain a rate level that is lower in relation to costs than the rate level that is established in the other states.

Also, the anecdotal evidence presented on Massachusetts, New Jersey, New York, and North Carolina shows a clear pattern of significant disagreement between the insurance department and insurers over necessary rate levels. States where regulators and the industry are in virtual agreement over necessary rate levels (such as

Alaska, Iowa, Louisiana, and Maryland) are distinguished by their lack of disapproved filings, rate hearings, court cases, and public statements on regulatory issues that would otherwise attract attention in the trade press. Michigan, prior to 1981, presents something of a middle case where regulation appears to have been more stringent than in the second group of states but less stringent than in the first group. In light of this evidence of varying regulatory stringency, the next chapter reviews previous studies of the effect of rate regulation on market performance in automobile insurance and what they have uncovered about the marginal impact of higher stringency on performance.

CHAPTER FIVE

PREVIOUS STUDIES OF REGULATORY STRINGENCY

A number of studies of the effects of state rate regulation on market performance in the private passenger automobile insurance industry have been conducted over the last decade. A very good survey of these studies is provided by Harrington. (1) This Chapter reviews primarily those studies which have attempted to control for the effect of varying regulatory stringency among states in some fashion or another. An examination of these studies reveals a general failure to adequately measure the degree of regulatory stringency among states. The measures of regulatory stringency that have been used have either been ambiguous or have appeared in misspecified empirical models lacking an adequate theoretical basis. Consequently, there has been a failure to accurately estimate the impact of regulatory stringency on performance. To date, there is still little understanding of how greater levels of regulatory stringency among states has affected market performance in automobile insurance.

The first section of this Chapter looks at two studies which have investigated the variation in regulatory attitudes and policies relating to stringency within state

1) Scott Harrington, "The Impact of Rate Regulation on Prices and Underwriting Results in the Property-Liability Insurance Industry: A Survey," *Journal of Risk and Insurance*, 51 (December 1984): 577-623.

insurance departments. These studies provide additional evidence that states do differ considerably in terms of the stringency with which they regulate rates. The second section examines two studies which consider only the impact of prior approval regulation on market performance in automobile insurance without consideration of the role of regulatory stringency. These two studies deserve looking at because they represent the most comprehensive of this type of study and consequently provide a good basis for comparison with studies that do consider regulatory stringency. The first study, like its predecessors, found no effect for regulation, while the second study, using more recent data, found prior approval regulation to raise liability loss ratios. The last section evaluates studies which have considered varying regulatory stringency in one form or another. Generally, these studies have not found that greater regulatory stringency has had any differential effect on performance but it will be shown that stringency-related variables used by these studies do not provide a good test of the stringency hypothesis, leaving the issue unresolved.

It should be noted that none of the studies reviewed in the last section had adopted a formal definition of regulatory stringency and then gone about assessing its importance. Each of these studies does refer to, in one form or another, the differential administration of similar regulatory statutes. The various terms that are used and

the context in which they are used suggest that the authors of these studies are attempting to account for something akin to the severity of regulation or the stringency of regulation as it has been defined here, but this cannot be assured. These studies will be discussed in terms of their implications concerning regulatory stringency as it has been defined here, recognizing that the authors of these studies may have intended to measure the impact of something other than this.

Surveys of Regulatory Attitudes and Behavior

Miles and Bhambri have conducted a fairly extensive survey of state insurance commissioners on their perceptions of their roles as regulators. They concluded that

Substantial difference in regulatory philosophies were found to coexist among regulatory executives operating in the same industry arena. . . . Such regulatory philosophies and the agendas they create for regulatory executives makes a big difference in the way government regulation of business is formulated and implemented.(2)

Miles and Bhambri essentially uncovered two basic types of regulators -- activists and arbiters. The activist commissioner is characterized as a strong promoter of consumers' interests as opposed to being a mediator between industry interests and consumer interests.

2) Robert Miles and Arvind Bhambri, The Regulatory Executives (Beverly Hills, C.A.: Sage Publications, 1983): 180.

Activist regulatory executives are advocates of the public interest. They see themselves as agents of the underdog, and they perceive a clear dichotomy between "the needs of the public" and "the needs of the industry." These regulatory executives, therefore, tend to take an initiating role in pioneering insurance legislation and in questioning traditional business practices. (3)

Activist commissioners tend to be Democrats who represent politically complex and volatile urban states where consumer groups are much more politically active.

Alternatively, arbiter commissioners, according to Miles and Bhambri, attempt to balance consumer and industry interests.

The arbiters among our regulatory executives, in contrast, see both the industry and the public as important constituencies. To them the interests of the public and the industry are not in direct conflict. Therefore, these interests are amenable to mediation by the regulatory executive. . . . Arbiters tend to be more satisfied with the status quo in the regulated industry than activists. (4)

Arbiters commissioners, which account for approximately two-thirds of all commissioners, tend to come from smaller, less urban states where consumer groups are less politically active.

Miles and Bhambri did not directly address regulators' views on rate regulation in automobile insurance. Their survey questions referred more to how narrowly regulators defined the scope of their role and to which constituencies

3) Ibid., p. 183.

4) Ibid., p. 186.

they listened. They did not ask insurance commissioners whether they thought that adequacy or excessiveness was the principal concern in rate regulation or whether investment income should be reflected in rate making. It seems reasonable, however, that commissioners who were typed as activist in their study would tend to take a more stringent approach to regulation of automobile insurance rates and would be less likely to give insurers the full rate increases that they request than commissioners who are identified as arbiters. Also, the fact that activist commissioners tend to be found in one kind of political environment and arbiter commissioners in another indicate that the occurrence of one or the other in a given state is not just a random event but may be at least partially dependent on a state's political environment.

The General Accounting Office also conducted a study of state property-casualty rate regulation in 1978 in which it found a great deal of variation among states in terms of the extensiveness of their regulatory efforts.

Rate regulation in prior approval states has been faulted on two contradictory counts. First, it is thought to be merely a rubber stamp that fails to analyze filings and allow companies to set whatever rates they wish. Second, the insurance industry criticizes the prior approval process as being too restrictive, fraught with delays; and prone to making large cuts in requested rates. Our study found evidence to support both criticisms, depending on which state we reviewed. (5)

5) U.S. General Accounting Office, Issues and Needed Improvements in State Regulation of the Insurance Business (Washington, D.C.: Government Printing Office, 1979): 60.

The GAO found no single course of action in the way rates were reviewed among the 35 states they compared. The time of rate filing reviews among prior approval states ranged from a few minutes to 14 months. States also varied significantly in terms of the level of actuarial analysis of rate filings. Ohio, for instance, had no independent actuarial review of rate filings at the time of the survey, but relied solely on companies' actuarial calculations. Other state insurance departments used, to varying degrees, their own actuaries or hired consultants to examine filings for the acceptability of actuarial assumptions and methods. Only the Massachusetts and Texas insurance departments assembled their own data and made their own actuarial calculations to evaluate requested rates.

The GAO found other differences among the states they surveyed. Six held no administrative hearings on rate filings in 1977 while the median number of hearings was four. The length of delay for approval of rate filings varied significantly as well.

We found that for six major companies and ISO, prior approval States spent an average of 3-1/2 months to approve major rate filings. In other states, however, the average delay was far greater -- almost 1 year in New Jersey and 6 months in South Carolina, for example.(6)

6) Ibid., p. 68.

The report goes on to point out that, if the requested rate increases are necessary, such delays result in inadequate rates for the period of the delay.

The Miles-Bhambri and GAO studies represent the only comprehensive surveys of the policies of state insurance commissioners and their departments that have been conducted. Other studies of state insurance departments have either only looked at a few states or have only surveyed specific policies such as investment income requirements. Although neither the Miles-Bhambri study nor the GAO study focused on the issue of the stringency of automobile rate regulation as it has been defined for this study, they do indicate that policies which are probably strongly associated with the level of regulatory stringency in property-casualty insurance generally do vary among states. To that extent they tend to corroborate the anecdotal evidence of varying regulatory stringency in automobile insurance presented in Chapter 4. Despite this evidence, recognition of state differences in regulatory stringency in studies of the effects of the rate regulation in automobile insurance has been grudging and incomplete.

The Effects of Prior Approval Rate Regulation on Market Performance

There have been a number of studies which have estimated the effect of prior approval rate regulation on market performance in automobile insurance but which have

not controlled for different degrees of regulatory stringency among prior approval states. These studies, for the most part, tend to be duplicative and are of little relevance to the subject of this study. However, it is useful to review the two most comprehensive studies that fall into this group because they provide a good basis for comparison with studies that consider regulatory stringency in addition to providing other interesting insights.

Ippolito tested a capture hypothesis that state prior approval rate regulation increased rates and lowered the state loss ratio in automobile insurance. (7) Using regression analysis, he estimated the effect of state prior approval regulation on the mean statewide total automobile liability and physical damage loss ratios for the periods 1971-73 and 1973-75. Ippolito employed a model in which the state loss ratio was a function of the existence of regulation, market concentration, and several cost-related variables. A dummy variable equal to one if a state had a prior approval system was used to indicate the existence of regulation. Ippolito did not find the existence of prior approval regulation to have a significant impact on the loss ratio. Therefore, he concluded that there was no support for the capture hypothesis that regulation lowered the market loss ratio.

7) Richard Ippolito, "The Effects of Price Regulation in the Automobile Insurance Industry," Journal of Law and Economics 22 (April 1979): 55-89.

Ippolito's findings are important because his represents the best of the earlier studies that estimated the effect of rate regulation on performance without considering differing degrees of regulatory stringency among prior approval states. This, of course, is its major limitation. While Ippolito's study indicates that, on the whole, rate regulation has not affected underwriting results, it leaves unresolved the questions of whether rate regulation has had an impact in any state or if greater regulatory stringency has any differential impact on the loss ratio since only one dummy variable is used to reflect the existence of regulation. If regulation does have a significant impact in particularly stringent states but not in other states, that effect will be obscured by lumping all prior approval states together with one regulatory variable.

Another concern is that Ippolito's data was confined to the early 1970s. It is conceivable that the effect of regulation in automobile insurance has shifted over time due to changing economic and political conditions within the industry. If this is the case, then the results Ippolito obtained may not be reflective of what has happened in more recent years.

Harrington has published a more recent study of the impact of prior approval rate regulation on state private passenger automobile liability insurance loss ratios over

the period 1976-81. (8) His study is interesting because of his use of more recent data and his consideration of whether the effect of rate regulation varies over different points in the underwriting cycle. He tested several different hypotheses about regulation: (1) a capture hypothesis that regulation has improved underwriting results (lowered loss ratios); (2) a consumer pressure hypothesis that regulation has worsened underwriting results (raised loss ratios); and (3) a regulatory lag hypothesis that loss ratios will be lower in prior approval states than in open competition states in periods of favorable underwriting experience and vice versa. To test these hypotheses he regressed state liability loss ratios on a dummy variable indicating the existence of a prior approval law and several cost-related variables. Regressions were run using mean values for the entire period as well as values for each year separately. Regressions were also run separately for direct writers and agency companies to see if the effect of regulation differed between these two groups.

Harrington found prior approval regulation to have a positive impact on the loss ratio for about half the years examined separately and for the entire period as a whole for both agency companies and direct writers. The effect of regulation tended to be greater in later years than in

8) Scott Harrington, "The Impact of Rate Regulation on Automobile Insurance Loss Ratios: Some New Empirical Evidence," Journal of Insurance Regulation 3 (December 1984): 183-202.

earlier years during the period. His estimates indicate that prior approval regulation increased the liability loss ratio by roughly 5 percent over the entire period 1976 through 1981. Harrington concluded that these results support the consumer pressure hypothesis that regulation raises the loss ratio as opposed to the capture hypothesis that regulation lowers the loss ratio. He also did not find support for the regulatory lag hypothesis based on the fact that the coefficient for the prior approval variable was positive for both good and bad years in the underwriting cycle.

Harrington's results are significant because they indicate that regulation, on the whole, has increased liability loss ratios whereas Ippolito (along with earlier studies) had found that regulation had no effect on liability loss ratios. One possible explanation for the difference in outcomes is the fact that Ippolito's sample covered the period 1971-75 whereas Harrington's sample covered the period 1976-81. This suggests that prior approval regulation, overall, may have had a greater impact on underwriting results in more recent years than in earlier years. However, the difference in results may also be attributable to the estimation of different empirical models. Ippolito's estimates were for commercial and private passenger automobile insurance combined whereas Harrington estimated his model for private passenger only. A better test of a shift in the effect of regulation over

time would be obtained by estimating the same model over the two different periods and comparing the results.

Harrington's study still does not answer the important question of whether greater regulatory stringency among prior approval states has further increased loss ratios and reduced underwriting profits because he uses only a single dummy variable for prior approval regulation. The effect of rate regulation among prior approval states may be relatively uniform or it may not be. Either situation could be the case and a statistically significant coefficient obtained for the prior approval variable. We now turn to studies which have attempted to control for differences in regulatory stringency among states and examine their findings.

The Effects of Regulatory Stringency on Market Performance

This section deals with studies that have attempted to control for the impact of regulatory stringency on market performance in automobile insurance in one form or another. Each of these studies requires some discussion because of the different ways that they have measured or attempted to account for regulatory stringency and the different results that they have obtained. It should be pointed out that these studies do not represent a progressive unfolding of knowledge about how stringency affects performance as much as they represent independent stabs at the same question. The major purpose of this examination is to show how these

studies have failed to adequately test the significance of regulatory stringency and illustrate the requirements for a good test.

Interestingly enough, the first study of the effects of rate regulation in automobile insurance that employed regression analysis also considered the differential impact of particularly stringent regulation. Smallwood regressed average automobile liability and physical damage loss ratios for the top 36 carriers in each state on several dummy variables reflecting the type of regulatory system, the application of particularly stringent regulation, and the time trend for the particular kind of coverage over the years 1967-69. (9) Five states in which the insurance commissioner had disapproved a rate filing as excessive or had otherwise intervened in a case significant enough to generate prominent discussion in the trade press were distinguished by a dummy variable to reflect the application of particularly stringent regulation. Smallwood ran pooled cross-sectional, time-series, regressions for all firms and all lines grouped together, and for major agency companies, direct writers, third-party lines, and first-party lines separately.

Of the regulatory variables, only the application of particularly stringent regulation was found to have a

9) Dennis E. Smallwood, "Competition, Regulation, and Product Quality in the Automobile Insurance Industry," in Almarin Phillips, ed., Promoting Competition in Regulated Markets (Washington, D.C.: Brookings, 1975): 241-300.

significant effect on loss ratios, especially for liability insurance. Smallwood concluded that particularly stringent rate regulation had increased loss ratios overall by approximately 8 percent in 1968, but that the type of regulatory system had little impact. He suggested that stringent regulation might be more important in third-party lines than in first-party lines because the former is compulsory in most states and, hence, regulators feel a greater responsibility to keep these rates low. (10)

Smallwood's results are significant because they suggest that, while the form of regulation makes little difference, especially stringent regulation does have a positive impact on the loss ratio. It is important to point out that Smallwood's measure of stringent regulation is relatively direct and unambiguous compared to the stringency measures employed in subsequent studies. However, Smallwood's model suffers from a serious flaw in that it omits cost-related variables which should also have a positive impact on the state loss ratio. The omission of relevant independent variables in a model will cause the coefficients for the included variables to be biased. (11) The coefficient for the stringent regulation variable will be upwardly biased to the extent that it is positively correlated with omitted cost-related variables which have a

10) Ibid., p. 273.

11) Peter Kennedy, A Guide To Econometrics (Cambridge: MIT Press, 1979): 57-58.

positive impact on the loss ratio. (12) A theoretical analysis of the determination of regulatory stringency in Chapter Six indicates that higher costs may be positively associated with stringency. Consequently, there is the chance that the estimated coefficient for stringent regulation that Smallwood obtained is upwardly biased.

Even if Smallwood's estimates are accurate, they were obtained for a relatively short period of time before 1970. The effect of stringent regulation that he found may have essentially been short-term and not reflective of its effect in other years. Hence, there is some curiosity as to whether the same relationship between the loss ratio and regulatory stringency would be revealed using a longer sample period.

Caswell and Goodfellow have estimated the impact of state consideration of investment income in approving rate filings on profitability in property-liability insurance.(13) They regressed estimated state underwriting profits for private passenger automobile liability insurance in 1973 on a number of independent variables used to reflect

12) Ibid., p. 65.

13) Jerry W. Caswell and Steve C. Goodfellow, "Effect of Including Investment Income in Ratemaking Upon Profitability of Non-Life Insurers," Journal of Risk and Insurance 43 (June, 1976): 305-315.

regulation and other cost-related factors in a state. (14) Regulation was represented by dummy variables for a prior approval law and investment income consideration. Caswell and Goodfellow found neither the existence of a prior approval statute nor the consideration of investment income to have a significant impact on underwriting profits.

On the face of it, this implies that above average regulatory stringency, indicated by the consideration of investment income in rate making, does not make any difference in the profitability of automobile insurers. However, Caswell's and Goodfellow's investment income consideration variable is a questionable indicator of stringent regulation. An examination of their source of information on this variable suggests that both states that required insurers to consider investment income and states that may have simply allowed insurers to do so were included here. (15) However, only states which require such consideration should be considered stringent regulators,

14) Caswell's and Goodfellow's measure of state underwriting profits was obtained from National Association of Insurance Commissioners, NAIC Report on Profitability By Line and By State for the Year 1973 (Oak Brook, Ill.: Applied Information Development, 1974).

15) Caswell and Goodfellow obtained their information on state policies toward investment income from George B. Flanigan, "Investment Income and Ratemaking," Annals of the Society of CPCU 26 (June 1963): 59-60. Respondent's to a survey of state policies by Flanigan did not indicate whether they actually required or simply allowed insurers to reflect investment income in making rates. Subsequent surveys indicate that some of these states have not explicitly required insurers to reflect investment income in their rates. See H.P. Walker, Memorandum to Louisiana Insurance Rating Commission members, August 18, 1981.

since simple permission to do so puts no regulatory imposition on insurers. Consequently, Caswell's and Goodfellow's investment income consideration variable is not a good measure of regulatory stringency and does not provide a good test of the regulatory stringency hypothesis.

Glasner has examined the effects of both the form of regulation as well as the stringency of regulation on premium levels as opposed to loss ratios. (16) His objective was to test a capture hypothesis that state rate regulation raises premium levels. He estimated several different versions of a basic empirical model in which the dependent variable was the premium charged by three large insurers for a hypothetical policy in selected cities in 1975. Independent variables in the model reflected regulation and the cost of the policy.

Under one version of the model, regulation was represented by dummy variables used to distinguish states with open competition systems and states which set their own rates, from states with prior approval systems. Another dummy variable also distinguished states with elected (instead of appointed) insurance commissioners. Using this model, Glasner found that state rate making increased premium levels but that the use of an open competition system had no differential effect relative to that of prior approval regulation, providing some marginal support for the

16) David Glasner, "The Effect of Rate Regulation on Automobile Insurance Premiums," (Ph.D. dissertation, University of California at Los Angeles, 1977).

capture hypothesis. The existence of an elected insurance commissioner had no effect on premiums.

In order to evaluate the impact of differences in regulatory administration, Glasner estimated a different model in which the dummy variable for state-made rates was replaced by a dummy variable for states that employed their own actuaries or actuarial consulting services to review rate filings as opposed to relying on insurers' rate calculations. Regressions were also run with an alternate dummy variable which was equal to one for states that either set rates or did not employ their own actuarial services. Glasner hypothesized that states which used their own actuarial services should be less pro-industry and more pro-consumer in their regulation which would have a negative effect on premiums.

Glasner, however, did not find the employment of actuarial services to have a significant impact on premium levels. He did find the combined state-made rates or no actuaries variable to be positive and statistically significant. He concluded that there was some evidence to support the hypothesis that the failure to use actuaries has a positive impact on premium levels by reason of the fact that the state-made rates variable and the combined state-made rates and no actuaries variable had similar t-statistics. (17)

17) Ibid., p. 68.

Glasner's study is interesting because of his use of premiums instead of loss ratios as a dependent variable and because of his alternative way of accounting for regulatory stringency. However, his results do not appear to provide strong evidence either for or against the hypothesis that greater regulatory stringency has a negative impact on premiums. On the one hand, his support for this hypothesis appears relatively weak in light of the fact that the employment of actuarial services variable was not significant. Moreover, Glasner does not explain why states which make their own rates are appropriately grouped with states that employ no actuarial services whatsoever. On the other hand, it is not clear that he provides a good test of the regulatory stringency hypothesis in his use of the employment of actuarial services to reflect regulatory stringency or regulatory bias. Actuarial resources may or may not be used to scrutinize automobile rate filings more stringently with the objective of holding rates down. Actuarial services may be employed for simple "empire-building" by the insurance commissioner or for use in other lines besides automobile insurance.

The GAO also estimated the effect of state rate regulation on private passenger automobile insurance loss ratios using several variables to control for differential regulatory administration. (18) The GAO regressed mean state liability and physical damage loss ratios for the

18) U.S. General Accounting Office, Issues, pp. 76-93.

period 1973-77 on a number of independent variables used to reflect both the form of regulation and the way regulation was administered. These variables were a dummy variable for a prior approval law, the state insurance department staff or budget (alternatively scaled by state population and the square root of state population), the proportion of trained professionals in the insurance department staff, a dummy variable equal to one if a state had actuaries, and a dummy variable equal to one if the insurance commissioner was elected. Some regressions were also run with a dummy variable equal to one when New Jersey was the state. This was done to control for the possibility that New Jersey was an exceptional case because of its considerably higher loss ratios.

Neither the existence of prior approval regulation nor the variables associated with regulatory administration were found to have a significant effect on loss ratios on any consistent basis under different specifications except the dummy variable for New Jersey. The dummy variable for New Jersey was positive and statistically significant in all equations in which it appeared. The GAO concluded that neither the form of regulation nor the way regulation was administered made a difference in the performance of state automobile insurance markets.

The GAO study is noteworthy because of its experimentation with several different variables to reflect the administration or stringency of regulation. However,

because of certain flaws in their approach it is not clear that their conclusion that the administration of regulation makes no difference can be accepted. First, as with Glasner, the measures of regulatory stringency that the GAO used are ambiguous. The size of the entire departmental budget and staff, the proportion of trained professionals, and the use of actuaries may or may not reflect the stringency of regulation of automobile insurance rates. Even if these variables were associated with stringent regulation of automobile insurance rates, their inclusion in the same equation is redundant and introduces the possibility of multicollinearity. The presence of multicollinearity would reduce the precision of the estimates obtained and make their interpretation more difficult.

A subsequent study by Petersen used a simultaneous equations approach in estimating the effect of rate regulation on market performance in private passenger automobile insurance, treating regulatory statutes and their administration as endogenous variables, dependent upon economic and political factors. (19) Petersen tested four different theories of regulatory behavior -- a capture theory, a consumer theory, an interest group theory, and an ideology theory.

19) William Petersen, "Economic Determinants of Legislation, Regulatory Behavior and Market Performance in the Automobile Insurance Industry," (Ph.D. dissertation, Harvard University, 1981).

Among the structural equations estimated in Petersen's model were equations for the determination of state loss ratios for liability and physical damage insurance. The independent variables in these equations reflected both the political-regulatory environment in the state as well as other cost-related factors.

Some of the political-regulatory variables in effect served as indirect measures of regulatory stringency since it was hypothesized that they affected loss ratios through their effect on the bias of regulators between consumers and insurers. These variables were the estimated statewide accident rate, the proportions of poor and urban residents and young male drivers in the state, the number of state insurance department employees per capita, and a dummy variable to distinguish states with elected insurance commissioners. The numerical rating of a state's congressman by the Americans for Democratic Action (a liberal political group) was also included as an independent variable. All of the above variables were hypothesized to have a positive impact on loss ratios because they induce or facilitate a greater pro-consumer bias on the part of regulators. The existence of a prior approval law was also distinguished by a dummy variable to reflect the form of regulation. The existence of a prior approval law and the number of insurance department employees per capita were treated as endogenous variables in these equations.

Petersen employed a hybrid two-stage regression technique to estimate the model. Logistic regression was used to create first-stage estimates of non-continuous endogenous variables. (20) The model was estimated with pooled time-series, cross-sectional, data for most states for the period 1973-76.

Petersen found the existence of a prior approval statute, per se, to have a positive effect on liability and physical damage loss ratios under some specifications but not under others. He also found the liberalness of a state's political ideology, as measured by its ADA rating, to have a small but significant, positive impact on both liability and physical damage loss ratios. Petersen also found some evidence that greater consumer political pressure on regulators to lower rates, as measured by the statewide accident rate, had a positive impact on liability loss ratios independently and in interaction with regulation. Other stringency-related variables did not prove to be significantly positive on any consistent basis. Petersen also tested the effect of regulation on a measure of premium levels. His results with this measure turned out to be highly sensitive to the exact specification of the

20) As Harrington points out, Petersen's model is recursive in terms of his loss ratio equation, i.e. the loss ratio is not a determinant of any of the independent variables in the equation. Thus, he could have used ordinary least squares to obtain unbiased estimates of his loss ratio equation with a dummy variable for the type of rating law; see Harrington, "A Survey," p. 612.

empirical equation so he rejected them as unreliable. (21)

Petersen's study is of interest because of his employment of several different variables associated with regulatory stringency that had not been used before. Overall, he did find some evidence to suggest that a greater consumer bias on the part of regulators may raise loss ratios, particularly for liability insurance. However, because of several problems with his analysis, the evidence his study provides on the impact of regulatory stringency is somewhat tenuous.

One important concern is that a statistical association between the state accident rate and the loss ratio cannot necessarily be attributed to a regulatory link. As explained in Chapter 2, a higher loss ratio can be sustained on a policy with a higher average loss cost without impairing profits because certain expenses on a policy are fixed. Hence, a positive association between the accident rate and the loss ratio is expected in a competitive market regardless of regulation. This is illustrated below. Assume that x equals marginal loss cost, e equals marginal expense cost, f equals the proportion of vehicles involved in accidents, and p equals the premium charged on a policy. Assume also that

$$(5.1) \quad x = af,$$

and

21) Petersen, "Economic Determinants," p. 240.

$$(5.2) \quad e = s + bx,$$

where s = the fixed expense on each policy.

It is also assumed that competition will ensure that premiums will equal costs and there will be no excess profits,

$$(5.3) \quad p = x + e.$$

The loss ratio, v , will be equal to marginal loss cost divided by price,

$$(5.4) \quad v = x/p,$$

$$(5.5) \quad v = \frac{x}{x + e},$$

$$(5.6) \quad v = \frac{af}{s + af(1+b)}.$$

Taking the derivative of loss ratio with respect to the accident rate, one obtains

$$(5.7) \quad \frac{dv}{df} = \frac{as}{(s + af(1 + b))^2},$$

which is positive. Consequently, the accident rate, if it has a positive affect on marginal loss cost, will also have a positive effect on the loss ratio. This has been

recognized by Pauly, et. al.. (23) Therefore, a positive statistical association between the accident rate and the loss ratio can not necessarily be attributed to more stringent regulation. Consequently, it is necessary to introduce an additional independent variable for regulatory stringency in order to isolate its marginal effect on the loss ratio.

The implications of Petersen's estimates for the ADA rating with respect to the effect of regulatory stringency on performance are also somewhat unclear. If a liberal political ideology has a positive impact on the loss ratio because it causes regulation to be more stringent, then the interaction between the ADA rating and prior approval regulation should be positive and statistically significant. However, while the ADA variable alone was positive and significant, the interaction between prior approval regulation and the ADA rating (with the ADA variable removed from the equation) was not found to be significant. Hence, Petersen's results suggests that a liberal political ideology has no effect in prior approval states. Consequently, it is not evident that a liberal political ideology has a positive effect on the loss ratio because it causes regulation to be more stringent.

Given these problems with Petersen's results, his study does not provide strong evidence of the positive effect of

23) M. Pauly, H. Kunreuther, and P. Kleindorfer, "Regulation and Quality Competition in the U.S. Insurance Industry." April 1984.

greater regulatory stringency on the loss ratio. However, his study does not provide a sure test of how regulatory stringency has affected loss ratios because the relationships between his political-economic variables and regulatory stringency are only hypothetical. The general lack of significance of these variables does not necessarily mean that regulatory stringency has not affected loss ratios. It may be the case that these variables have had no impact on regulatory stringency. Hence, Petersen's study is inconclusive with respect to the effect of regulatory stringency on the loss ratio.

D'Arcy also used a simultaneous equations model to analyze the impact of the existence of rate regulation and "regulatory restrictiveness" on state loss ratios and underwriting profits for private passenger liability and physical damage insurance combined. (24) His study is particularly interesting for its use of data from a survey of insurance industry executives to measure the "restrictiveness" of property-casualty regulation in a state. (25) D'Arcy's objective was to test four different theories of regulation -- a capture theory, a political support maximizing theory, a conflict minimizing theory, and an agency theory.

24) Steven D'Arcy, "An Economic Theory of Insurance Regulation," (Ph.D. dissertation, University of Illinois at Champaign-Urbana, 1982).

25) Conning and Co., Regulatory Review Property and Casualty Insurance Industry (Hartford, Conn: Conning and Co., 1975, 1978, and 1980).

Market performance in D'Arcy's model, whether measured by the loss ratio or underwriting profits, was a function of cost-related factors, market concentration, and regulation. Regulation was represented by a dummy variable for the existence of a prior approval system in one formulation and by a state's regulatory restrictiveness "score" in another formulation. Other independent variables were also hypothesized to affect market performance through their affect on regulatory restrictiveness or stringency. These variable were the percentage of the population living in urban areas, the three-firm concentration ratio, and several dummy variables which controlled for the employment and selection characteristics of the state insurance commissioner. The percentage of population living in urban areas was hypothesized to have a positive effect on the loss ratio through its impact on regulatory behavior. Market concentration, the election of the commissioner, and either pre-term or post-term industry employment of the commissioner were hypothesized to have a negative effect on the loss ratio through their impact on regulatory behavior. Market performance and regulation were assumed to be endogenous variable within the model. D'Arcy estimated his model with a hybrid two-stage regression procedure and pooled time-series, cross-sectional, data for all states and the period 1973-80, with multiple probit regression employed to create first-stage estimates of the prior approval variable.

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D'Arcy found that greater overall regulatory restrictiveness, as indicated by the industry survey, had a negative impact on the loss ratio, confirming the capture hypothesis. The other stringency-related variables were either statistically insignificant or had signs contrary to their expected signs.

The implications of these results for the effect of regulatory stringency on the loss ratio are unclear. D'Arcy's results, interpreted one way, might suggest that greater regulatory stringency had a negative effect on the loss ratio which is difficult to conceive. However, D'Arcy never defined what he meant by regulatory restrictiveness and its relationship to regulatory stringency is hazy. Respondents to the survey on which his measure was based were simply asked to rank states on the "freedom" which they allowed insurers to "manage the personal lines business."

The term "freedom" could refer to the lack of any kind of regulatory control or interference with respect to a number of different areas besides rates such as underwriting, policy forms, cancellation, etc. In terms of rates, lack of freedom could be equated with regulatory intervention to raise rates as well as lower rates depending on the respondent. The survey question was also not specific to automobile insurance but referred to all personal property-casualty lines. Given these discrepancies, the regulatory restrictiveness variable that D'Arcy used does not appear to be a good measure of

regulatory stringency as it has been defined in this study. Consequently, his study contributes little to an understanding of the effect of regulatory stringency on performance.

Summary

In sum, the empirical literature has almost been unanimous on the point that prior approval regulation, as it has been generally administered, has had a negligible effect on state loss ratios in private passenger automobile insurance, at least during the early 1970s. Harrington's results do suggest, however, that prior approval regulation, on the whole, has had a positive effect on the liability loss ratio in more recent years. Glasner's research also indicates that state rate making has raised rates. While this last finding is interesting, it hardly indicates a general effect for regulation since only two states made rates compared with 29 states that required prior approval at the time of his study.

At the same time, the evidence on the impact of greater regulatory stringency among prior approval states on market performance is inconclusive. The studies by the GAO and Miles and Bhambri and the anecdotal evidence reviewed in Chapter 4 do indicate that some prior approval states attempt to regulate property-liability insurance rates in a more stringent manner than other prior approval states. However, for the most part, variables that have been hypothesized to positively affect or be directly associated with the pro-consumer bias or stringency of regulation of automobile insurance rates have not been shown to have a significant impact on loss ratios or premium levels. One

stringency-related variable that was found to be positively associated with loss ratios, the estimated state accident rate, might also affect loss ratios directly and not through regulation. Consequently, the positive association of this variable with loss ratios does not provide conclusive evidence that regulatory stringency positively affects loss ratios. On the other hand, because the relationship between other variables and regulatory stringency in automobile insurance is not assured, these variables have failed to provide a good test of its significance.

The one exception to the above is Smallwood who does employ a relatively unambiguous and direct measure of regulatory stringency. This measure did have a positive and statistically significant association with state loss ratios. However the fact that his empirical model does not adequately control for non-regulatory factors that can affect differences in loss ratios across states implies the possibility of bias in his estimates. Hence, to date, no study has provided clear evidence that either supports or refutes the hypothesis that greater regulatory stringency increases state loss ratios.

In order for a study to provide a good test of this hypothesis, it should ideally do all of the following which no study has yet done:

- 1) employ a direct and unambiguous measure of regulatory stringency;

2) estimate the effect of regulatory stringency using a fully specified empirical model which does not omit any important variables which affect differences in loss ratios across states;

3) use data from a relatively lengthy sample period that covers a number of years in order to transcend short-term effects of regulation.

This study is designed so as to satisfy all of these criteria. The next chapter presents a theoretical model of the private passenger automobile insurance market under regulation which analyzes how the degree of regulatory stringency is determined and what its impact will be on the market loss ratio. This analysis provides the basis for the empirical model used to estimate the actual effect of regulatory stringency on the loss ratio.

CHAPTER SIX

A THEORETICAL MODEL

This chapter presents a theoretical model of the private passenger automobile insurance market which is used to derive inferences about the effect of rate regulation on market performance. In the model, the market rate for a given insurance policy is determined by costs, the competitive structure of the market, and regulation. An important aspect of the model is the treatment of the stringency of rate regulation as both an important determinant of market performance and a factor which will vary itself depending upon underlying economic and political conditions within the market. The model implies that an empirical analysis of the effects of state rate regulation on market performance in automobile insurance should consider the degree of regulatory stringency that is applied in each state as well as over time and between insurance lines.

The chapter begins with an analysis of the automobile insurance market without regulation. Market results under different competitive structures are examined when there is no regulatory intervention. This analysis shows that, if not subject to regulation, the market rate and loss ratio for a given type of insurance policy will be a function of the cost of producing the policy and the competitive structure of the market. Rate regulation is then introduced into the

model using Peltzman's framework to analyze the determination of the degree of regulatory stringency and its effect on the market rate and loss ratio. The stringency of rate regulation is shown to be dependent upon cost and demand conditions and the relative political sensitivities of consumers to prices and producers to profits. The effect of regulation upon the market loss ratio, in turn, is shown to be dependent upon the degree of regulatory stringency, the market determined loss ratio, the capacity of insurers to mislead regulators about costs, and insurers' ability to affect their costs by adjusting their quality of service.

The Automobile Insurance Market Without Regulation

For the purpose of this analysis it is assumed that insurers sell only one standard automobile insurance policy and that drivers are identical in terms of the probability that they will have a claim and the expected severity of that claim. In reality, insurers sell a variety of policies which differ in terms of deductibles, liability limits, coverages, etc.. Policyholders will also vary in terms of their riskiness depending upon their driving habits and location. In effect, a separate market or submarket could be said to exist for each combination of policy and type of driver. The basic implications of the ensuing analysis for the impact of regulation on market performance should be the same for every submarket, however, and for the statewide

market as a whole. The model used in this section is similar to one used by Glasner. (1)

Figure 6.1 depicts, graphically, the determination of the price and quantity of automobile insurance sold in the long-run for a particular type of policy and driver when the market is characterized by perfect competition and there is no regulatory intervention. DG represents the market demand curve for insurance, indicating the total number of policies demanded at various premium levels. Higher premiums cause some buyers to drop out of the market and buy a cheaper policy or simply forgo insurance altogether.

The market supply curve is determined by the marginal cost of producing an insurance policy. Insurers' costs consist of payments on claims or loss costs and the administrative, loss adjustment, and selling expense associated with selling and servicing policies including the cost of invested capital. For the sake of simplicity, it is assumed here that costs are discounted for investment income. Long-run average and marginal cost for insurers are assumed to be invariant with respect to the number of policies sold. Consequently, average and marginal cost are equivalent. Glasner makes the same assumption which is consistent with Joskow's findings on cost behavior in the property-casualty insurance industry which were discussed in

1) David Glasner, "The Effect of Rate Regulation on Automobile Insurance Premiums," (Ph.D. dissertation, University of California at Los Angeles, 1977): 31-39.

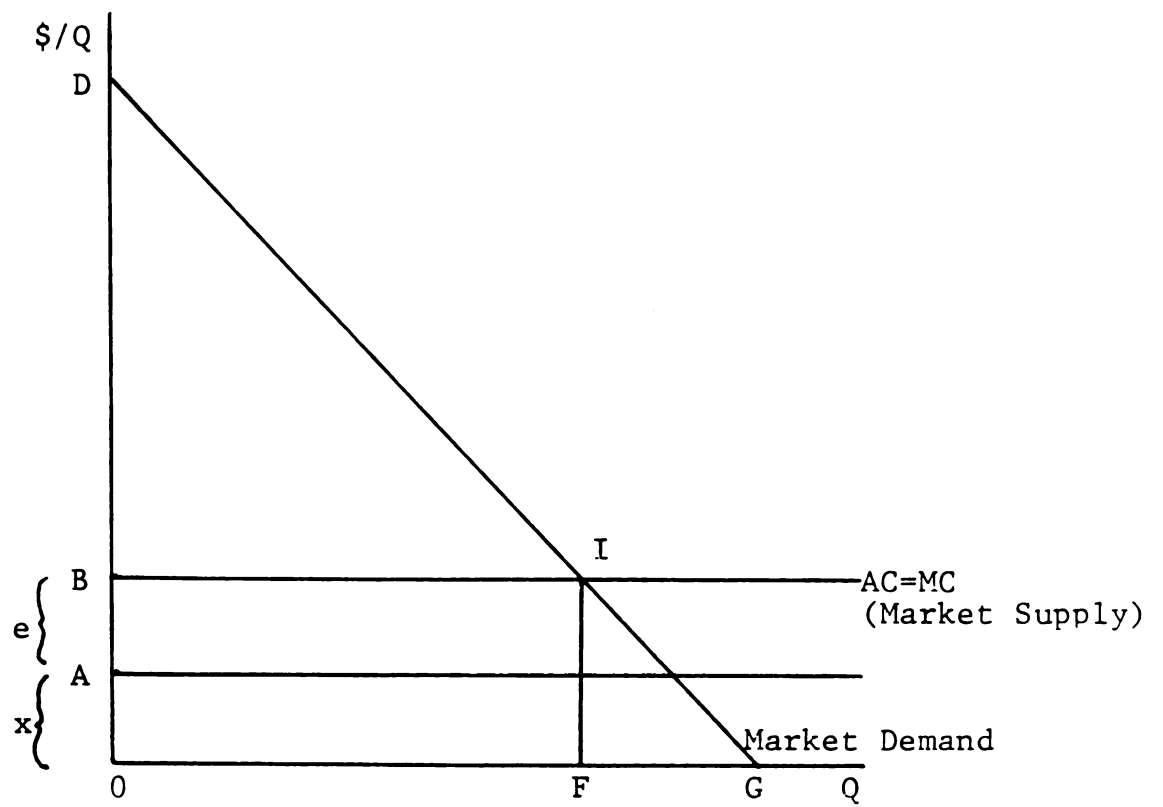


Figure 6.1: Market Equilibrium Under Perfect Competition

Chapter 2. (2) Marginal loss cost, x , is equal to the distance OA. Marginal expense cost, e , is equal to the distance AB. Combined marginal loss and expense cost, c , is equal to the distance OB. The market supply curve is horizontal at the level of marginal cost. Under perfect competition, the market price or rate will equal average and marginal cost, the distance OB, and the number of policies sold will equal the distance OF,

$$(6.1) \quad p_c = c.$$

Total premiums will equal total cost which will equal the area OBIF and economic profits will be absent.

Alternatively, the profit-maximizing solution for a monopolist, shown in Figure 6.2, would be a price equal to OC and sales equal to OE under the same cost and demand conditions. The profit-maximizing price for the monopolist will equal some multiple of average cost which will depend upon the elasticity of demand,

$$(6.2) \quad p = c / (1 + 1/n),$$

where n = the elasticity of demand for insurance.

Under a perfect monopoly, total premiums would be equal to the area OCJE and total costs would be equal to the area

2) Ibid., p. 37.

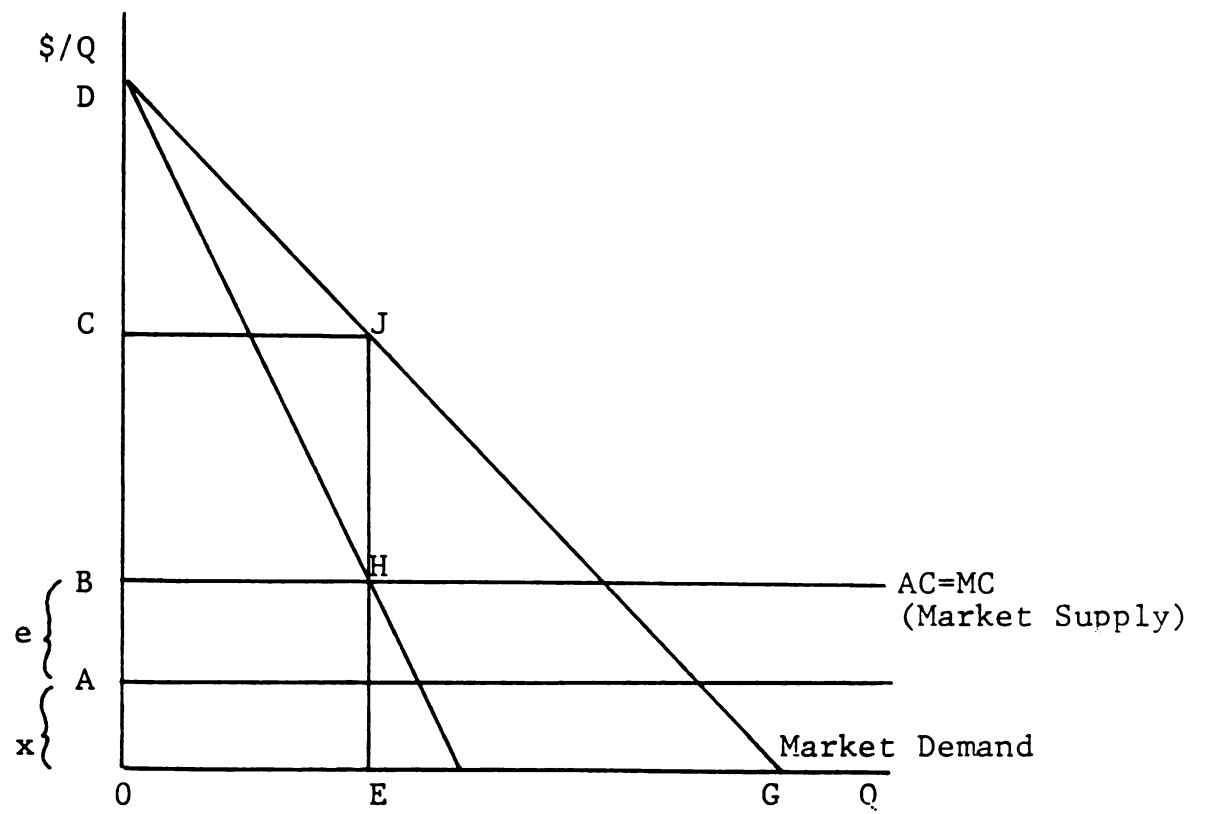


Figure: Market Equilibrium Under Monopoly

OBHE. Total profits would be positive and equal to the area BCJH.

When the market is characterized by neither perfect competition nor pure monopoly, the market price will be set somewhere between the competitive price and monopoly price. (3) Where p will be established between c and the monopoly price will depend upon the market power held by insurers. The more oligopolistic is the industry, the higher the price that insurers will be able to sustain and the greater excess profits that will be earned. The market power held by insurers is determined by the degree of market concentration and barriers to entry into the market. Higher levels of concentration lead to increased recognition among insurers of the interaction of their pricing decisions. This recognition establishes a basis for mutual restraint of price competition and limits on output for the purpose of establishing a higher market price and increasing profits. (4) However, even if concentration is high, if barriers to entry are low it will be difficult for insurers to sustain a market price above the competitive price

3) The relationship between concentration and entry barriers and profitability is a fundamental argument in the structure-conduct-performance paradigm adopted by industrial organization economists; See Joe S. Bain, "Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-40," *Quarterly Journal of Economics* 65 (August 1951): 293-324; and Howard P. Marvel, "Competition and Price Levels in the Retail Gasoline Market," *Review of Economics and Statistics* 60 (May 1978): 252-58.

4) See F.M. Scherer, *Industrial Market Structure and Economic Performance* 2nd edition (Chicago: Rand-McNally, 1980): 151-168.

because excess profits will attract entry into the industry which will increase competition and undermine insurers' pricing discipline. (5) Increased competition will cause prices to fall until excess profits are eroded away. Hence, a supracompetitive price requires both a significant degree of concentration and barriers to entry into the market.

The market loss ratio reflects the overall efficiency of the market. The loss ratio is equal to total losses divided by total premiums which is equivalent to the average loss, x , divided by the market price, p . The loss ratio reflects the amount of loss protection policyholders receive for a dollar's worth of premiums. The rate of return on equity, of course, is more typically used as a measure of an industry's performance. A property of optimal market performance is that investors receive a rate of return no higher than the cost of the capital they have invested. The emphasis in this analysis is on the loss ratio because this is the performance measure used in the empirical portion of this thesis. However, it can be shown there is only one optimum value for the loss ratio given the level of expenses, including the cost of capital.

This can be demonstrated by analyzing how the rate of return on equity is determined and how it is related to the loss ratio. Total revenue for an insurer will be equal to premium income here with costs discounted for investment income,

5) Ibid, pp. 232-260.

$$(6.3) \quad P = pQ,$$

where P = total premiums,
 Q = quantity.

Total costs, excluding the cost of capital, are equal to loss costs plus expense costs,

$$(6.4) \quad C = X + E,$$

where X = total loss costs,
 E = total expense costs.

Total profits can be derived by subtracting total costs from total revenue,

$$(6.5) \quad \begin{aligned} Z &= P - C, \\ &= P - X - E, \end{aligned}$$

where Z = total profits.

The profit margin on sales, z , then is equal to total profits divided by premiums,

$$(6.6) \quad \begin{aligned} z &= Z/P \\ &= 1 - X/P - E/P. \end{aligned}$$

The rate of return on equity or surplus is equal to total profits divided by the amount of surplus,

$$(6.7) \quad r = Z/K,$$

where r = rate of return on surplus,
 K = total surplus.

If we multiply the right side of equation (6.7) by P/P we obtain,

$$(6.8) \quad r = PZ/PK,$$

$$(6.9) \quad r = (P/K)(1 - X/P - E/P),$$

$$(6.10) \quad X/P = 1 - E/P - rK/P,$$

where X/P is the loss ratio. It is clear from equations (6.9) and (6.10) that the relationship between the loss ratio and the rate of return on surplus depends on the expense ratio and the premium to surplus ratio.

Joskow demonstrated that, with free entry and exit, P/K will vary inversely with the profit margin so as to maintain a rate of return on surplus equal to the opportunity cost of capital. (6) To illustrate this point, Joskow initially assumed that rates were fixed by a rating bureau and/or regulatory agency so as to yield a particular z and that all insurers adhered to the cartel rates. At the same time, he

6) Paul L. Joskow, "Cartels, Competition, and Regulation in the Property-Liability Insurance Industry," Bell Journal of Economics 4 (Autumn 1973): 414.

assumed that the entry and exit of capital into and out of the market was free. For any given level of z and P , r will then be determined by the amount of capital in the industry as indicated in equation (6.8). A higher P/K ratio will result in a higher r , all else equal. At the same time, the opportunity cost of capital will vary directly with P/K because of the greater investor risk associated with a higher P/K . A higher P/K means greater investor risk because there is relatively less surplus to back potential claims. Consequently, investors will require a higher rate of return to invest their capital, the higher is the premium-surplus ratio.

Joskow considers two different ways in which the opportunity cost of capital, r^c , might vary with the premium-surplus ratio. Under case (a), r^c is a linear function of P/K . This is shown in Figure 6.3 where the r^c function is represented as a positively sloped straight line. The r^c function intercepts the y -axis at r_n , the expected rate of return from a pure investment trust. The function for the earned rate of return on surplus, r , is also represented as a positively sloped straight line for a given level of z and P . Under this scenario, there will only be one stable equilibrium position where the r function intersects the r^c function. If $r > r^c$, then capital will be attracted into the industry and P/K and r will fall. Conversely, if $r < r^c$, then capital will exit the industry

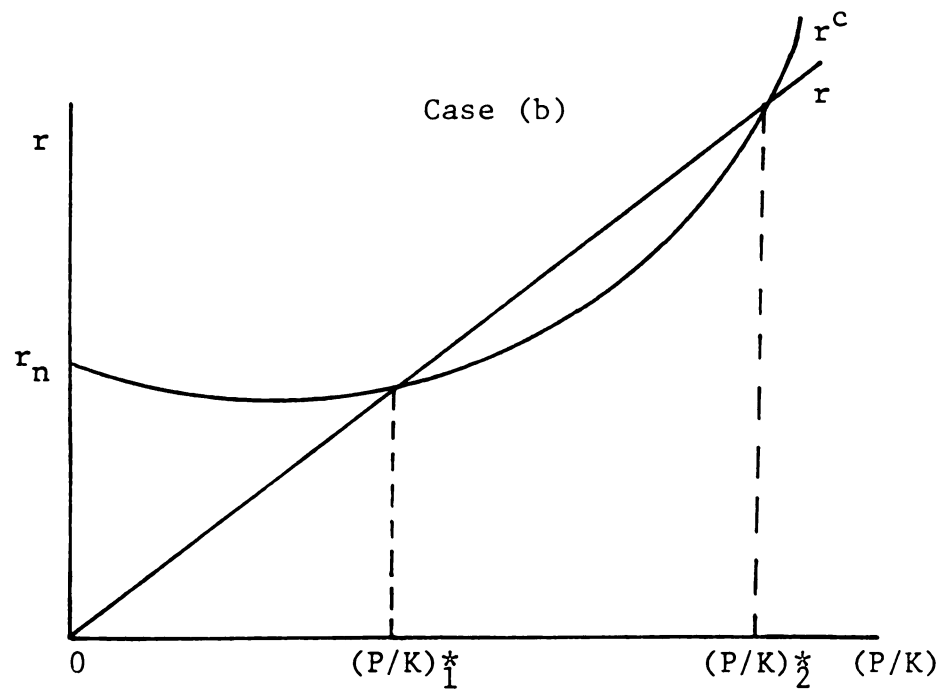
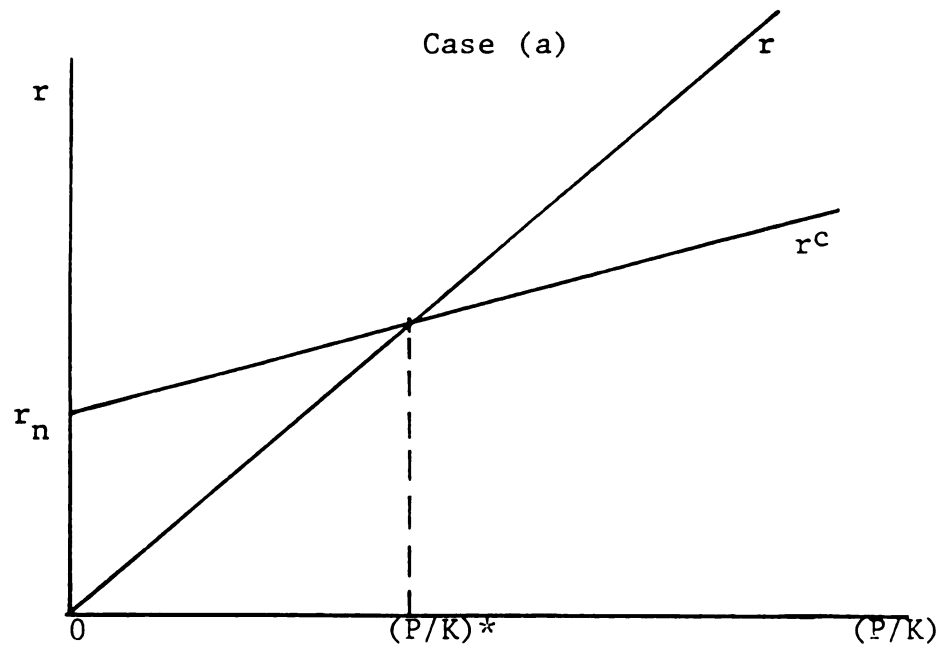


Figure 6.3: Opportunity Cost of Capital Versus Earned Rate of Return

and P/K and r will rise. Hence, there will be an equilibrium only when $r = r^C$.

Under case (b), also shown in Figure 6.3, r^C is assumed to increase more than proportionately with P/K . This yields two equilibrium P/K values, $(P/K)_1^*$ and $(P/K)_2^*$. Joskow points out that only $(P/K)_1^*$ is stable. The system is not explosive in that insurers will avoid moving beyond $(P/K)_2^*$ by refusing to supply all insurance demanded since r^C will exceed r beyond $(P/K)_2^*$.

The equilibrium premium-surplus ratio will move inversely with z , *ceteris paribus*. A lower z , causing a downward shift in the r function, will result in a lower equilibrium P/K value. In case (a), any $(P/K)^*$ value can be supported by varying z , which Joskow suggests may be somewhat unrealistic. In case (b), only a limited range of stable P/K values can be supported by varying z . In both cases, there is some lower bound on z , call it z^* , below which firms will simply withdraw from the industry.

Joskow points out that in a truly competitive market, not subject to regulation, we would expect insurance rates to be driven down to the point where they were just high enough to clear the market. The competitive equilibrium underwriting profit would be set at z^* which would be just high enough to attract sufficient capital into the industry to supply insurance to all who demanded it with each firm operating at a premium-surplus ratio of $(P/K)^{**}$. A z lower than z^* would cause insurers to withdraw from the market. A

z higher than z^* would not be sustainable since it would mean that firms were earning excess profits or had excess capacity or both.

Competitive equilibrium values for z and P imply competitive equilibrium values for loss and expense ratios based on equation (6.6),

$$(6.11) \quad z^* = 1 - (X/P)^* - (E/P)^*,$$

$$(6.12) \quad (X/P)^* = 1 - (E/P)^* - z^*.$$

The competitive loss ratio, $(X/P)^*$, then reflects the maximum loss protection that investors can receive for a dollar's worth of premiums given the level of expenses and the opportunity cost of capital to an insurer operating at maximum capacity. If price is set above the competitive level then the loss ratio will be less than $(X/P)^*$. This means that consumers will receive a lower amount of loss protection for their dollars than they should be receiving.

Under perfect competition, the loss ratio will equal the ratio OA/OB . Under a perfect monopoly, the loss ratio will equal the ratio OA/OC which is less than the ratio OA/OB . Under oligopoly, with a market price established somewhere between the competitive price and the monopoly price, the loss ratio will be less than OA/OB and higher than OA/OC . All else equal, less competition results in a lower loss ratio and reduced efficiency.

The main implication of the preceding analysis is that when the market is not subject to regulation the market price and loss ratio are dependent upon cost and demand conditions and the competitive structure of the market. Bounded between marginal cost and the monopoly price, the market price is subject to competitive conditions. Greater competition will result in a lower market rate and a higher market loss ratio. The next step is to introduce price-entry regulation into the model in order to analyze its impact on the market rate and the market loss ratio.

The Automobile Insurance Market Under Regulation

Considerable variation in the apparent stringency of rate regulatory policies among states has been observed. The objective of this study is determine how differences in regulatory stringency affect performance. Therefore, there is an interest in finding a plausible framework to explain how the level of regulatory stringency is established and what impact it will have on the market rate and loss ratio.

Peltzman's model of regulation is used to analyze the determination of regulatory behavior in private passenger automobile insurance and its effect on performance. (7) The Peltzman model offers a better general framework for explaining regulatory behavior in automobile insurance than

7) Sam Peltzman, "Toward a More General Theory of Regulation," Journal of Law and Economics 19 (August 1976): 211-240.

either the public interest model of regulation or the capture model of regulation.

According to the public interest theory, economic regulation is instituted to protect the public by correcting some market failure. It has been principally used to explain regulation in the instance of natural monopoly. However, automobile insurance is not characterized by natural monopoly or any other kind of market failure that would seem to create a clear necessity for rate regulation. Moreover, if rate regulation was necessary in automobile insurance to protect consumers, the public interest model predicts that regulatory policy and its impact would be essentially the same in every state. That prediction contrasts sharply with the degree of variability in regulatory stringency that we observe across states.

The capture theory of regulation says that regulation will either be initiated or eventually acquired by the regulated industry for its own benefit rather than to protect the public. The theory predicts that state regulation of automobile insurance rates will always be pro-insurer and will increase profits for insurers in every state. This prediction does not square with the apparent attempts of regulators in some states to lower rates and the considerable disagreement between insurers and regulators over necessary rate levels in these states.

In Peltzman's model, however, the bias of regulation is not fixed but is subject to economic and political

conditions. Peltzman essentially formalized Stigler's economic theory of regulation. (8) The basic thesis of the economic theory of regulation is that regulation is used as a means to redistribute wealth among various groups. It is treated as a commodity whose allocation is governed by laws of supply and demand in a political market. Legislators and their regulatory agents supply favorable regulation in return for political support. The size of the transfer (or tax) received by each group becomes a function of the net political support (or opposition) it is willing and able to muster for (against) politicians.

Peltzman developed both a general model of the political market for transfers between various groups imposed by government as well as a more specialized model of price-entry regulation which operates on the same principles. Because of its capacity for varying regulatory stringency, an adaptation of the latter model to state regulation of automobile insurance is used to explain regulatory behavior in this study and is presented below.

Assume that there are two groups vying to achieve benefits or mitigate losses from the regulation of automobile insurance, insurers and consumers. Regulators are constrained to provide these gains and costs through the setting of a maximum or minimum price together with control of entry. Regulators are either elected officials or their

8) George J. Stigler, "The Theory of Economic Regulation," Bell Journal of Economics 2 (Spring 1971): 3-21.

objective is to maximize political support for the elected officials that appoint them. In the case of appointed insurance commissioners, it is assumed that legislators are held directly accountable by voters for the policies of the regulators they appoint. Regulators, then, seek to maximize a political majority M , where

$$(6.13) \quad M = M(p, Z).$$

It is assumed that $M_p < 0$, $M_Z > 0$, and $M_{pp} < 0$, $M_{ZZ} < 0$, i.e., there are diminishing political returns to higher profits and lower prices.

There is an overall constraint on the total amount of insurers' profits, determined by cost and demand conditions, and summarized by the profit function

$$(6.14) \quad Z = f(p, C),$$

where $C = cQ$, $f_p > 0$, $f_{pp} < 0$, and $f_c < 0$. For the present it is assumed that both insurers and regulators know with certainty what c is. The implication of imperfect information about c for regulators is examined later.

According to the Peltzman model, regulators will intervene in the market if they can increase their political support by imposing a different market price than the market would otherwise establish. The formal problem for a successful regulator is to maximize the Lagrangian

$$(6.15) \quad L = M(p, Z) + j(Z - f(p, C))$$

with respect to p , Z , and j which yields

$$(6.16) \quad -M_p/f_p = M_Z = -j.$$

This result says that the marginal political product of a dollar of profits, M_Z , must equal the marginal political product of a price cut, $-M_p$, that also costs a dollar of profits where f_p is the dollar profit loss per dollar price reduction. This requires that $f_p > 0$ (since $-M_p, M_Z > 0$), i.e., a political equilibrium will not result in the monopoly or cartel profit maximizing price ($f_p = 0$).

This result is shown graphically in Figure 6.4. Equation (6.13) is represented as a series of "iso-majority" curves, $M_i M_i$. Equilibrium occurs at the tangency between the profit hill, representing equation (6.14), and an iso-majority curve. Pure insurer protection, maximum Z and a price equal to p_m , will make sense only if there is no marginal consumer opposition to higher prices in which case the iso-majority curves will all be horizontal. Similarly, pure consumer protection, $Z = 0$ and a price equal to p_c , will occur only if there is no marginal insurer support for higher profits in which case the $M_i M_i$ curves will all be vertical. Given that there is some marginal consumer opposition to higher prices and some marginal insurer support for higher profits, regulators will set a price

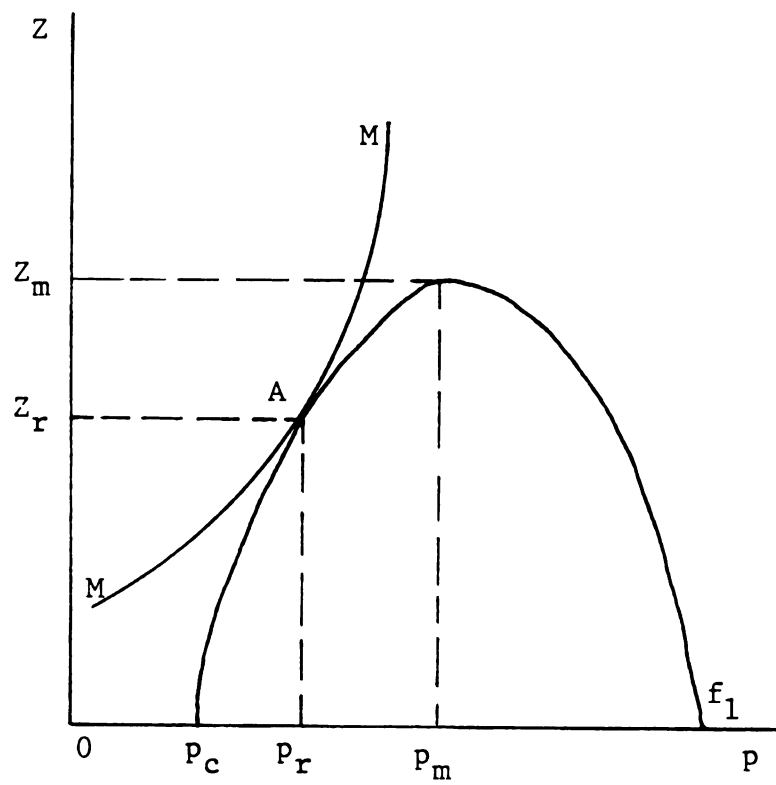


Figure 6.4: Market Equilibrium Under Regulation

somewhere between p_c and p_m . According to this model, regulators will never set a rate below the competitive rate since neither consumers nor producers would benefit from such a rate.

This analysis, of course, in and of itself does not tell us whether regulation will benefit consumers or insurers in a given market. To know this one needs to know not only the shape of $M(p,Z)$ and $f(p,C)$, but also the outcome of the market in the absence of regulation. It ultimately remains an empirical question as to whether conditions favor consumers or insurers in a given market. If the tangency of the iso-majority curve and the profit hill occurs at a point below the market-determined price-profit outcome, then regulation will benefit consumers. If the tangency occurs at a point above the market determined outcome, then regulation will benefit insurers. Peltzman, however, declined to investigate what determines the shape of the $M(p,Z)$ function and who gets what share of the economic surplus to focus on the implication of the result that the surplus will in fact be shared.

Peltzman formally derived the effects of parametric shifts in the demand and cost functions on the political equilibrium. In the case of a shift in marginal cost one obtains

$$(6.17) \quad \frac{dp}{dc} = \frac{-jf_{pc} + f_c f_p M_{zz}}{-(M_{pp} - jf_{pp}) - f_p^2 M_{zz}}.$$

The denominator is positive by a necessary condition for a maximum, so the sign of equation (6.17) depends on that of the numerator, which is positive. The insight provided by equation (6.17) is that the price increase has distinct political and economic components. The first term in the numerator, $(-jf_{pc})$, is essentially a "substitution effect" like that facing an unregulated firm. A rise in marginal cost makes a higher price profitable. The second term is a "political wealth" effect: the surplus to be disposed of has shrunk and this forces the regulator to reduce his purchases of political support. The regulator will not force the entire adjustment onto one group. Rather, he will have consumers buffer some of insurers' losses. Conversely, regulators will force insurers to share some of their gains from cost reductions.

The case of a shift in demand is more complex because the demand function enters indirectly into the M function. Formally, a change in demand, dy , yields

$$(6.18) \quad \frac{dp}{dy} = \frac{-j f_{py} + M_{py} + f_y f_p M_{zz}}{-(M_{pp} - j f_{pp}) - f_p^2 M_{zz}}.$$

The first term of the numerator is a profit-maximizing "substitution" effect which is positive and the last term is a political wealth effect which is negative. The middle term represents the effect of the demand shift on political "tastes," i.e., the slope of the iso-majority curve. This effect is ambiguous. For example, if a rise in consumer income raises the payoff of price reductions, $M_{py} < 0$, then the political wealth effect is reinforced. Ignoring this taste change, the results are symmetric with those of a cost change. For instance, if there is a rise in demand such that $f_{py} = 0$, the political wealth effect will nevertheless induce a price reduction because the diminishing political returns to both profit increases and price decreases make a combination of the two the best strategy for political "spending" of more wealth.

According to Peltzman, what emerges from this analysis is more a working hypothesis than an a priori conclusion about the nature of price and profit adjustment under regulation. He states, "If the political wealth effect is empirically important, it will be manifested in attenuation of price changes when demand changes and in their

amplification when costs change and vice versa for profit changes." (9)

Although Peltzman declined to investigate what determines the shape of the $M(p, Z)$ function we can still observe the effect of the relative political sensitivities of consumers and insurers on the regulated price and profit. The more willing are consumers to award political support (or opposition) on the basis of the price of an insurance policy, the higher M_p will be. The more willing are insurers to award political support or opposition on the basis of profits, the higher M_Z will be. The slope of the $M_i M_i$ curve depends on the marginal political products of price and profits. The lower is the marginal political product of price and the higher is the marginal political product of profits, the flatter will be the slope of the $M_i M_i$ curve. A flatter $M_i M_i$ curve will result in a higher regulated price-profit outcome, all else equal. Consequently, greater political responsiveness on the part of consumers will result in a lower price-profit outcome, all else equal. Greater political responsiveness on the part of producers will result in a higher price-profit outcome, all else equal.

This is demonstrated in Figure 6.5. Assume that there is an increase in the political responsiveness of insurers to profits from M_Z to M_Z' , $M_Z' > M_Z$. This will decrease the slope of the $M_i M_i$ curve as $M_p/M_Z' < M_p/M_Z$. The result of a

9) Peltzman, "Toward a More General Theory," p. 226.

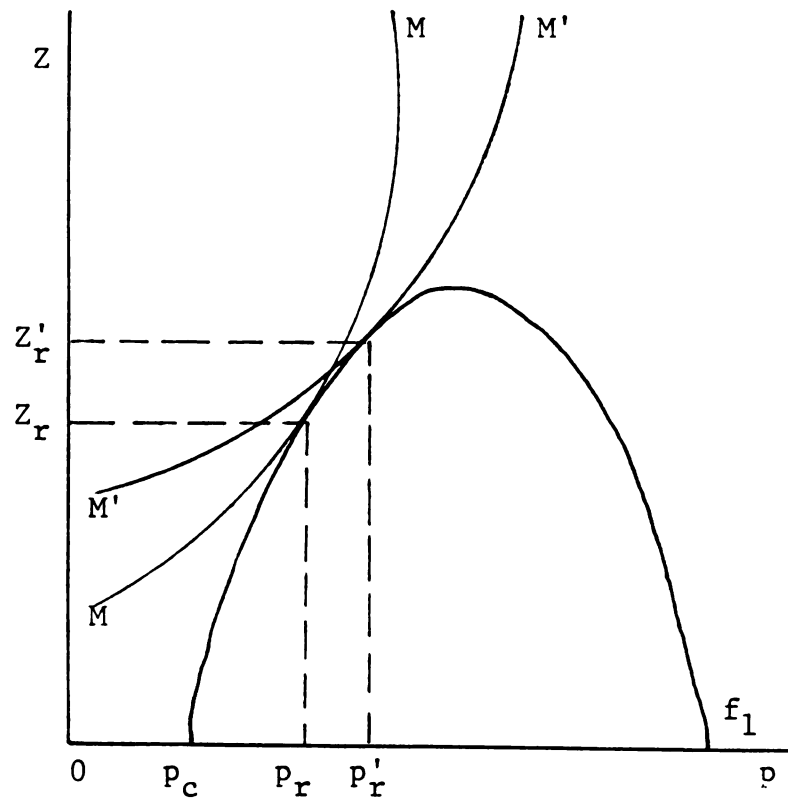


Figure 6.5: The Effect of a Change in the Slope of the Iso-Majority Curve

flatter iso-majority curve is a higher equilibrium price $p_r' > p_r$, and a higher equilibrium level of profit, $z_r' > z_r$.

The effect of rate regulation on the market rate depends upon where regulators set the market rate in relation to where it would be set in the absence of regulation. If regulators elect to set the market rate below its market determined level, then regulation will have a negative effect on the market rate and profits, all else equal. Conversely, if regulators set the market rate above its market determined level, then regulation will have a positive effect on the market rate and profits, all else equal. If regulators take no action then regulation will have no effect on the market rate or profits. Since the loss ratio is inversely related to the market rate, the effect of regulation on the loss ratio will be the opposite of its effect on the market rate. If regulation decreases the market rate it will have a positive effect on the market loss ratio assuming there is no change in loss costs. If regulation increases the market rate it will have a negative effect on the loss ratio.

The Peltzman Model and Regulatory Stringency

Two important questions are now addressed; how is the degree of regulatory stringency determined within the preceding framework and what will its impact be on the market loss ratio? As discussed in Chapter 1, the degree of regulatory stringency is indicated by the difference between

the regulated rate and what regulators perceive marginal cost to be. For the purpose of illustration, the model is examined first under an assumption that perceived marginal cost equals actual marginal cost. The consequences of relaxing this assumption are subsequently examined.

The degree of regulatory stringency, using the Peltzman framework, is reflected in Figure 6.6 by the margin between the regulated price, p_r , and the perceived level of marginal cost, c^* . The smaller this margin is the more stringent regulation could be considered. The assumption of c^* as marginal cost yields the perceived profit hill, f^* , which represents the set of price-profit options regulators believe exist. In the view of regulators, a price equal to c^* would yield zero economic profits. Any price below c^* would be perceived to result in economic losses to insurers which would drive them out of the market or force them to reduce their level of service. Therefore, maximum stringency would be achieved if p_r was set at c^* . Regulators will set the market price at that level which they believe will maximize their political support based on the price-profit options they perceive to exist. Equilibrium occurs at the tangency between the perceived profit hill and the iso-majority curve.

As the impact of changes in cost and demand conditions on the regulated price were derived earlier, we can also consider the impact of changing conditions on the degree of regulatory stringency. If we set $m = p_r - c^*$, then

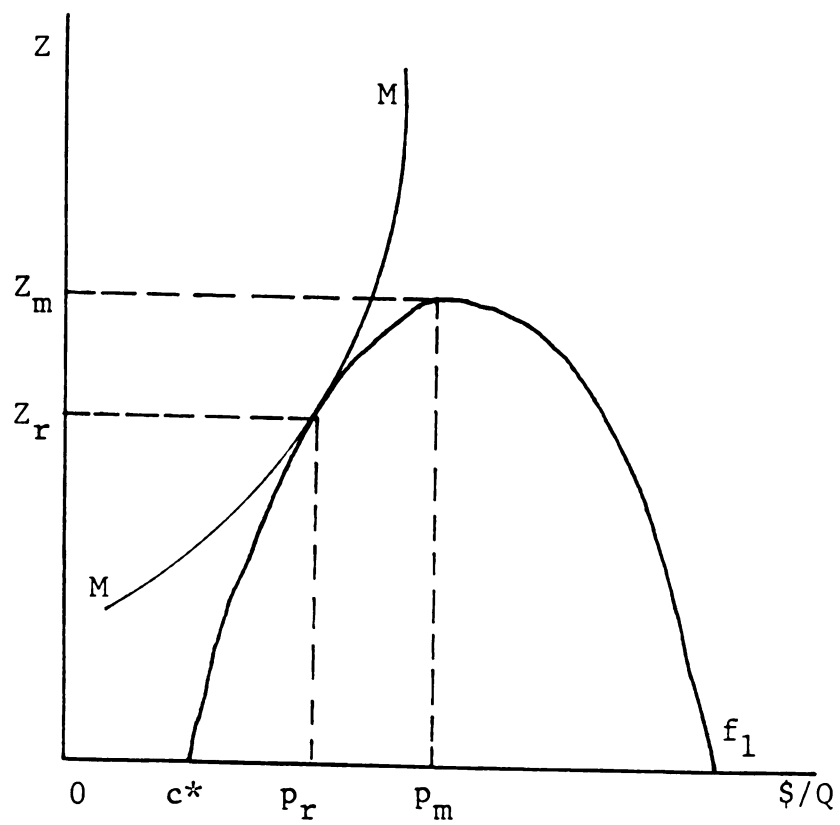


Figure 6.6: The Determination of the Degree of Regulatory Stringency

for a change in perceived marginal cost one obtains,

$$(6.19) \quad \frac{dm}{dc^*} = \frac{-jf_{pc} + f_c f_p M_{zz}}{-(M_{pp} - jf_{pp}) - f_p^2 M_{zz}} - 1.$$

The sign of equation (6.19) depends upon whether the first part of the expression, the effect of a shift in marginal cost on the regulated price, is greater or less than one. If a shift in marginal cost results in a less than proportional shift in the regulated price then dm/dc^* will be negative, i.e. regulatory stringency will vary directly with marginal cost.

We know that dp_r/dc^* will be less than one if $-(M_{pp} - jf_{pp}) > -jf_{pc}$ and $-f_p^2 M_{zz} \geq f_c f_p M_{zz}$. This can be shown fairly easily. The first condition is equivalent to $(-M_{pp} + j2Q_p) > jQ_p$ which is true since $-M_{pp}$ and jQ_p are both positive. (10) The second condition requires that $|f_p^2| \geq |f_c f_p|$ or $|f_p| \geq |f_c|$ since both $-f_p^2 M_{zz}$ and $f_c f_p M_{zz}$ are positive. This latter condition is equivalent to $|Q_p p + Q(p) - Q_p c| \geq |-Q(p)|$ which is true. Hence, it is demonstrated that an increase in marginal cost will cause an increase in regulatory stringency.

10) If the demand function has the form $Z = Q(p)p - Q(p)c$, then $f_p = Q_p p + Q(p) - Q_p c$, $f_c = -Q(p)$, $f_{pc} = -Q_p$, and $f_{pp} = 2Q_p$.

The effect of an increase in demand on regulatory stringency will also be positive if the political wealth effect is empirically important. In the case of a shift in demand, one obtains

$$(6.20) \quad \frac{dm}{dy} = \frac{-jf_{py} + M_{py} + f_y f_p M_{zz}}{-(M_{pp} - jf_{pp}) - f_p^2 M_{zz}},$$

which is equivalent to equation (6.18) since marginal cost remains unaffected by a shift in demand. Consequently, the effect of a change in demand on regulatory stringency depends solely upon what happens to the regulated price. As discussed earlier, this will depend on the effect of a change in demand on political "tastes" (M_{py}) and the magnitudes of the "substitution" ($-f_{py}$) and political "wealth" ($f_y f_p M_{zz}$) effects. As was shown earlier, if $M_{py} < 0$ and the political wealth effect is significant, then the regulated price will move inversely with demand. This means that regulatory stringency will move directly with demand.

We can also observe the impact of changes in the shape of the $M(p, Z)$ function on the level of regulatory stringency. The degree of regulatory stringency will vary directly with the political sensitivity of consumers to price and vary inversely with the political sensitivity of insurers to profits. This is demonstrated in Figure 6.7.

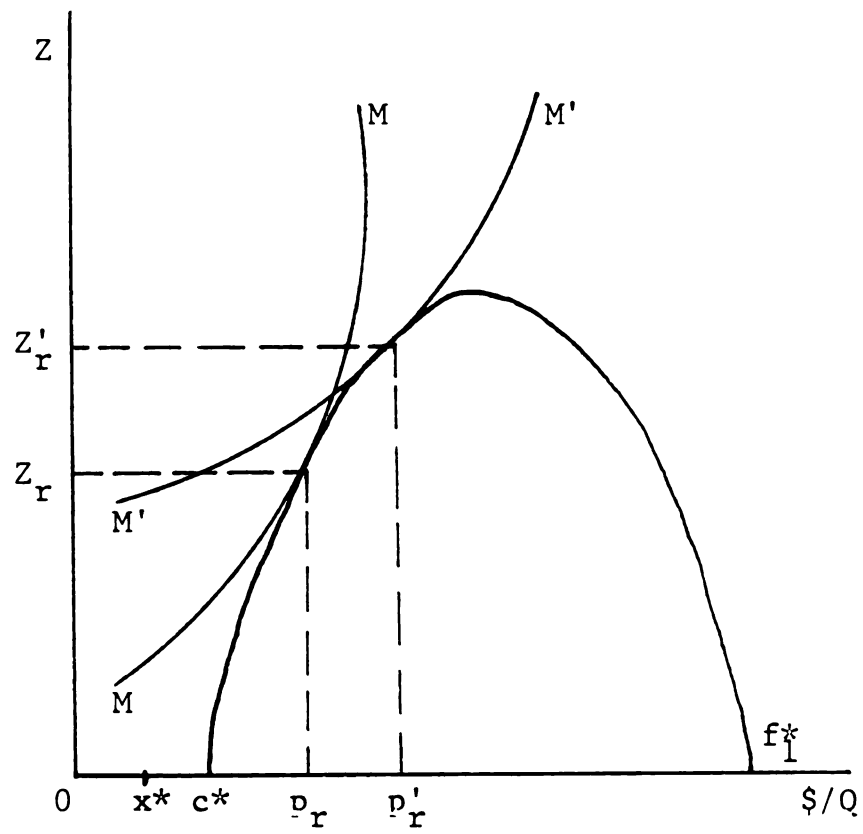


Figure 6.7: The Effect of a Change in the Slope of the Iso-Majority Curve on Regulatory Stringency

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Assume, as before, that there is an increase in the political response of insurers to profits, $M_Z' > M_Z$, which decreases the slope of the iso-majority curve, $M_p/M_Z' < M_p/M_Z$. The result of a flatter iso-majority curve will be higher regulated price, p_r' , and a lower degree of regulatory stringency as $(p_r' - c^*) > (p_r - c^*)$.

The loss ratio will vary directly with the degree of regulatory stringency assuming that perceived marginal cost is equal to actual marginal cost. A lower degree of regulatory stringency will result in a lower loss ratio and vice versa. This is also demonstrated in Figure 6.7 where actual marginal loss cost equals perceived marginal loss cost $x^* = c^*/2$. As the degree of regulatory stringency decreases from $(p_r - c^*)$ to $(p_r' - c^*)$, the loss ratio decreases from x^*/p_r to x^*/p_r' .

The above analysis has important implications with respect to how the effect of regulation on the loss ratio might vary, not only across states, but over time and between liability and physical damage coverages. In regards to the effect of marginal cost on regulatory stringency, the above analysis shows that higher costs will result in greater regulatory stringency and a higher loss ratio. Thus, the Peltzman model predicts that higher cost states will tend to have more stringent regulation and higher loss ratios, all else equal. Similarly, the model predicts that increases in marginal cost over time in any given state will cause regulation to become more stringent and the loss ratio

to be higher, all else equal. Conversely, decreases in costs over time will cause regulation to become less stringent which will result in a lower loss ratio. Time-shifts in the effect of regulation will not necessarily be the same in liability and physical damage insurance, of course, if costs are moving differently for these two lines.

The Peltzman model also predicts that greater consumer political sensitivity to automobile insurance rates will cause regulation to be more stringent and the loss ratio to be higher, all else equal. Hence, the model predicts that states where consumers tend to be more aware of and politically responsive to insurance rates will tend to have more stringent regulation and higher loss ratios. Similarly, the model predicts that if consumers tend to be more politically sensitive to the rates of one type of coverage than the other, regulation will be more stringent and loss ratios higher for the more politically sensitive coverage.

There is reason to believe that consumers will be more politically sensitive to liability rates than physical damage rates. Smallwood has suggested that there may be greater political concern about liability rates because liability insurance is compulsory in most states and there would be a view that its rates should be kept affordable for

that reason. (11) Several states have retained prior approval authority for liability rates but not for physical damage rates. Also, a number of state assigned risk plans provide liability coverage for drivers who cannot obtain it in the voluntary market but they do not provide physical damage coverage. Given this evidence of greater political sensitivity to liability rates, the Peltzman model predicts that liability rate regulation will be more stringent than physical damage rate regulation. Thus, the model predicts that regulation will cause higher loss ratios in liability insurance than in physical damage insurance.

Imperfect Information and Regulatory Stringency

This relationship between regulatory stringency and the loss ratio is not assured, however, if one does not assume that regulators necessarily have correct information about insurers' costs. If insurers are able to secure a higher rate than they would otherwise obtain from regulators by providing inflated estimates of their costs, they will be inclined to do so if it will increase their profits. This is significant because it introduces the possibility that

11) Dennis E. Smallwood, "Competition, Regulation, and Product Quality in the Automobile Insurance Industry," in Almarin Phillips, ed., Promoting Competition in Regulated Markets (Washington, D.C.: Brookings, 1975): 273; This view was also expressed, for example, by the Michigan Supreme Court when it held that if the state required automobile owners to carry no-fault insurance and residual liability coverages that it also had a responsibility to make sure that the rates for those coverages are kept affordable. Shavers v. Attorney General, 402 Mich. 554 (1978).

greater regulatory stringency will not result in a higher market loss ratio.

The possibility that firms might misrepresent their costs in order to secure a higher price from regulators is not considered by Peltzman. Yet, a fair amount of literature has been generated on the informational difficulties that regulators face, how producers might try to exploit those difficulties, and what countermeasures regulators might undertake in the form of audit, incentive, and penalty systems. (12)

The informational asymmetry that insurance regulators face would seem to be especially severe. In reality, it is difficult for regulators to ascertain what the cost of a given insurance policy will ultimately be. When an insurer files for new rates it bases its request on what it projects that the cost of various policies it sells will be over the foreseeable future and what revenue it will need to cover those costs. Cost projections are essentially based on past experience and certain assumptions or expectations with respect to how costs will change over the ensuing period. Insurers are in a much better position to know or project

12) See A. Alchian and H. Demsetz, "Production, Information Costs, and Economic Organization," American Economic Review (December 1972): 777-795; J. Mirrlees, "The Optimal Structure of Incentives and Authority within an Organization," Bell Journal of Economics 7 (Spring 1976): 105-131; David P. Baron and David Besanko, "Regulation, Asymmetric Information, and Auditing," Rand Journal of Economics 15 (Winter 1984): 447-470; and Douglas Needham, The Economics and Politics of Regulation: A Behavioral Approach (Boston: Little, Brown and Company, 1983): 328-370.

what their costs will be than are regulators. Rate making is a complicated exercise in insurance and insurers are more intimately familiar with the factors that affect their costs and have much better access to actuarial data than regulators.

The somewhat arbitrary nature of decisions on necessary reserves for unpaid and unreported claims and assumptions about cost trends permit an opportunity for insurers to inflate cost estimates in order to secure higher rates. Regulators are in a difficult position to challenge cost estimates within a plausible range because of the informational asymmetry between them and insurers. (13) In terms of Peltzman's framework, this implies that regulators could be misled about what price-profit options exist. It was assumed earlier that regulators will set the market rate based on the price-profit options that they perceive rather than the ones that are actually available. If regulators perceive marginal cost to be higher than what it actually is, they will assume a lower profit hill than what actually exists. This in turn will cause regulators to set a higher market rate and permit insurers higher profits than they would if they knew the true level of marginal cost, given that $dp_r/dc^* > 0$.

13) This characterization of the insurance regulator's position was confirmed by R. Kevin Clinton, Chief Actuary of the Michigan Insurance Bureau, in an interview held on January 3, 1986.

Insurers will be induced to submit inflated estimates of their costs if they believe that they might secure a higher rate and higher profit by doing so. How easily insurers can mislead regulators about costs will depend on the obscurity of underlying cost factors and insurers' skill in inflating costs estimates relative to regulators' skill in uncovering inflated estimates. No specific assumptions are made here as to how easily insurers can mislead regulators about costs other than it is assumed that there are limits to the extent to which regulators can be fooled. Clearly, estimates must be within plausible ranges or they will not be accepted. Hence, such a tactic cannot be used to secure any rate that insurers desire. Rather, such a tactic can only be used to obtain a somewhat higher rate than regulators would otherwise allow subject to some limit of reasonability.

The extent to which insurers can secure higher rates and profits by inflating their cost estimates will lessen their need to provide political support to regulators for the same purpose. However, because of limits on the degree to which regulators will accept inflated cost figures as reasonable, insurers will find it advantageous to provide a combination of both political support and misinformation about costs in order to secure higher rates and profits. No attempt is made there to determine what will be the optimal mix of strategies for insurers. Rather, the purpose here is to show that the effect of regulatory stringency on the loss

ratio is indeterminate if the coordinated supply of misinformation about costs by insurers is possible. The submission of inflated cost estimates, to the extent that they are accepted by regulators, will act to diminish the effect that a given level of regulatory stringency would otherwise have on the loss ratio.

This is illustrated in Figure 6.8. Assume that x_1 is the actual level of marginal loss cost, c_1 is the actual level of combined marginal cost with $c = 2x$, and that f_1 is the true profit hill. If insurers file c_1 as their marginal cost figure and regulators accept this figure, then the market rate will be set at p_r which will yield the loss ratio x_1/p_r and the profit Z_r . If, however, insurers file an inflated cost figure $c_1^* > c_1$ and regulators accept this cost figure as accurate, then the perceived profit hill will shift downward from f_1 to f_1^* . With f_1^* as the perceived profit hill, regulators will set the market price at p_r' , believing this will maximize their political support. Under this configuration, the level of regulatory stringency is actually higher than under f_1 , as $(p_r - c_1) > (p_r' - c_1^*)$. However, the true loss ratio is lower under this configuration, as $x_1/p_r > x_1/p_r'$. Profits are higher as $Z_r' > Z_r$.

Regulators, however, will have an incentive to try to uncover inflated cost estimates in insurers' rate filings because it will permit them to increase their political support. This is also illustrated in Figure 6.8. If

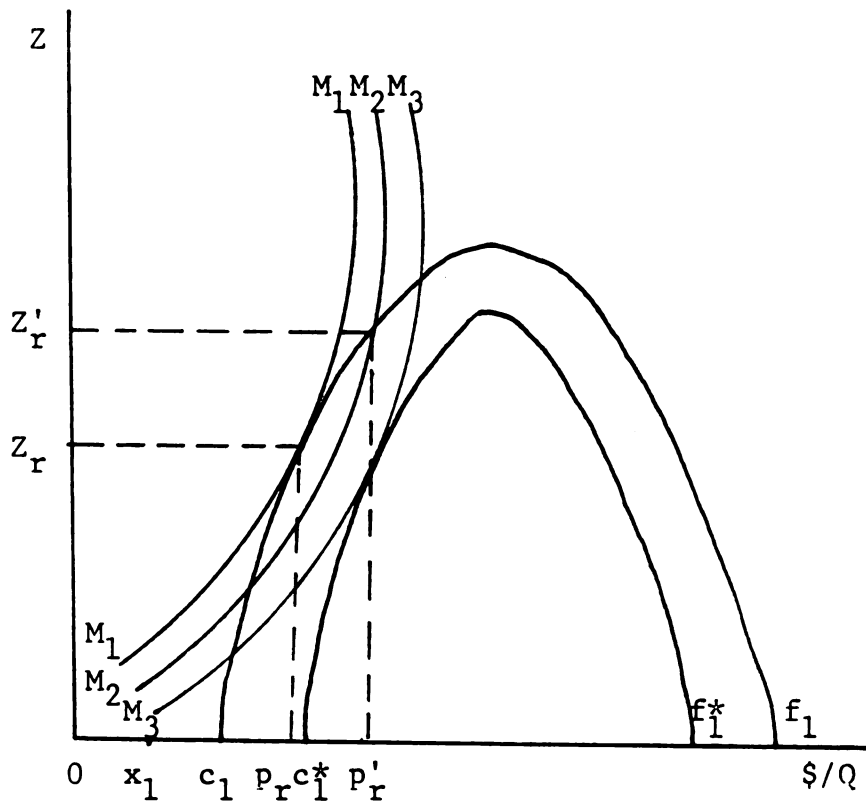


Figure 6.8: Effect of Regulatory Stringency
Offset by Inflated Cost Estimate

regulators set the market price at p_r' which yields a profit of Z_r' , they will receive a level of political support represented by the iso-majority curve M_2M_2 . This will be a level of political support less than what they could obtain than if they set the market price at p_r as M_1M_1 is higher than M_2M_2 . Hence, they will have an incentive to determine the true level of c since this will enable them to lower the market price and increase their political support by doing so.

Even though it is clearly in their interest to get accurate readings on insurers' costs, insurance regulators face especially severe problems in doing so, even ex post, because of the unique nature of insurance. A portion of the claim costs incurred for a given set of policies will not be paid until after the terms of the policies expire. Consequently, assumptions about these costs must be maintained for some time until these claims are fully paid. (14) This extended time-frame for payouts on claims tends to make it much more difficult for regulators to determine that previous cost estimates were excessive. (15)

Therefore, it would be difficult for regulators to implement incentive or penalty schemes for accurate reporting of costs because of the extreme difficulty that

14) An indication of the variety of methods used to set loss reserves and the assumptions involved is provided by David Skurnick, "A Survey of Loss Reserving Methods," Proceedings of the Casualty Actuarial Society 60 (May 1973): 16-58.

15) This was also confirmed by the Michigan Chief Actuary.

would be encountered in establishing the basis for a reward or a penalty. It is not surprising, then, that in practice no state does employ such a system. Consequently, a significant possibility remains that insurers are able to at least partially offset stringent regulation by filing inflated cost estimates which will not be detected retroactively. How successful regulators will be at uncovering inflated cost estimates will depend upon their skill relative to that of insurers, the amount of staff resources available for reviewing rate filings, and the inherent ease of distorting underlying cost estimates and reserves.

The use of cost exaggeration to offset stringent regulation should be more successful in liability insurance than in physical damage insurance. It should be easier for insurers to inflate liability cost estimates because of the longer payout pattern associated with liability claims. (16) Because of this longer payout pattern, it is necessary for insurers to make more assumptions about the severity of liability losses than physical damage losses which are then factored into cost estimates. The fact that these assumptions are subject to some manipulation implies a greater capacity for insurers to manipulate liability cost estimates than physical damage cost estimates. This ability to inflate cost estimates then could be used more

16) See Skurnick, "A Survey of Loss Reserving Methods," pp. 16-58.

effectively to offset regulation of liability rates than physical damage rates. Hence, it is more likely that the predictions of the Peltzman model will be invalidated by insurers' cost exaggeration in liability insurance than in physical damage insurance.

It should also be pointed out that the limits to the use of a misinformation strategy implies that it might successfully offset relatively low levels of regulatory stringency but not completely neutralize higher levels of stringency. Consequently, if cost exaggeration is used successfully as a counter-regulation strategy, we would expect to see the effect of less stringent regulation negated before the differential effect of more stringent regulation was eliminated. That is, we would not expect regulation to have a positive and significant impact on the liability loss ratio at low levels of stringency but no differential effect at higher levels of stringency.

Quality of Service and Regulatory Stringency

Insurers can also attempt to secure higher profits by lowering their costs in relation to the regulated price by lowering their quality of service. As explained in Chapter 2, insurers can adjust the quality of service that they provide on a given policy by varying the "tightness" of their claims settlement policy. A tighter claims policy will result in fewer claims being accepted as well as lower settlements on some claims that are accepted. These actions

will act to reduce the loss costs incurred on a given set of policies. This tactic can be used to secure a higher profit if the regulated rate has been set assuming a higher level of service and a higher level of costs. This action will also diminish the effect of a given level of stringency on the loss ratio.

The effect of price-entry regulation on quality of service has received considerable attention in the literature. (17) White demonstrated that regulation induces uniformity in quality offerings whereas an unregulated industry would offer a variety. (18) Moreover, he showed that a firm's quality offerings will vary directly with the regulated price. (19) In insurance, the focus has been primarily on the possibility that non-price competition would erode profits otherwise generated by monopoly rates imposed by regulation. (20) However, Harrington has discussed the possibility that an opposite situation could

17) See Lawrence J. White, "Quality Variation When Prices Are Regulated," Bell Journal of Economics 3 (Autumn 1972): 425-436; A.M. Spence, "Monopoly, Quality and Regulation," Bell Journal of Economics 6 (Autumn 1975): 247-254; and Needham, Economics and Politics of Regulation, pp. 247-254.

18) White, "Quality Variation," p. 429.

19) Ibid.

20) See H. Frech and J. Samprone, "The Welfare Loss of Excess Nonprice Competition: The Case of Property-Liability Insurance Regulation," Journal of Law and Economics 23 (October 1980): 429-440.

occur where insurers would reduce their quality of service in response to overly restrictive regulation. (21)

No assumptions are made here as to how easily insurers can reduce their costs by tightening their claims policy other than the following. First, there will be legal limits on how far insurers can tighten their claims policy. Some claims will clearly be payable based on the terms of the policy. Insurers' discretion in regards to claims settlement will be confirmed to "marginal" claims where the terms of the policy are not so clear. Second, a reduction in quality will have some negative impact on demand if demand is at all sensitive to quality. These factors will act to limit insurers' reliance on quality adjustment as a strategy to gain higher profits. Consequently, insurers will find it advantageous to employ a mix of strategies - political influence, inflated cost estimates, and quality reduction - as means to secure higher profits. No attempt is made here to determine the optimal mix of strategies for insurers. Rather, the purpose here is to demonstrate that quality adjustment, to the extent that it is employed, can serve as an additional source of indeterminacy between the level of regulatory stringency and the loss ratio. This is illustrated by the following analysis.

21) Scott Harrington, "The Impact of Rate Regulation on Prices and Underwriting Results in the Property-Liability Insurance Industry: A Survey," Journal of Risk and Insurance 51 (December 1984): 614.

Assume that the quantity of automobile insurance policies demanded is a function of both their price and the perceived quality of service. Quality of service is evaluated by insurers' treatment of marginal claims. Consumers equate a tighter claims policy with lower quality. Demand will be negatively affected by price and positively affected by quality, all else equal. Therefore, the demand function can be written as

$$(6.21) \quad Q = Q(p_r, b),$$

where b = an index of quality,

with $Q_p < 0$ and $Q_b > 0$. Marginal loss cost is also a function of the level of service provided,

$$(6.22) \quad x = x(b),$$

with $x_b > 0$. Marginal expense cost is proportional to marginal loss cost,

$$(6.23) \quad e = ax(b).$$

Hence, combined marginal cost can be written as

$$(6.24) \quad c = c(b),$$

with $c_b > 0$. A higher level of service will increase marginal cost. The profit function, under these assumptions, can be written as,

$$(6.25) \quad Z = Q(p_r, b)(p_r - c(b)).$$

With price and entry controlled by regulators, if insurers are able to collectively control their quality of service they will be induced to set it at that level which will maximize industry profits given the regulated rate. Lower quality will reduce marginal cost but it will also lower the number of policies demanded. One can determine the optimal level of b for insurers by taking the derivative of profit with respect to quality of service and setting it to zero, which obtains

$$(6.26) \quad Q_b p_r = Q_b c + c_b Q$$

Insurers will maximize industry profits by setting quality at that level where the additional revenue gained from an increase in demand due to an increase in quality will be equal to the resulting increase in costs.

Formally, the impact of a change in the regulated price on the profit-maximizing level of equality obtains,

$$(6.27) \quad \frac{db}{dp} = \frac{1}{c_b} - \frac{Q_p}{Q_b},$$

which is positive. Hence, if regulators lower the market price it will result in a lower level of quality, all else equal.

The response of quality and marginal cost to increased stringency will diminish its effect on the loss ratio. For example, assume initially that the market price is set at p_r , marginal loss cost is equal to $x(b_1)$, and combined marginal cost is equal to $c(b_1)$. Under this configuration, the level of regulatory stringency will be equal to $p_r - c(b_1)$ and the loss ratio will equal $x(b_1)/p_r$.

Now consider the impact of a decrease in the regulated price from p_r to p_r' and an increase in the level of regulatory stringency from $(p_r - c(b_1))$ to $(p_r' - c(b_1))$. If there is no corresponding shift in quality of service then the result will be a higher loss ratio as $x(b_1)/p_r' > x(b_1)/p_r$ given that $p_r' < p_r$. However, if insurers respond to the reduction in price by lowering quality from b_1 to b_2 as indicated by equation (6.27), then marginal loss cost will also decline, $x(b_2) < x(b_1)$ as $x_b > 0$. This implies that the increase in stringency will have a diminished effect on the loss ratio as $x(b_2)/p_r' < x(b_1)/p_r'$ if $x(b_2) < x(b_1)$.

The main implication of this analysis is that shifts in quality of service and loss costs by insurers could diminish the impact of regulatory stringency on the loss ratio, at least in the short term. Over the long-term, of course,

regulators might find out about the reduction in costs and consequently would lower the market price. Insurers, in response to this, might try to continue to reduce claim settlements each year below regulators expectations. However, as mentioned above, there are limits to insurers' discretion with respect to how they settle claims because of statutory restrictions and the policy terms themselves. Consequently, the capacity for quality adjustment to diminish the effect of regulatory stringency on the loss ratio is itself limited. Ippolito, however, did find evidence of this phenomena when he determined that prior approval regulation had no effect on the market loss ratio but had a negative effect on both the average premium and the average loss. (22)

There is reason to believe that endogenous quality would be more likely used to offset the effect of physical damage rate regulation than liability rate regulation. Insurers, presumably, should have greater opportunity to offset higher stringency in physical damage insurance by reducing their quality of service since it should be easier for them to restrict settlement of claims involving damages to vehicles as opposed to personal injuries. On physical damage claims it is relatively easy for insurers to insist that insureds get several estimates on vehicle repairs from which they can select a lower estimate as the appropriate

22) Richard A. Ippolito, "The Effects of Price Regulation in the Automobile Insurance Industry," Journal of Law and Economics 22 (April 1979): 83-84.

settlement. It is much more difficult to challenge the severity of injuries or the cost of their treatment on liability claims. The prospect of this kind of litigation probably has a strong chilling effect on this kind of challenge. Thus, the endogenous quality model predicts that rate regulation will have less of an effect on the physical damage loss ratio than on the liability loss ratio.

Summary

The preceding analysis reveals that several factors can affect the market loss ratio. In the absence of regulation, the market loss ratio will be determined, ultimately, by the ratio of marginal expense cost to marginal loss cost and the competitive structure of the market. Under perfect competition, the market rate will equal combined marginal cost. In this instance, the market loss ratio will equal, x/p_c , which is equivalent to x/c or $x/(x + e)$, marginal loss cost divided by combined marginal cost. The higher is marginal expense cost in relation to marginal lost cost, the lower the competitive loss ratio will be, and vice versa.

If the market is less than perfectly competitive, then the market rate will be set at some level above combined marginal cost, which will yield economic profits. In this instance, the market loss ratio will equal $x/(c + v)$, which is equivalent to $x/(x + e + v)$, where v is the excess profit per policy. The higher the market rate is set above marginal cost, the lower the market loss ratio will be.

Regulation can also affect the loss ratio subject to cost and demand conditions. Regulators will set the market rate somewhere between marginal cost and the level where industry profits will be maximized. Under regulation, the market loss ratio will equal x/p_r where p_r is the regulated rate. If p is set below the market determined rate, then

regulation will have a negative effect on the market rate and a positive impact on the loss ratio, and vice versa.

Under conditions of perfect information and no quality adjustments by insurers, greater regulatory stringency will result in a higher loss ratio where regulatory stringency is measured by the difference between the regulated rate and what regulators perceive marginal cost to be. If regulators, in effect, target a lower price-cost margin than that which would be established by the market, then regulation will have a positive effect on the loss ratio and vice versa.

The degree of regulatory stringency is not a fixed factor but is dependent upon cost and demand conditions and the political sensitivities of consumers and insurers. The degree of regulatory stringency will vary directly with marginal cost. If the political wealth effect is empirically important, regulatory stringency will also vary directly with demand. Lastly, regulatory stringency will vary directly with the political sensitivity of consumers to rates and inversely with the political sensitivity of insurers to profits. The significance of this is that the degree of regulatory stringency will not necessarily be fixed over time or between different regulatory jurisdictions or insurance coverages, but will vary as economic and political conditions vary. Consequently, the Peltzman model predicts that the effect of regulation on the

loss ratio will vary across states, over time, and between lines, as the degree of regulatory stringency varies.

Specifically, the Peltzman model predicts that states with higher costs or greater political sensitivity to automobile insurance rates will regulate more stringently, resulting in higher loss ratios, all else equal. The model also predicts that liability rate regulation will be more stringent than physical damage rate regulation because of greater political sensitivity towards liability rates. Hence, rate regulation will cause loss ratios to be higher in liability insurance than in physical damage insurance. The Peltzman model also predicts that a real increase in the cost of producing insurance over time will cause regulatory stringency to increase, resulting in a higher loss ratio. Conversely, the model predicts that a decline in marginal cost will cause regulatory stringency and the loss ratio to decrease.

There are two major challenges to the Peltzman model in terms of the predicted effects of regulation on the loss ratio. One factor is the filing of inflated estimates of marginal cost by insurers. The other is reductions in the quality of service provided by insurers as reflected in the generosity of claim settlements. Both of these factors could work to offset the effect of regulation on the loss ratio.

If regulators can be misled into believing costs are higher than they actually are, they will allow higher rates

than they otherwise would. This will induce insurers to provide inflated estimates of their costs in order to secure higher rates and profits. If regulators award higher rates to insurers on the basis of inflated costs it will act to diminish the effect of regulatory stringency on the loss ratio. More specifically, the cost exaggeration model predicts that rate regulation will have a less positive impact on the liability loss ratio than on the physical damage loss ratio. This is because the necessity of more assumptions about the payout of liability claims than physical damage claims presents a greater opportunity for insurers to manipulate cost estimates to thwart regulation.

Insurers can also diminish the effect of regulatory stringency on the loss ratio, at least in the short-term, by reducing their costs through tightening their claims settlement policies. For this to work as a long-term strategy, however, insurers must be able to keep their costs below levels which regulators have projected. Specifically, the endogenous quality model predicts that regulation will be less effective in physical damage insurance than in liability insurance because insurers should be better able to tighten physical damage claims.

In sum, according to the model of the automobile insurance market offered here, the degree of regulatory stringency can be an important determinant of market performance and should be an important consideration in an empirical analysis of the impacts of automobile insurance

rate regulation. Greater regulatory stringency will result in higher loss ratios if insurers are unable to fully offset increased stringency by inflating cost estimates or reducing their quality of service.

The next chapter discusses the empirical estimation of this model and the test of the hypothesis that greater regulatory stringency will result in a higher loss ratio.

CHAPTER SEVEN

EMPIRICAL ESTIMATION

This Chapter presents an empirical specification of the theoretical relationship between market performance and regulation in private passenger automobile insurance developed in the last chapter. The primary focus is on how different levels of regulatory stringency affect the loss ratio. Does a higher degree of regulatory stringency among prior approval states result in higher loss ratios? Does regulation have any effect at all in lower stringency states? Is the effect of stringent regulation on the loss ratio different in liability insurance than in physical damage insurance? In addition to these questions, the possibility that the effect of regulation on performance has shifted over the last decade is also considered.

The major premise of this study is that the role of regulation in the determination of market performance in automobile insurance cannot be fully understood without consideration of the degree of regulatory stringency that is applied. The impact of regulation on the loss ratio may be quite different depending upon whether regulators essentially let the market set rates, enforce rates significantly above competitive levels, or attempt to hold rates near or at competitive levels.

With this perspective, this study evaluates empirically, whether a more stringent regulatory policy among states that require prior approval of rates causes loss ratios to be higher than they would under a less stringent policy. Previous studies of the effect of regulation in automobile insurance have generally considered only the effect of prior approval regulation per se on performance without differentiating among states in terms of the strictness of the standards that they require rates to effectively meet before they are approved. Those studies that have attempted to account for regulatory stringency have not done so in a direct and unambiguous manner so as to provide a clear test of its significance.

This study utilizes a direct and unambiguous measure of regulatory stringency to estimate its differential impact on the loss ratio. A requirement that insurers explicitly reflect investment income in their rate making is used to indicate particularly stringent rate regulation. The reader will recall that the relationship between regulatory stringency and an investment income requirement was demonstrated in Chapter Three. It is hypothesized that more stringent regulation will force insurers to charge lower rates and incur higher loss ratios than they otherwise would. Consequently, the existence of an investment income requirement should be positively associated with higher loss ratios.

This hypothesis is examined separately for liability and physical damage insurance because of the possibility that these two lines are regulated differently and because different market conditions in these two lines could affect the efficacy of regulation. The Peltzman model predicts that regulation will be more stringent and have a greater positive impact on the liability loss ratio than on the physical damage loss ratio because of greater political sensitivity to liability rates. Also tested are competing hypotheses about the relative effectiveness of regulation in liability and physical damage insurance. A cost exaggeration model of regulation predicts that regulation of liability rates will be less effective than regulation of physical damage rates because of the greater capacity to inflate liability cost estimates. Alternatively, the endogenous quality model predicts that regulation of physical damage rates will be less effective than regulation of liability rates because of the greater capacity to tighten physical damage claims.

Lastly, different hypotheses are tested about how the effect of regulation on the loss has shifted over the last decade in liability and physical damage insurance.

According to the Peltzman model, regulatory stringency will vary directly with marginal cost. Evidence suggests that the cost of liability claims has increased in real terms over time while the cost of physical damage claims has decreased over the sample period studied. Hence, the

Peltzman model predicts that the positive effect of regulation or the loss ratio will have increased in liability insurance and decreased in physical damage insurance over this period.

A description of the variables that comprise the regression model used to test the above hypotheses follows.

DESCRIPTION OF VARIABLES

Loss Ratio: The statewide loss ratio is used as the measure of market performance in this study. As discussed in Chapter 2, the loss ratio is the best measure of profitability that is available on a by-line and by-state basis. The loss ratio was calculated by dividing incurred losses, excluding loss adjustment expense, by earned premiums, minus dividends paid to policyholders. Separate loss ratios for private passenger automobile liability insurance, LILR, and physical damage insurance, PDLR, were calculated in order to estimate the effect of regulation separately for those two lines. Data for statewide loss ratios were obtained from the A.M. Best Data Executive Service A-2 Report. Figures on private passenger no-fault and other liability automobile coverages were added together to obtain total liability figures. (1)

The statewide loss ratio is preferable to measures of estimated statewide underwriting profit margins used by some

1) A.M. Best Company, Best's Executive Data Service, A-2 report, "Experience By State," (Oldwick, N.J.: A.M. Best Company, 1974-1983).

earlier studies. These profit margins, published by the NAIC, are calculated using estimates of expenses on a by-state and by-line basis which are based on allocated countrywide figures. (2) This manner of deriving by-line and by-state expenses using countrywide averages essentially eliminates any potential advantage a true profit measure would have in reflecting differences in expenses across states. Consequently, the loss ratio is still preferred for estimating the effect of regulation on by-line and by-state profitability.

Data on loss ratios were obtained for all 50 states and the District of Columbia for the years 1973-82. Data for all other variables in this study were obtained on the same basis. This time period, which is longer than that used by any previous study, was chosen for several reasons. First, there is a desire to measure the impact of regulation over an extended time interval in order to transcend short-term effects. Secondly, the years 1973-82 cover the sample period used by previous studies (early 1970s) as well as the period used by Harrington (late 1970s). This permits the same model to be estimated separately over these two sub-periods. The results for the two periods can be compared to see if the effect of regulation has shifted over time consistent with the predictions of the Peltzman model.

2) National Association of Insurance Commissioners, NAIC Report on Profitability By Line and By State For the Year 1982 (Kansas City, MO: NAIC, 1984).

Regulation: Several different measures of state regulatory stringency are employed in order to get a fuller understanding of how varying levels of regulatory stringency among prior approval states affect loss ratios. PAR1 is a dummy variable equal to one if a state has a prior approval regulatory system for automobile insurance rates.

Information on state regulatory systems is obtained from state laws and surveys conducted by the NAIC and the National Association of Independent Insurers. PAR1 includes states that actually set rates rather than simply require prior approval as well as states which have open competition statutes but in effect require prior approval of rates.

PAR1, which is the principal measure of regulation used by previous studies, effectively groups all prior approval states together regardless of the degree of regulatory stringency which they administer and treats their regulatory policies as equivalent. The coefficient obtained for PAR1 then will represent the average effect of the different levels of regulatory stringency applied in the various prior approval states.

The coefficient obtained for PAR1 is of considerable interest and useful as a reference point but PAR1 is inadequate as the only measure of regulatory stringency in that it does not distinguish different levels of regulatory stringency that may be applied among prior approval states. An additional variable is needed then to distinguish among

prior approval states according to the stringency with which they regulate rates.

SPAR1, a dummy variable equal to one if a state has a prior approval statute and requires that automobile insurers reflect investment income in setting rates, is used to indicate greater regulatory stringency. SPAR1 does not include open competition states since investment income requirements are essentially irrelevant in states which do not actively regulate rates. Information on states' policies with respect to investment income was obtained from a survey conducted by H.P. Walker for the Louisiana Rating Commission which was supplemented by state statutes and regulations. (3)

As illustrated in Chapter 3, a regulatory investment income requirement implies greater regulatory stringency, all else equal, because it effectively reduces the allowed margin of premiums over costs. SPAR1 has two important advantages over variables that have been used in previous studies to control for regulatory stringency. For one, it measures regulatory stringency more directly than variables that are hypothesized to affect regulatory stringency based on a theory of the determination of regulatory behavior that is being tested. In this sense, SPAR1 is a reflection of stringent regulation rather than a possible determinant of stringent regulation. A second advantage of SPAR1 is that

3) H.P. Walker, Memorandum to Louisiana Insurance Rating Commission, August 18, 1981.

it specifically measures regulatory policies towards automobile insurance in contrast to previous measures of regulatory resources which are the cumulative reflection of regulatory policies towards all insurance lines in the state. SPAR1 differs even from the regulatory investment income "consideration" variable used by Caswell and Goodfellow in that SPAR1 equals unity only when a prior approval state requires investment income to be reflected whereas Caswell's and Goodfellow's variable apparently included states which simply allowed insurers to consider investment income. For these reasons, SPAR1 offers a much less ambiguous test of the impact of greater regulatory stringency in automobile insurance than that offered by previous measures.

It should be pointed out that SPAR1 is not a perfect measure of regulatory stringency. SPAR1 simply indicates that a state requires insurers to discount their rates for investment income which will imply a higher level of stringency than if no discount is required, all else equal. Of course, all else might not be equal. States with such a requirement might vary in terms of other rating factors which regulators apply which will also affect the margin between price and marginal cost. Regulators can vary their assumptions on the level of investment income, the appropriate premium to surplus ratio, and the necessary rate

of return on equity. (4) SPAR1 will not reflect differences in regulatory stringency across states with investment income requirements. This imprecision in measuring regulatory stringency may result in different estimates for SPAR1 if liability and physical damage rates are regulated with different levels of stringency or if regulatory stringency is changing over time. However, because information on the actual margin between rates and marginal cost targeted by regulators is not available, SPAR1 represents the best measure of regulatory stringency that is currently available. (5) It still is significantly improved over previous stringency measures used and permits a valid test of the stringency hypothesis unlike these previous measures.

A third dummy variable was created to isolate observations for New Jersey. NJ is equal to one for those observations when New Jersey is the state. Inclusion of NJ as an independent variable permits separate estimation of the effect of regulation in New Jersey relative to that in other states. This permits a test of the validity of the

4) As explained in Chapter Three, there is no reason to believe that states with investment income requirements systematically liberalize other rating factors as an offset since this defeats the purpose of using the requirement.

5) In order to obtain data on the actual markup between the rate approved and regulators' estimates of marginal cost it would be necessary to individually examine insurer rate filings and associated correspondence in each state, which would be a massive undertaking.

hypothesis that only regulation in New Jersey has had a significant impact on market performance.

Modified versions of PAR1 and SPAR1 were also created in order to more clearly show the mean effects of regulation in states that apply different levels of stringency. PAR2 is a dummy variable equal to one when a state requires prior approval for rates but has no investment income requirement. SPAR2 is equivalent to SPAR1 except that SPAR2 is equal to zero when New Jersey is the state.

Concentration: Market concentration is measured by CR3, the proportion of total premiums written in the combined statewide automobile insurance market (private passenger and commercial) by the top three insurers.

CR3 should serve as a good indicator of concentration in private passenger automobile liability and physical damage insurance in a state. Concentration in these two lines corresponds fairly closely as both coverages are normally sold together. Since these two lines form the predominant portion of total automobile insurance, concentration in these two lines will tend to dictate CR3. The data for CR3 has been published annually in Best's Review. (6)

Expense Costs: Because the level of expense costs in relation to loss costs can affect the loss ratio, it is

6) CR3 was derived by adding the market shares of the three top automobile insurers in each state, as presented in annual articles on automobile insurance appearing in the August issue of Best's Review Property/Casualty Edition, years 1973-1983.

necessary to control for this effect in the model.

Unfortunately, as explained earlier, figures are not kept on expense costs at the state level. Consequently, variables are introduced into the model which should influence the level of expense costs as has been done in previous studies.

LIDWMS and PDDWMS are the proportion of total earned premiums in a state accounted for by direct writers in private passenger automobile liability and physical damage insurance respectively. (7) As discussed in Chapter 2, direct writers have been found to have lower expenses than agency companies. A higher direct writer market share should have a negative effect on total market expense costs and a positive impact on the market loss ratio if direct writers pass at least a portion of their savings on to consumers through lower premiums.

The existence of a no-fault statute with a restriction on lawsuits should also have a negative impact on expense costs for liability insurance which should also result in higher liability loss ratios. NFL is a dummy variable equal to one for states with a no-fault insurance law which requires damages to meet some sort of threshold before a tort-liability suit is permitted against a negligent party.(8) The specification that the no-fault law has to

7) Data for LIDWMS and PDDWMS are obtained from A.M. Best Company, Best's Executive Data Service, A-2 Report, "Experience By State," 1974-1983.

8) Obtained from, Insurance Information Institute, 1984-85 Property/Casualty Fact Book (New York: Insurance Information Institute, 1984): 97.

include a restriction on suits is important. Otherwise, the law's ability to restrict litigation and its expense is significantly impaired.

Loss Costs: It is also necessary to control for marginal loss cost as it will have a positive impact on the loss ratio, as explained in Chapter 2. Unfortunately, no figures on marginal or average loss cost are readily available. Alternatively, variables are introduced into the model which should affect marginal loss cost.

Marginal loss cost will be a function of claim frequency and claim severity. Claim frequency is measured by the first principal component of the total and injury accident rate (per 100 million vehicles driven) and traffic density in a state, ACRDEN. (9) Traffic density is measured by the number of vehicle miles actually driven per mile of roadway in a state. Petersen used a similar measure to serve as a proxy for claim frequency. (10)

The first principal component of traffic density and the fatal and injury accident rate is used because both variables provide valuable information about the actual accident rate yet they are strongly correlated. Their simple statistical correlation is .50 It would be difficult

9) Obtained from, U.S. Department of Transportation, Fatal and Injury Accident Rates, "State Totals" table, (Washington, D.C.: U.S. Government Printing Office, 1974-1983).

10) William Petersen, "Economic Determinants of Legislation, Regulatory Behavior and Market Performance in the Automobile Insurance Industry," (Ph.D. dissertation, Harvard University, 1981): 89-90.

to get an accurate estimate of their effect on the loss ratio individually because of the problem with multicollinearity. Principal components is a device commonly used in this type of situation. (11)

The fatal and injury accident rate serves as an indicator of the frequency of serious claims. Since data is not available on non-injury accidents, traffic density is used as an indicator of the frequency of these claims which form the major portion of all claims. Traffic density has been found to be a major determinant of geographic differences in total claim frequency. (12)

Other variables are included in the model which should affect claim severity. RAHCPS, the statewide average hospital cost per patient stay, adjusted for inflation, serves as a measure of the relative cost of hospitalization in a state which will affect the cost of liability claims.(13)

Average hospital cost per patient stay represents the total expenses of community hospitals, including payroll, professional fees, supplies, depreciation expense, and purchased services, divided by the number of patient stays.

11) See J. Johnston, Econometric Methods. 2nd edition (New York: McGraw-Hill, 1972): 321-331.

12) All-Industry Research Advisory Council, Geographical Differences in Automobile Insurance Costs (Oak Brook, Ill: AIRAC, 1982).

13) Obtained from, Health Insurance Association of America, Source Book of Health Insurance Data, "Community Hospital Statistics" table, (Washington, DC: Health Insurance Association of America, 1974-83).

The number of patient stays is adjusted to reflect outpatient visits as well as inpatient visits. The average hospital cost per patient stay should reflect the price of inputs for hospitals, the level of service provided for a given condition, and the type or severity of conditions treated. Both the price of medical inputs and the level of service provided should affect the cost of medical care provided for a person injured in an automobile accident in a state. There is no reason to believe that the severity of illnesses treated in hospitals, which will also affect average cost, should vary greatly across states or over time. Since no other comprehensive measures of medical input prices or service levels are available on a statewide basis for the entire time series, average hospital cost represents the best available measure of the cost of medical care associated with treating injuries from automobile accidents.

Average hospital cost per stay is divided by the annual average Consumer Price Index (1967 = 100) for all urban consumers, all items, to put average hospital cost into real terms. (14) Average hospital cost per stay is adjusted for inflation so as to capture the effect of higher medical care costs on the relative level of expenses. Presumably, both expenses and loss costs are generally increasing at the rate of inflation which would leave the loss ratio unaffected if

14) U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Indexes, U.S. City Average, 1973-1982.

premiums increase at the same rate. Hence, only to the extent that medical costs exceed the rate of inflation should they have a positive impact on the loss ratio.

RRCI, the estimated average annual salary (in \$1000s) of employees of automobile top and body repair shops adjusted for inflation, serves as a proxy for the cost of repairing damaged vehicles which will affect loss costs for physical damage insurance. This measure was first used by Glasner. (15) RRCI is calculated by dividing total annual payrolls of automobile top and body repair establishments by the number of employees and dividing again by the CPI for all urban consumers. (16)

Table 7.1 presents a list of variables and their respective acronyms. Table 7.2 provides descriptive statistics for each variable.

ESTIMATION

The basic model used for analyzing the effect of regulation on the loss ratio is described by equation (7.1):

15) David Glasner, "The Effect of Rate Regulation on Automobile Insurance Premiums," (Ph.D. dissertation, University of California at Los Angeles, 1977): 46.

16) RRCI was derived by dividing total state payrolls of automobile top and body repair establishments by the number of full-time equivalent employees as of March 12 of each year. This figure was further divided by the CPI for all urban consumers, all items, to put it into real terms. Obtained from, U.S. Department of Commerce, Bureau of the Census, City and County Data Book (Washington, D.C.: Government Printing Office, 1973-82).

TABLE 7.1: Variable List

LILR	liability loss ratio
PDLR	physical damage loss ratio
PAR1	dummy variable for prior approval regulation
PAR2	dummy variable for prior approval regulation with no investment income requirement
SPAR1	dummy variable for prior approval regulation with investment income requirement
SPAR2	dummy variable for prior approval regulation with investment income requirement excluding New Jersey
NJ	dummy variable for New Jersey
CR3	3-firm concentration ratio for automobile insurance
LIDWMS	direct writer market share for liability insurance
PDDWMS	direct writer market share for physical damage insurance
NFL	dummy variable for no-fault law with tort liability threshold
ACRDEN	first principal component of traffic density and fatal and injury vehicle accident rate
RRCI	annual average salary of employees of automobiles top and body repair shops adjusted for inflation
RAHCPS	annual average hospital cost per patient stay adusted for inflation

TABLE 7.2: Description of Variables

<u>Variable</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Minimum</u>	<u>Maximum</u>
LILR	0.663	0.085	0.400	0.976
PDLR	0.669	0.088	0.409	1.011
PAR1	0.580	0.494	0	1
PAR2	0.376	0.485	0	1
SPAR1	0.204	0.403	0	1
SPAR2	0.184	0.388	0	1
NJ	0.020	0.139	0	1
CR3	36.0%	6.8%	19.6%	53.9%
LIDWMS	0.562	0.129	0.220	0.852
PDDWMS	0.565	0.120	0.135	0.790
NFL	0.267	0.443	0	1
ACRDEN	-2.37	1.00	-4.25	2.74
RRCI	\$5.11T	\$0.94T	\$0.54T	\$11.75T
RAHCPS	\$719.36	\$194.78	\$362.13	\$1440.39

$$(7.1) \quad LR = a_0 + a_1R + a_2CR3 + a_4CS + u_r,$$

where

- LR = the loss ratio (either LILR or PDLR);
- R = a vector of regulation variables (PAR1, PAR2, SPAR1, SPAR2, NJ);
- CS = a vector of cost related variables (LIDWMS, PDDWMS, NFL, ACRDEN, RAHCPS, RRCI);
- u = a disturbance term;

all other variables as previously defined.

Since the loss ratio is dependent upon regulation, concentration, and costs but not vice versa, ordinary least squares regression is sufficient to provide unbiased and consistent estimates of the parameters of equation (7.1).(17) If regulatory policy was affected by the loss ratio then it would be necessary to use two-stage least squares or a like procedure to estimate the model. (18) However, this is not the case. No study has established, either theoretically or empirically, that the loss ratio or profitability generally will affect regulatory policy in automobile insurance and that it is necessary to use two-

17) For a discussion of ordinary least squares regression see D. Gujarati, Basic Econometrics (New York: McGraw-Hill, 1978).

18) Ibid, pp. 335-344.

stage least squares to estimate the effect of regulation on the loss ratio. (19)

Only Petersen and D'Arcy have used two-stage least squares to estimate the loss ratio equation and neither demonstrated the need to do this. None of the theories they tested postulated the loss ratio or profitability generally as a determinant of regulation. Despite this fact, D'Arcy estimated equations using a two-stage procedure in which the form of regulation was the dependent variable and the loss ratio was included as an endogenous independent variable. The loss ratio was not statistically significant in these equations, however. (20)

One might question what harm there would be in estimating equation (7.1) using two-stage least squares as a check on the validity of the theory that regulation is not affected by the loss ratio. However, it is not clear what econometric procedure would be acceptable to use since the regulation variables are dummy variables which makes calculation of an instrumental regulation variable problematic. (21) Neither Petersen nor D'Arcy justify their use of a hybrid two-stage procedure in which logit and

19) See Scott Harrington, "The Impact of Rate Regulation on Prices and Underwriting Results in the Property - Liability Insurance Industry: A Survey," Journal of Risk and Insurance 51 (December 1984): 612.

20) Stephen P. D'Arcy, "An Economic Theory of Regulation," (Ph.D. dissertation, University of Illinois at Champaign-Urbana, 1982): 106-181.

21) See Gujarati, Basic Econometrics, pp. 312-318.

probit regression were used respectively to create first-stage estimates of the dummy regulation variable. The statistical properties of their estimating techniques remain uninvestigated. It is pointless to compare ordinary least squares estimates of equation (7.1) with estimates obtained from an alternative procedure unless it can be assured that the estimates obtained from the alternative procedure are, at worst, no more biased than the estimates obtained from ordinary least squares.

Pooled cross-sectional, time-series, regression across all 50 states and the District of Columbia over the years 1973-1982 is used to estimate the model. Pooled data is used in order to estimate the effect of changes in the regulatory variables over time as well as across states.

Two important assumptions underlying the superiority of ordinary least squares estimators are that the residuals have the same variance and are independently distributed. Use of pooled cross-sectional, time-series, data sometimes can engender violations of these assumptions, however. (22) Autocorrelation violates the assumption that the residuals are mutually independent. Autocorrelation most often arises with time-series data when the effect of omitted variables or random shocks on the dependent variable extend over more than one period causing the residuals for these periods to be serially correlated. The adverse consequences of

22) See G.S. Maddala, Econometrics (New York: McGraw-Hill, 1977): 257-291.

autocorrelation for ordinary least squares estimators is reduced efficiency and bias of the sampling variances which can result in exaggerated t-statistics if the sampling variances are understated.

However, there is no reason to believe that autocorrelation is a problem with the model and data used here. It is conceivable that statewide loss ratios are subject to short-term fluctuations due to exogenous forces which are unanticipated by insurers or regulators. An unanticipated upsurge in inflation or driving activity, for instance, could cause losses to increase unexpectedly which would cause a higher loss ratio. However, insurers are in a position to adjust their rates for such changes relatively quickly. It is not uncommon for insurers to change their rates twice in one year if necessary. Consequently, it is not likely that loss ratios will be affected by unexpected changes in underlying cost factors for more than one year.

A second problem that can arise with this kind of data is heteroskedasticity, that is a violation of the assumption that the residuals have equal variance. Heteroskedasticity arises if the error term varies directly with the size of the independent variable. As with autocorrelation, the ordinary least squares estimators will remain unbiased in the presence of heteroskedasticity, but they are no longer efficient. Two potential sources of heteroskedasticity in studies of the effects of state insurance regulation have been suggested by Harrington: 1) a varying regulatory effect

among prior approval states; and 2) large differences across states in the number of vehicles insured. (23) The first potential problem is addressed directly in this study by the inclusion of a variable to control for the degree of regulatory stringency. The second potential problem seems less likely. Harrington suggested that smaller markets may show greater variation in underwriting results. However, even relatively small states have relatively sizeable automobile insurance markets. Even the smallest market in 1983, Wyoming, generated \$79 million in written premiums. Hence the difference in the error term between large and small states may be minimal. Therefore, it is not surprising that when Harrington subsequently estimated a model of automobile insurance regulation using a maximum likelihood procedure that incorporated potential heteroskedasticity in the disturbances, he did not find these results to differ materially from those obtained with ordinary least squares. (24)

EMPIRICAL RESULTS AND INTERPRETATION

The effect of regulation on the loss ratio is analyzed from several different perspectives. First, the average effect of prior approval regulation on the loss ratio

23) Harrington, "A Survey", pp. 612-613.

24) Scott Harrington, "The Impact of Rate Regulation on Automobile Insurance Loss Ratios: Some New Empirical Evidence," Journal of Insurance Regulation 3 (December 1984): 189.

without consideration of differential regulatory policies is evaluated. This analysis essentially replicates the standard approach taken and presents a basis for comparison. An additional explanatory variable is then introduced to reflect the stringency of regulation in order to evaluate its differential impact on the loss ratio. Subsequently, the effect of regulation is estimated separately for different sub-periods to determine whether it has shifted over the last decade. In each analysis separate estimates are obtained for liability and physical damage insurance to control for the possibility that the two lines are regulated differently. This is a distinct possibility given that cost and political conditions are somewhat different for these two lines.

The Effect of Prior Approval Regulation

Tables 7.3 and 7.4 present regression results obtained for liability and physical damage insurance respectively when regulation is interpreted only as the existence of a prior approval requirement. This is the standard approach taken by earlier studies of automobile insurance regulation. Equation (1) shows the estimates obtained when all cost-related variables appear in the equation. Subsequent equations show the results obtained when cost-related variables are selectively omitted in order to test for the presence of multicollinearity between PAR1 and the cost-related variables. The presence of multicollinearity

TABLE 7.3: Regression Analysis of the Effect of Prior Approval Regulation on the Liability Loss Ratio Using Pooled Cross-sectional, Time-Series, Data for 1973-1982

Independent Variable	Regressions				
	1	2	3	4	5
Constant	.5473 ^a (16.08)	.5434 ^a (15.76)	.5546 ^a (15.27)	.5435 ^a (21.61)	.6024 ^a (26.63)
PAR1	.0154 ^b (2.12)	.0109 ^c (1.50)	.0144 ^b (1.85)	.0156 ^b (2.15)	.0142 ^b (1.95)
CR3	-.0008 (1.10)	.0012 ^b (2.20)	-.0007 (.87)	-.0008 (1.05)	-.0010 ^c (1.42)
LIDWMS	.1507 ^a (3.83)	-	.1321 ^a (3.14)	.1471 ^a (3.79)	.1676 ^a (4.33)
NFL	.0670 ^a (8.46)	.0653 ^a (8.15)	-	.0673 ^a (8.51)	.0696 ^a (8.85)
ACRDEN	.0026 (.53)	-.0006 (.13)	.0049 (.95)	-	.0098 ^a (2.82)
RAHCPS	.00005 ^b (2.16)	.00007 ^a (2.94)	.00009 ^a (3.24)	.0637 ^a (3.52)	-
R ²	.2005	.1772	.0432	.2000	.1930
N	510	510	510	510	510

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

TABLE 7.4: Regression Analysis of the Effects of Prior Approval Regulation on the Physical Damage Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data for 1973-1982

Independent Variable	Regressions			
	1	2	3	4
Constant	.6609 ^a (19.86)	.6642 ^a (20.17)	.6675 ^a (21.54)	.7020 ^a (27.28)
PAR1	.0218 ^a (2.63)	.0207 ^a (2.54)	.0219 ^a (2.64)	.0212 ^a (2.55)
CR3	-.0020 ^a (2.39)	-.0016 ^a (2.61)	-.0020 ^a (2.39)	-.0020 ^a (2.39)
PDDWMS	.0344 (.73)	- -	.0360 (.76)	.0431 (.91)
ACRDEN	-.0022 (.55)	-.0023 (.59)	- -	-.0006 (.15)
RRCI	.0082 ^b (1.94)	.0084 ^b (2.02)	.0077 ^b (1.87)	- -
R ²	.0403	.0393	.0397	.0331
N	510	510	510	510

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

increases the possibility of a Type II error, i.e. acceptance of the null hypothesis when in fact the independent variable does affect the dependent variable.

The evidence indicates that prior approval regulation, on average, has increased both liability and physical damage loss ratios during the sample period. The estimate for PAR1 also appears to be fairly insensitive to the omission of other variables which indicates that it is not distorted because of multicollinearity. Only when the direct writer market share is excluded from the liability equation does the coefficient for PAR1 drop considerably in magnitude and statistical significance. This may be attributable to a negative association between prior approval regulation and the direct writer market share which also has a positive impact on the liability loss ratio as expected. The simple correlation coefficient for PAR1 and LIDWMS is $-.32$. However, while the mean effect of prior approval regulation is generally statistically significant, it is still relatively small. According to the estimates presented in equation (1), prior approval regulation has raised the liability loss ratio by 2.8 percent and the physical damage loss ratio by 3.3 percent.

The hypothesis that liability rate regulation has had a greater impact on the liability loss ratio than on the physical damage loss ratio is not supported by these results. Neither do the cost exaggeration and endogenous quality models receive particular support here. The former

predicts that liability rate regulation will not be effective and the latter predicts that physical damage rate regulation will not be effective. Yet, regulation is shown to be effective in both lines with roughly the same relative impact on the loss ratio.

The finding that prior approval regulation has raised loss ratios contradicts the finding of no effect by previous studies. The divergence of these results with previous findings may be attributable either to model specification or to the sample period covered. The fact that the coefficient for PAR1 is fairly insensitive to the presence of cost-related variables in the equation tends to discount the first explanation. The more likely explanation is that the effect of prior approval regulation on the loss ratio has increased in recent years which are sampled in this study but not in these earlier studies. This possibility is evaluated in a later section in this Chapter.

The estimates obtained for the other independent variables are also of some interest. Concentration is generally shown to have a negative impact on physical damage loss ratios, as expected, but an insignificant impact on liability loss ratios. The exception to this is when the direct writer market share is excluded from the equation, in which case concentration becomes positive and statistically significant for liability insurance. This result may be attributable to the high correlation (.72) between CR3 and

the liability direct writer market share which has a strong positive impact on the liability loss ratio.

Concentration could have a greater negative impact on the physical damage loss ratio than on the liability loss ratio because of somewhat different political climates for the two lines in open competition states. As discussed in Chapter Six, there is reason to believe that the political environment tends to be more sensitive for liability insurance than for physical damage insurance. This suggests a propensity in some open competition states to return to prior approval rating if there were dramatic increases in liability rates. Many open competition statutes have triggering mechanisms requiring a return to prior approval regulation if it is determined that the market is not sufficiently competitive. Indeed, this is what happened in New York and Massachusetts. This kind of political environment might tend to have a chilling effect on the inclination of politically conscious insurers to use their market power under open competition to raise liability rates lest they trigger a return to prior approval regulation. This would cause concentration to have less of an effect on liability loss ratios than on physical damage loss ratios.

At the same time, direct writers apparently realize greater savings in liability insurance than in physical damage insurance or tend to pass their savings on to consumers more so in liability insurance than in physical

damage insurance. This latter possibility might also be attributed to the greater political sensitivity of liability insurance which might induce this pass-through.

The presence of a no-fault system apparently plays a more important role in raising liability loss ratios than does prior approval regulation. According to equation (1) in Table 7.3, the presence of a no-fault system raises loss ratios by roughly 12 percent. Indeed, the omission of NFL from the equation, while not affecting the coefficient for regulation noticeably, lowers the overall explanatory power of the model considerably as indicated by the significant decline in the R^2 for the regression.

The general lack of significance for the estimated statewide accident rate in liability insurance may be attributable to multicollinearity between it and the average hospital cost. The simple correlation between ACRDEN and RAHCPS is .70. The estimated coefficient for ACRDEN, while generally positive, is not statistically significant except when RAHCPS is omitted from the equation. Conversely, when ACRDEN is omitted from the equation, the magnitude of the coefficient for RAHCPS increases considerably. Hence, it is possible that claim frequency has had a positive impact on the liability loss ratio. Medical costs and automobile repair costs are revealed to have significantly positive effects on the liability and physical damage loss ratios respectively as expected.

The Effect of Greater Regulatory Stringency

The use of a single dummy variable to control for regulation permits estimation of only the average effect of rate regulation among all prior approval states. In order to estimate the differential effect of greater regulatory stringency among prior approval states, an additional explanatory variable, SPAR1, is added to the model. SPAR1, a dummy variable equal to one when a state has both prior approval regulation and an investment income requirement, should indicate the application of greater regulatory stringency than that applied in prior approval states without such a requirement. When both PAR1 and SPAR1 appear in the same equation the coefficient for SPAR1 will represent the marginal effect of the additional stringency practiced in states with investment income requirements.(25) A t-test of the statistical significance of this coefficient in effect tests the validity of the hypothesis that greater regulatory stringency will cause a higher loss ratio.

Tables 7.5 and 7.6 show the results obtained for liability insurance and physical damage insurance respectively when both PAR1 and SPAR1 appear in the equation. For liability insurance, the evidence indicates that rate regulation has had no significant effect on the loss ratio, on average, among states with no investment income requirement. The differential effect of more

25) See Robert S. Pindyck and Daniel L. Rubinfeld, Econometric Models and Economic Forecasts 2nd ed. (New York: McGraw-Hill, 1981): 322.

TABLE 7.5: Regression Analysis of the Differential Effect of Greater Regulatory Stringency on the Liability Loss Ratio Using Pooled Cross-Sectional, Time-Series Data for 1973-1982

Independent Variable	Regressions				
	1	2	3	4	5
Constant	.5420 ^a (16.06)	.5380 ^a (15.75)	.5465 ^a (15.29)	.5362 ^a (21.87)	.5930 ^a (26.27)
PAR1	.0066 (.85)	.0017 (.23)	.0021 (.25)	.0066 (.86)	.0051 (.67)
SPAR1	.0297 ^a (3.22)	.0311 ^a (3.33)	.0416 ^a (4.32)	.0299 ^a (3.26)	.0305 ^a (3.31)
CR3	-.0006 (.81)	.0013 ^a (2.51)	-.0004 (.50)	-.0006 (.78)	-.0008 (1.10)
LIDWMS	.1456 ^a (3.73)	-	.1266 ^a (3.06)	.1439 ^a (3.74)	.1612 ^a (4.19)
NFL	.0628 ^a (7.89)	.0610 ^a (7.58)	-	.0629 ^a (7.92)	.0651 ^a (8.23)
ACRDEN	.0012 (.25)	-.0019 (.40)	.0028 (.55)	-	.0079 ^b (2.26)
RAHCPS	.00005 ^b (2.03)	.00007 ^a (2.78)	.00009 ^a (2.98)	.00005 ^a (3.03)	-
R ²	.2166	.1950	.1194	.2165	.2102
N	510	510	510	510	510

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

TABLE 7.6: Regression Analysis of the Effect of Prior Approval Regulation on the Physical Damage Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data for 1973-1982

Independent Variable	Regressions			
	1	2	3	4
Constant 6)	.6609	.6642	(19.38)	(21.21) (26.7
PAR1	.0168 ^b (1.90)	.0157 ^b (1.82)	.0175 ^b (2.00)	.0170 ^b (1.92)
CR3	-.0018 ^b (2.20)	-.0015 ^a (2.46)	-.0018 ^b (2.23)	-.0019 ^b (2.23)
PDDWMS	.0292 (.62)	-	.0324 (.69)	.0396 (.84)
ACRDEN	-.0037 (.91)	-.0039 (.96)	-	-.0017 (.43)
RRCI	.0091 ^b (2.14)	.0093 ^b (2.22)	.0082 ^b (1.99)	-
R ²	.0455	.0447	.0439	.0367
N	510	510	510	510

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

stringent regulation on the loss ratio, however, is decidedly positive and statistically significant. The additional stringency practiced in states with investment income requirements increases the liability loss ratio by an additional 5.5 percent, according to equation (1). Hence, the hypothesis that greater regulatory stringency increases the loss ratio is supported for liability insurance. Indeed, the implication is that prior approval regulation has had no effect on the liability loss ratio unless it has been relatively stringent.

The indicated effect of particularly stringent regulation appears to be relatively insensitive to the presence of specific cost-related variables. The one exception is when the no-fault variable is omitted from the equation in which case the coefficient for SPAR1 increases in magnitude and significance. This suggests that there may be some multicollinearity between SPAR1 and NFL which would not be surprising. States which are particularly concerned about automobile insurance rates might look to no-fault as well as stringent regulation as means to lower premiums.

A somewhat different pattern is revealed for physical damage insurance. The application of less stringent prior approval regulation in states without an investment income requirement still has a significantly positive impact on the physical damage loss ratio. The mean effect of such regulation is a 2.6 percent increase in the physical damage loss ratio. In turn, the differential effect of greater

stringency is not nearly as decisive as it is in liability insurance. Higher stringency, as reflected by an investment income requirement, is shown to cause an additional increase of 2.7 percent in the physical damage loss ratio which is just statistically significant at the 5 percent level when all explanatory variables are used in the equation. Hence, the regulatory stringency hypothesis is supported in physical damage insurance but the marginal effect of greater stringency is relatively less than it is for liability insurance.

These results provide some support for the cost exaggeration hypothesis in that liability rate regulation is shown to have no effect on the liability loss ratio at a lower level of stringency. It will be recalled that the analysis in Chapter Six indicated that cost exaggeration by insurers might be used to offset lower levels of regulatory stringency in liability insurance but limits on that strategy could prevent complete neutralization of the effect of higher stringency. Hence, the finding that regulation has had an effect in higher stringency states is not inconsistent with this hypothesis.

In order to more clearly show the separate effects of rate regulation in less stringent and more stringent states, another set of regressions were run in which PAR1 was replaced by PAR2. PAR2 takes a value of one only when a prior approval state has no investment income requirement. When the regulation variables are constructed in this

manner, the coefficient for PAR2 will represent the mean effect of regulation in states without an investment income requirement and the coefficient for SPAR1 will represent the mean effect of regulation in states with an investment income requirement. Tables 7.7 and 7.8 contain the estimates from these regressions for liability and physical damage insurance.

Consistent with the results shown in Table 7.5, these estimates indicate that less stringent rate regulation has had no impact on the liability loss ratio relative to open competition. On the other hand, more stringent regulation has raised the liability loss ratio by 5.8 percent relative to open competition. In physical damage insurance, less stringent regulation has increased the loss ratio by approximately 3 percent and more stringent regulation has raised it 5.2 percent. What is evident from these results is that while rate regulation has clearly had an impact on market performance, that impact even in particularly stringent states has not been considerable in a relative sense. This finding is not surprising given the apparent inherent competitiveness of the industry and the potential limits to regulatory effectiveness that exist.

Previous studies have raised the question of whether any indicated effect of prior approval regulation is actually attributable to particularly high loss ratios in New Jersey which is also a prior approval state. Observation does suggest that rate regulation has been more

TABLE 7.7: Regression Analysis of the Effects of Different Levels of Regulatory Stringency on the Liability Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data for 1973-1982

Independent Variable	Regressions				
	1	2	3	4	5
Constant	.5521 ^a (16.15)	.5521 ^a (15.98)	.5506 ^a (15.22)	.5457 ^a (22.46)	.6016 ^a (26.63)
PAR2	-.0008 (.10)	-.0072 (.95)	-.0008 (.10)	-.0006 (.76)	-.0028 (.39)
SPAR1	.0321 ^a (3.44)	.0285 ^a (3.04)	.0420 ^a (4.29)	.0324 ^a (3.50)	.0314 ^a (3.36)
CR3	-.0006 (.84)	.0012 ^b (2.30)	-.0004 (.51)	-.0006 (.82)	-.0008 (1.10)
LIDWMS	.1391 ^a (3.51)	-	.1238 ^a (2.95)	.1375 ^a (3.51)	.1524 ^a (3.89)
NFL	.0623 ^a (7.85)	.0610 ^a (7.60)	-	.0624 ^a (7.87)	.0646 ^a (8.19)
ACRDEN	.0013 (.26)	-.0013 (.27)	.0026 (.56)	-	.0077 ^b (2.21)
RAHCPS	.00005 ^b (1.92)	.00006 ^a (2.55)	.00008 ^a (2.93)	.00005 ^a (2.92)	-
R ²	.2155	.1963	.1193	.2154	-
N	510	510	510	510	510

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

TABLE 7.8: Regression Analysis of the Effects of Different Levels of Regulatory Stringency on the Physical Damage Loss Ratio Using Pooled, Cross-Sectional, Time-Series, Data for 1973-1982

Independent Variable	Regressions			
	1	2	3	4
Constant	.6453 ^a (18.90)	.6494 ^a (19.23)	.6602 ^a (22.22)	.6936 ^a (26.51)
PAR2	.0191 ^b (2.15)	.0172 ^b (2.01)	.0192 ^b (2.17)	.0189 ^b (2.12)
SPAR1	.0334 ^a (3.11)	.0324 ^a (3.04)	.0312 ^a (2.96)	.0303 ^a (2.84)
CR3	-.0020 ^a (2.37)	-.0015 ^a (2.52)	-.0020 ^a (2.40)	-.0020 ^a (2.40)
PDDWMS	.0393 (.82)	-	.0423 (.88)	.0494 (1.03)
ACRDEN	-.0043 (1.06)	-.0045 (1.11)	-	-.0023 (.57)
RRCI	.0093 ^b (2.19)	.0096 ^b (2.28)	.0082 ^b (2.00)	-
R ²	.0474	.0461	.0452	.0383
N	510	510	510	510

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

stringent in New Jersey than in any other state. The question arises: is the effect of relatively stringent regulation previously estimated attributable primarily to the effect of regulation in New Jersey which has an investment income requirement? Has greater stringency in other states besides New Jersey resulted in higher loss ratios?

This proposition was tested by running regressions in which observations for New Jersey were excluded. Tables 7.9 and 7.10 present the estimates that were obtained for liability and physical damage insurance respectively. For liability insurance, the results indicate that the exclusion of observations for New Jersey does make a considerable difference in the estimates obtained for regulation. The indicated mean effect of regulation in states with investment income requirements drops from a 5.8 to a 4.2 percent increase in the loss ratio. Still, the coefficient for stringent regulation retains statistical significance at the 5 percent level even with New Jersey out of the picture. Therefore, more stringent rate regulation does affect the liability loss ratio in states besides New Jersey.

The regulatory estimates obtained for physical damage insurance are also reduced when New Jersey is excluded, but only marginally so. The estimated mean effect of less stringent prior approval regulation is still positive and statistically significant in these regressions. However, the regulatory stringency hypothesis receives weaker support

TABLE 7.9: Regression Analysis of the Effects of Regulation on the Liability Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data Excluding New Jersey for 1973-1982

Independent Variable	Regressions		
	1	2	3
Constant	.4966 ^a (14.75)	.4963 ^a (14.79)	.5007 ^a (14.66)
PAR1	.0096 (1.36)	.0042 (.57)	- -
PAR2	- -	- -	.0008 (.10)
SPAR1	- -	.0190 ^b (2.09)	.0211 ^b (2.29)
CR3	-.0002 (.26)	-.00008 (.11)	-.0001 (.14)
LIDWMS	.1087 ^a (2.83)	.1078 ^a (2.81)	.1050 ^a (2.71)
NFL	.0050 ^a (7.02)	.0531 ^a (6.75)	.0527 ^a (6.72)
ACRDEN	-.0085 ^b (1.73)	-.0087 ^b (1.77)	-.0088 ^b (1.78)
RAHCPS	.00009 ^a (3.79)	.00009 ^a (3.59)	.00009 ^a (3.53)
R ²	.1689	.1762	.1756
N	500	500	500

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

TABLE 7.10: Regression Analysis of the Effects of Regulation on the Physical Damage Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data Excluding New Jersey for 1973-1982

Independent Variable	Regressions		
	1	2	3
Constant	.6570 ^a (19.63)	.6474 ^a (19.00)	.6427 ^a (18.73)
PAR1	.0205 ^a (2.44)	.0163 ^b (1.84)	- -
PAR2	- -	- -	.0189 ^b (2.13)
SPAR1	- -	.0158 ^c (1.46)	.0312 ^a (2.83)
CR3	-.0018 ^b (2.17)	-.0017 ^b (2.04)	-.0018 ^b (2.20)
PDDWMS	.0240 (.50)	.0210 (.44)	.0309 (.64)
ACRDEN	-.0035 ^b (1.97)	-.0045 (1.09)	-.0052 (1.25)
RRCI	.0083 ^b (1.96)	.0092 ^b (2.15)	.0094 ^b (2.20)
R ²	.0381	.0423	.0445
N	500	500	500

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

without New Jersey as the differential effect of more stringent regulation is statistically significant at only the 10 percent level. Overall, the evidence still indicates that rate regulation generally has affected the physical damage loss ratio in other states besides New Jersey.

A second set of regressions were run in which observations for New Jersey are reintroduced but a separate dummy explanatory variable, NJ, is also added to the model which is equal to one for these observations. With NJ added as an independent variable, SPAR1 is replaced by SPAR2 which excludes New Jersey. This approach allows the estimation of the effect of regulatory policy in New Jersey separate from other states. Tables 7.11 to 7.12 show the results of these regressions for liability and physical damage insurance respectively.

These results reveal that rate regulation in New Jersey has had an extremely strong and positive impact on the liability loss ratio. Although the coefficient for NJ does appear to be somewhat sensitive to the presence of other cost-related variables in the equation, it is still considerably higher in magnitude and significance than the coefficient for "moderately" stringent regulation under any specification. Using the estimates contained in equation (1), New Jersey rate regulation is indicated to have raised the liability loss ratio by 36.8 percent which is nine times the effect of regulation in other states with investment income requirements. This finding is consistent with

TABLE 7.11: Regression Analysis of the Effects of Different Levels of Regulatory Stringency on the Liability Loss Ratio with Dummy Variable for New Jersey Using Pooled Cross-Sectional, Time-Series, Data for 1973-1982

Independent Variable	Regressions				
	1	2	3	4	5
Constant	.5013 ^a (14.77)	.4983 ^a (14.59)	.4893 ^a (13.84)	.5448 ^a (23.19)	.5935 ^a (26.96)
PAR2	.0009 (.12)	-.0040 (.54)	.0012 (.15)	-.0003 (.05)	-.0029 (.39)
SPAR2	.0211 ^b (2.30)	.0177 ^b (1.93)	.0269 ^a (2.82)	.0203 ^b (2.21)	.0215 ^b (2.32)
NJ	.1846 ^a (7.11)	.1906 ^a (7.31)	.2249 ^a (8.53)	.1687 ^a (6.90)	.1612 ^a (6.34)
CR3	-.0002 (.22)	.0012 ^a (2.51)	.0001 (.16)	-.0003 (.47)	-.0005 (.76)
LIDWMS	.1082 ^a (2.81)	-	.0892 ^b (2.22)	.1209 ^a (3.18)	.1356 ^a (3.55)
NFL	.0528 ^a (6.76)	.0512 ^a (6.53)	-	.0531 ^a (6.79)	.0580 ^a (7.47)
ACRDEN	-.0087 ^b (1.78)	-.0113 ^a (2.32)	-.0096 ^b (1.87)	-	.0037 (1.08)
RAHCPS	.00009 ^a (3.54)	.0001 ^a (4.16)	.0001 ^a (4.70)	.00006 ^a (3.25)	-
R ²	.2724	.2610	.2061	.2678	.2542
N	510	510	510	510	510

1) The figures in parenthesis are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

TABLE 7.12: Regression Analysis of the Effects of Different Levels of Regulatory Stringency on the Physical Damage Loss Ratio with Dummy Variable for New Jersey Using Pooled Cross-Sectional, Time-Series, Data for 1973-1982

Independent Variable	Regressions			
	1	2	3	4
Constant	.6442 ^a (18.85)	.6478 ^a (19.16)	.6616 ^a (21.20)	.6916 ^a (26.36)
PAR2	.0191 ^b (2.15)	.0173 ^b (2.03)	.0192 ^b (2.16)	.0188 ^b (2.21)
SPAR2	.0311 ^a (2.83)	.0301 ^a (2.76)	.0293 ^a (2.69)	.0279 ^a (2.55)
NJ	.0587 ^b (1.99)	.0599 ^b (2.04)	.0486 ^b (1.72)	.058 ^b (1.96)
CR3	-.0019 ^b (2.29)	-.0015 ^a (2.50)	-.0019 ^b (2.34)	-.0019 ^b (2.31)
PDDWMS	.0349 (.72)	-	.0396 (.82)	.0444 (.92)
ACRDEN	-.0051 (1.24)	-.0054 ^c (1.31)	-	-.0032 (.80)
RRCI	.0091 ^b (2.15)	.0094 ^b (2.23)	.0080 ^b (1.93)	-
R ²	.0467	.0480	.0460	.0402
N	510	510	510	510

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

earlier findings and supports industry contentions that New Jersey's severe regulatory climate has considerably depressed rate levels and worsened underwriting results.

The impact of New Jersey regulation does not appear to be nearly so severe in physical damage insurance. Rate regulation in New Jersey has increased the physical damage loss ratio by 9.1 percent which is roughly twice the average effect of regulation in other states with investment income requirements.

In sum, the evidence supports the hypothesis that greater regulatory stringency in private passenger automobile insurance has resulted in higher loss ratios. In liability insurance, rate regulation has only been consequential in states that have required insurers to reflect investment income in their rate calculations. In physical damage insurance, rate regulation has raised the loss ratio in both lower and higher stringency states but more so in the latter. The regulatory stringency hypothesis retains support even when exception is made for New Jersey's severe regulatory policy. The cost exaggeration model also receives some support in that regulation was found to have no effect at lower levels of regulatory stringency in liability insurance.

The Peltzman hypothesis that regulation will have a greater effect on the liability loss ratio than on the physical damage loss ratio because of different stringency levels did not receive any real support. The relative

regulatory effect on the liability loss ratio was shown to be marginally less than that on the physical damage loss ratio under some specifications and vice versa under others. The endogenous quality model also failed to receive any support as physical damage rate regulation was found to be effective at both lower and higher levels of stringency.

Evidence of a Shift in the Effect of Regulation Over Time

The finding that prior approval rate regulation has generally increased the loss ratio during the last decade is inconsistent with the general finding of previous studies. A question arises as to whether this is attributable to the use of different model specifications or to the fact that the effect of regulation on the loss ratio has increased over time. This study incorporates more recent data while earlier studies have tended to use data from the early to the middle 1970s. If the effect of regulation has changed over time, one's findings about it will depend on the sample period used.

As demonstrated in Chapter Six, the Peltzman model predicts that regulatory stringency will vary directly with marginal cost. At the same time, there is evidence that automobile liability insurance costs have outpaced the general rate of inflation over the last decade. For the period 1974-1983, the CPI for all items increased by 102 percent but the cost of items related to automobile liability insurance increased considerably more than this.

The cost of medical care items, hospital rooms, and physician fees increased by 137.4 percent, 207.5 percent, and 133.5 percent respectively over this period. (26) This implies that, even in real terms, automobile liability insurance costs have increased considerably. Hence, the Peltzman model predicts that the effect of regulation on the liability loss ratio will have increased.

However, at the same time, the average hourly rate for automobile repair work, which would affect the cost of physical damage claims, increased by only 88 percent over this period. (27) This implies that, in real terms physical damage costs have actually decreased. Hence, the Peltzman model predicts that the effect of regulation on the physical damage loss ratio will have decreased over this period.

In order to test these hypotheses, the sample period was split into two sub-periods, 1973-1977 and 1978-1982. The basic model formulations presented in Tables 7.3-7.12 were then estimated separately for these two periods. If there has been a significant change in the effect of regulation over time then there should be a significant difference in the estimates obtained for the regulatory variables for the two periods.

Tables 7.13 and 7.14 present estimates obtained for liability insurance for the years 1973-1977 and 1978-1982

26) Insurance Information Institute, Property/Casualty Fact Book, pp. 49-50.

27) Ibid, P. 50.

respectively. The estimates obtained for liability insurance over the years 1973-1977 contrast sharply with those obtained for 1978-1982. Prior approval regulation apparently has had no differential impact on the liability loss ratio on average over the earlier period, even in higher stringency states. The only exception to this was in New Jersey where regulation had a strong positive effect. In contrast, rate regulation in higher stringency states is shown to have a significantly positive effect on the liability loss ratio over the period 1978-1982, even when an exception for New Jersey is made. The effect of regulation in New Jersey was even greater during this period. Regulation in lower stringency states still had no effect on the liability loss ratio during the latter period.

The fact that liability rate regulation was not a significant factor for the period 1973-1977, which accords with the finding of previous research on this period, is not surprising given the untypical cost conditions existing at that time and the predictions of the Peltzman and cost exaggeration models. The year 1973 marked a sudden rise in gasoline prices with the emergence of the oil producers cartel which had a dampening effect on driving activity and the number of traffic fatalities for several years until consumers adjusted to the increases and automobile fuel efficiency improved. This development represented a significant aberration in an overall trend of increasing vehicle mileage and traffic fatalities since 1945 which

TABLE 7.13: Regression Analysis of the Effects of Regulation on the Liability Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data for 1973-1977

Independent Variable	Regressions			
	1	2	3	4
Constant	.5804 ^a (12.40)	.5790 ^a (12.36)	.5777 ^a (12.25)	.5200 ^a (10.88)
PAR1	.0054 (.58)	.0027 (.27)	- -	- -
PAR2	- -	- -	.0034 (.34)	.0039 (.40)
SPAR1	- -	.0095 (.78)	.0123 (.99)	- -
SPAR2	- -	- -	- -	.0019 (.15)
NJ	- -	- -	- -	.1442 ^a (4.21)
CR3	-.0022 ^a (2.43)	-.0021 ^b (2.29)	-.0021 ^b (2.30)	-.0015 ^b (1.69)
LIDWMS	.2614 ^a (4.94)	.2576 ^a (4.85)	.2590 ^a (4.84)	.2214 ^a (4.20)
NFL	.0856 ^a (7.94)	.0846 ^a (7.78)	.0845 ^a (7.79)	.0748 ^a (6.95)
ACRDEN	.0107 ^c (1.53)	.0102 ^c (1.45)	.0101 ^c (1.43)	-.0012 (.15)
RAHCPS	.00001 (.39)	.00001 (.32)	.00001 (.34)	.00006 ^c (1.60)
R ²	.3182	.3199	.3200	.3637
N	255	255	255	255

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

TABLE 7.14: Regression Analysis of the Effects of Regulation on the Liability Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data for 1978-1982

Independent Variable	Regressions			
	1	2	3	4
Constant	.5985 ^a (11.35)	.5857 ^a (11.28)	.6234 ^a (11.56)	.5758 ^a (10.86)
PAR1	.0247 ^b (2.28)	.0115 (1.01)	- -	- -
PAR2	- -	- -	-.0111 (.94)	-.0082 (.72)
SPAR1	- -	.0426 ^a (3.20)	.0424 ^a (3.13)	- -
SPAR2	- -	- -	- -	.0322 ^a (2.44)
NJ	- -	- -	- -	.2012 ^a (5.31)
CR3	.0023 ^b (1.87)	.0023 ^b (1.90)	.0023 ^b (1.87)	.0025 ^b (2.10)
LIDWMS	-0.592 (.89)	-.0500 (.77)	-.0762 (1.13)	-.0913 (1.40)
NFL	.0469 ^a (4.18)	.0403 ^a (3.60)	.0397 ^a (3.55)	.0312 ^a (2.85)
ACRDEN	.0054 (.78)	.0029 (.43)	.0039 (.57)	-.0051 (.73)
RAHCPS	.00002 (.60)	.00003 (.67)	.00002 (.40)	.00005 ^c (1.39)
R ²	.1164	.1516	.1511	.2148
N	255	255	255	255

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

resumed its upward climb after 1976. (28) The rise in medical costs was also roughly equivalent to the general rate of inflation during the early 1970s. This occurrence too was untypical in that medical costs rose considerably faster than the general rate of inflation during the 1960s and the last half of 1970s and early 1980s. (29) Taken together, these factors indicate that the first part of the 1970s was generally characterized as a period of lower automobile liability costs in real terms for insurers, which contrasted with the cost conditions found in both previous and subsequent periods.

Thus, it appears that previous research has tended to draw its finding from an anomalous period in terms of the underlying cost conditions. The later period, 1978-1982, during which liability rate regulation is found to be effective, appears to be a more typical period because of its higher costs. It will be argued below that the finding of no effect for liability rate regulation during the earlier period is a predictable result based on a synthesis of the Peltzman and cost exaggeration models and the cost conditions of that period. Hence, the general finding of previous studies that rate regulation is irrelevant is

28) National Safety Council, Accident Facts: 1985 Edition (Chicago, Ill.: National Safety Council): 40.

29) The medical care CPI rose 52.5 percent from 1960 to 1970 compared with 31.1 percent for the all items CPI. From 1970 to 1975, the medical care CPI rose 39.8 percent while the all items CPI rose 38.6 percent. From 1975 to 1984, the medical care CPI rose 125.1 percent compared to 93.0 percent for the all items CPI. Bureau of Labor Statistics, Consumer Price Indexes.

attributable to their focus on liability insurance during a period of untypically low costs.

Tables 7.15 and 7.16 present the same comparison of periods for physical damage insurance. A different pattern than that for liability insurance is revealed here. The mean effects of regulation on the physical damage loss ratio in both higher stringency and lower stringency states are significantly positive for both periods. The marginal effect of greater regulatory stringency is greater for the earlier than for the later period but is still statistically significant at the 10 percent level for both periods. Generally, rate regulation is indicated to have had a greater impact over the earlier period than over the later period for physical damage insurance. New Jersey is an exception here in that its regulation is shown to have had a slightly greater effect over the later period. Curiously, when regulation is represented by PAR1, its coefficient is nominally higher and more significant for the later period which contradicts the above results.

Taken together, these results on the regulatory trend would tend to explain the divergence of Harrington's findings with previous studies in regards to the effect of regulation on the liability loss ratio. That is, previous research has tended to use data from the first half of the 1970s which the evidence suggests was a period during which rate regulation was less relevant in liability insurance. Also, the fact that the coefficient for PAR1 was not highly

TABLE 7.15: Regression Analysis of the Effects of Regulation on the Physical Damage Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data for 1973-1977

Independent Variable	Regressions			
	1	2	3	4
Constant	.7350 ^a (13.59)	.7169 ^a (12.91)	.7024 ^a (12.65)	.7016 ^a (12.60)
PAR1	.0228 ^b (1.73)	.0162 (1.15)	-	-
PAR2	-	-	.0283 ^b (2.01)	.0281 ^b (2.00)
SPAR1	-	.0244 ^c (1.39)	.0454 ^a (2.55)	-
SPAR2	-	-	-	.0443 ^a (2.42)
NJ	-	-	-	.0582 (1.23)
CR3	-.0025 ^b (2.01)	-.0022 ^b (1.69)	-.0023 ^b (1.83)	-.0023 ^b (1.78)
PDDWMS	-.0720 (.91)	-.0904 (1.14)	-.0694 (.87)	-.0726 (.90)
ACRDEN	-.0046 (.66)	-.0075 (1.04)	-.0076 (1.06)	-.0081 (1.10)
RRCI	.0089 ^c (1.38)	.0103 ^c (1.57)	.0108 ^b (1.66)	.0108 ^c (1.65)
R ²	.0817	.0888	.0986	.0989
N	255	255	255	255

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

TABLE 7.16: Regression Analysis of the Effects of Regulation on the Physical Damage Loss Ratio Using Pooled Cross-Sectional, Time-Series, Data for 1978-1982

Independent Variable	Regressions			
	1	2	3	4
Constant	.6044 ^a (15.66)	.5947 ^a (15.19)	.5965 ^a (15.14)	.5949 ^a (15.10)
PAR1	.0235 ^a (2.46)	.0184 ^b (1.80)	-	-
PAR2	-	-	.0160 ^c (1.54)	.0161 ^c (1.56)
SPAR1	-	.0165 ^c (1.40)	.0311 ^a (2.61)	-
SPAR2	-	-	-	.0280 ^b (2.29)
NJ	-	-	-	.0663 ^b (1.98)
CR3	-.0023 ^b (2.17)	-.0023 ^b (2.18)	-.0026 ^a (2.42)	-.0025 ^b (2.33)
PDDWMS	.2224 ^a (3.62)	.2259 ^a (3.68)	.2379 ^a (3.76)	.2319 ^a (3.65)
ACRDEN	-.0012 (.28)	-.0023 (.54)	-.0032 (.74)	-.0042 (.96)
RRCI	-.0019 (.34)	-.0010 (.18)	-.0012 (.21)	-.0013 (.23)
R ²	.0647	.0722	.0688	.0736
N	255	255	255	255

1) The figures in parentheses are t-statistics.

2) Based on one-tailed tests: a = 1% significance;
b = 5% significance; c = 10% significance.

significant for 1973-1977 for physical damage insurance tends to support earlier findings of no regulatory effect in that line. However, in more recent years, from which Harrington draws his data, rate regulation has apparently had a much greater impact in liability insurance, at least in states that employ greater than average stringency.

As pointed out above, automobile liability insurance costs appear to have been untypically low during the period 1973-1977 because of the convergence of a dramatic increase in gasoline prices and relatively moderate medical cost inflation. Given these cost conditions, the Peltzman model implies that regulatory stringency for liability insurance would have been lower for the period 1973-1977 than for either previous or subsequent periods since it hypothesizes that stringency is directly related to costs. This lower stringency, in turn, would have made it easier for insurers to completely negate the effect of liability rate regulation on their loss ratios by exaggerating their costs, according to the cost exaggeration model. The reader will recall that it is hypothesized that, because insurers must present cost estimates within limits of reasonableness, a cost exaggeration strategy is more likely to completely offset low levels of regulatory stringency than high levels of stringency.

Hence, the general pattern of no regulatory effect for liability insurance for the sample period 1973-1977 was predictable based on a synthesis of the Peltzman and cost

exaggeration models. The lower stringency practiced even in higher stringency states during this period made it possible for insurers to completely negate the effect of regulation by exaggerating their costs. At the same time, the pattern of no regulatory effect for this period would appear to be untypical given the anomalous cost conditions during that period and the implications of the Peltzman and cost exaggeration models. Liability rate regulation was shown to be effective in higher stringency states for the subsequent period which was more normal because of its higher costs.

It should also be noted that Smallwood did find stringent rate regulation to have a positive significant impact on the liability loss ratio during the late 1960s, a period in which costs also appear to have been higher than in the early 1970s. Therefore, it is fairly clear that the general finding of previous studies (with the exception of Smallwood and Harrington) of no effect for automobile insurance regulation is attributable to their focus on liability insurance during a period with untypical cost conditions. In this context, it is not surprising that studies which examine previous (Smallwood) and subsequent periods (Harrington, this study) do find rate regulation to have an impact on the loss ratio. Hence, the general finding of previous studies that insurance rate regulation has no effect on performance appears to be invalid because of its focus on automobile liability insurance, a line

somewhat subject to counter-regulation actions by insurers, during an unusual period of relatively lower costs.

Several important findings can be drawn from this comparison of periods. First of all, the basic hypothesis that more stringent regulation results in a higher loss ratio is generally supported by the results obtained for both periods. Although this hypothesis is not supported for liability insurance for the period 1973-1977, to the extent that greater stringency is reflected by an investment income requirement, even this finding is not inconsistent with the Peltzman model in terms of its interaction with the cost exaggeration model. The Peltzman model does predict that stringency would be lower during this period because of its lower costs. When this prediction is combined with the prediction of the cost exaggeration model that low levels of regulatory stringency will not be effective, the finding of no regulatory effect for liability insurance is a predictable result. Consistent with the above finding, the hypothesis that the effect of regulation has increased in liability insurance and decreased in physical damage insurance is also supported by these regression results. As regulatory stringency increased in liability insurance so did its impact on the loss ratio and conversely for physical damage insurance.

The cost exaggeration hypothesis does receive strong support for the period 1973-1977 in that liability rate regulation was shown to be effective only in New Jersey.

The hypothesis still retains support for the period 1978-1982 in that liability rate regulation still had no effect in lower stringency states. It is clear that cost exaggeration by insurers is not able to offset the level of regulatory stringency more typically practiced in states with particularly stringent policies which is a finding entirely consistent with the cost exaggeration model as explained above. What is implied by these results is that even though cost exaggeration has worked successfully to some extent as a counter-regulation strategy in liability insurance it still has not been able to negate the effect of particularly stringent regulation as would be expected.

In addition, neither the hypothesis that liability rate regulation will be more effective than physical damage rate regulation nor the endogenous quality model receive support for either the period 1973-1977 or the period 1977-1982.

These are important findings. They indicate regulation is not an irrelevant factor in automobile insurance, contrary to the general finding of previous research. Rather, rate regulation does have a significant impact on the loss ratio, at least when applied with a sufficient level of stringency. Moreover, that level of stringency, as practiced in liability insurance in recent years, is the more typical case. Hence, the more common experience should be that rate regulation does have a positive and significant effect on the loss ratio. The above results indicate that this will continue to occur as long as there is not a

significant decline in liability costs in real terms. Given that the rapid rise in medical care costs and jury awards show no signs of abating at present at the same time and gasoline prices are declining (which should have a positive effect on driving activity), liability rate regulation should continue to have a significant impact on the loss ratio for the foreseeable future.

Summary

It was hypothesized that higher levels of regulatory stringency will result in higher loss ratios. Empirical evidence supports this hypothesis in that it reveals that states with more stringent regulatory policies have generally achieved higher loss ratios than states with less stringent policies. Also receiving support were hypotheses that effect of regulation on the liability loss ratio has increased over the last decade while its effect on the physical damage loss ratio has decreased. The prediction that regulation would have a greater effect on the liability loss ratio than on the physical damage loss ratio because of greater political sensitivity to liability rates was not supported, however. It may very well be the case that political sensitivity towards rates is not sufficiently different between these two line to result in any significant differential effect for regulation. Looking at all the evidence, it is concluded that regulatory stringency is an important factor to be considered in studying the effects of regulation on market performance.

Other hypotheses were examined empirically. The hypothesis that rate regulation has only been a significant factor in New Jersey was tested. While it was indicated that rate regulation has had a stronger impact in New Jersey than in other states, the impact of regulation in other states was still shown to be significant. Consequently, the

hypothesis that regulation is irrelevant in states outside of New Jersey was not supported.

Lastly, the prediction of the cost exaggeration model that rate regulation would be ineffective in liability insurance also received some support. Liability rate regulation was not shown to be effective in states outside of New Jersey for the period 1973-1977. For 1978-1982, liability rate regulation was still ineffective in lower stringency states. The endogenous quality model received no support as physical damage rate regulation was effective at all levels of stringency during both periods.

CHAPTER EIGHT

CONCLUSIONS AND POLICY IMPLICATIONS

The primary objective of this study was to examine how greater regulatory stringency affects market performance in private passenger automobile insurance. Previous studies of the effect of state automobile insurance rate regulation have not explicitly considered the role of regulatory stringency. They have either treated the existence of a prior approval requirement as the only relevant regulatory factor or they have employed ambiguous or indirect measures of regulatory stringency which have not provided a true test of its significance. Consequently, to date, there was no clear understanding of how greater regulatory stringency has affected market performance in automobile insurance.

In order to provide a true test of the differential impact of more stringent regulation on market performance in automobile insurance, this study employed a direct and unambiguous measure of regulatory stringency among states. This measure of regulatory stringency was incorporated into equations which sought to explain interstate differences in liability and physical damage loss ratios over the period 1973-82. By using the existence of an investment income requirement as an indicator of relatively stringent regulation, the study revealed that greater regulatory stringency has generally resulted in higher state loss ratios.

In the case of liability insurance, regulation in less stringent prior approval states, that is states without an investment requirement, was not shown to be a significant factor, whereas in states with such a requirement, regulation was shown to have a positive and significant impact on the loss ratio. In the case of physical damage insurance, regulation in less stringent states has had a positive and significant effect on the loss ratio. However, rate regulation in more stringent states had an even greater positive impact on the loss ratio. These relationships held even when exception is made for New Jersey where the effect of regulation has been particularly severe, especially in liability insurance.

The results of this study also indicate that the effect of regulation on the loss ratio has increased in liability insurance and decreased in physical damage insurance over the period 1973-1982 as the Peltzman model predicts. This indicates that there is a direct relationship between costs, regulatory stringency, and the loss ratio. The evidence did not support a direct relationship between political sensitivity and regulatory effect across insurance lines, however. The cost exaggeration model was validated to some extent in that regulation had no effect on the liability loss ratio at lower levels of stringency. At the same time, there was no evidence that endogenous quality of service works to defeat regulatory objectives.

The main implication of these findings is that even though rate regulation is somewhat hobbled by an information problem, at least in liability insurance, regulators still can affect performance if they practice sufficient stringency. Hence, it is clear that the general belief that rate regulation is irrelevant in automobile insurance is incorrect.

Public Policy Implications

While it is clear that rate regulation has affected market performance in automobile insurance, at least in some states, no conclusions are offered here with respect to whether consumers are worse off or better off because of this. The model of regulatory behavior used here does not allow for the possibility that regulators might actually set rates below competitive levels. In reality, however, regulators might be induced to do so if consumers were more politically responsive to the benefits of lower rates than the possible adverse consequences of restricted availability or diminished service. This, of course, would require a much different theory of regulatory behavior than that offered by Peltzman.

If the industry is already competitive and performance is optimal then rate regulation can only make consumers worse off. If the industry is not competitive and performance is less than optimal then rate regulation could be benefiting consumers in those states where it has been

effective by lowering premiums in relation to the amount of loss protection provided. The fact that estimated impact of rate regulation on the loss ratio, even in stringent states outside of New Jersey, is relatively small may very well be attributable to the inherent competitiveness of the industry and a limited potential for improved performance through regulation.

New Jersey clearly represents an exceptional case. Insurers point to New Jersey as a situation where regulation has gone completely awry. According to the estimates produced in this study, the liability loss ratio in New Jersey was in the area of 40 percent higher because of rate regulation over the period sampled. Several insurers have pulled out of New Jersey, allegedly because of the regulatory climate. At the same time, close to one-half of New Jersey vehicles are insured through the joint underwriting association which is more than 40 points higher than any other state. (1) It is difficult to imagine that loss ratios in open competition states are depressed by 40 percent because of a lack of competition in those states. The more likely case is that New Jersey regulators have held rates significantly below competitive levels. The implications of New Jersey's regulation for the welfare of its consumers is beyond the scope of this study but there

1) Insurance Information Institute, 1984-85 Property/Casualty Fact Book (New York: Insurance Information Institute, 1984): 43.

clearly is some question as to the benefits of replicating its regulatory posture in other states.

Since there is no clear presumption about the benefits of rate regulation in automobile insurance, there is no basis for recommending that states retain prior approval regulation. However, the fact that regulation can result in moderately higher loss ratios, at least if applied stringently, suggests that states might proceed with some caution with regards to deregulation of automobile insurance rates. One of the major arguments that has been used to justify open competition is the lack of empirical evidence to show that rate regulation makes any difference. This argument is no longer valid based on the findings of this study. Since regulation can make a difference, the possibility that open competition may result in consumers paying higher premiums for the same amount of loss protection has to be considered.

A prior approval state that is considering open competition for automobile insurance may be wise to closely examine the structure of its market and its institutional features to determine whether it will sustain workable competition under deregulation. A provision that the market be closely monitored and its performance reviewed after a certain period to see if open competition is successful may also be advisable for any proposed legislation. States should also investigate possible legal barriers to entry into the market and competition such as licensing

requirements or laws which make it difficult for insurers to become direct writers. States might also invest in consumer education with regard to the purchase of automobile insurance which could also improve performance by making consumers more responsive to price and quality competition. States which have retained prior approval regulation but do not require insurers to discount their rates for investment income might be advised to do so.

Areas for Further Research

A number of interesting areas remain for further research. There is considerable interest in testing the effect of a continuous measure of regulatory stringency on performance. A continuous measure of regulatory stringency would permit a more sensitive estimate of the actual relationship between the degree of regulatory stringency applied and the loss ratio. Possible candidates for such a measure might be the percentage of rate filings disapproved, the average percentage difference between requested rates and approved rates, or the number of regulatory staff assigned to review automobile insurance rate filings. Data on these kinds of measures would have to be obtained from a special survey of state insurance departments that would probably require extensive fieldwork.

Considerable interest also remains in the impact of regulation on other market performance variables besides the loss ratio, particularly price and quality of service.

Unfortunately, good data on either of these variables is not readily available. With respect to premiums, it would be preferable to survey premiums for a hypothetical policy in selected territories from several carriers in each state. Data on accident rates, traffic density, and other cost-related variables should also be available on the same basis in order to properly isolate the effect of regulation. A possible measure of quality of service for which data might be available is the percentage of claims paid or the average claim paid.

A third area of interest which has gone largely uninvestigated is the effect of regulation on rate structure or the rate relativities between various territories or driver classes. Peltzman has predicted that automobile insurance regulation will act to suppress rate differences between urban and rural drivers because regulators will increase their political support by doing so. (2) It would be of some interest to determine if prior approval regulation has indeed tended to constrain rate differences between higher and lower cost territories.

Lastly, as this study has established that regulatory stringency is a relevant factor in automobile insurance, there is an interest in obtaining a better understanding of what factors determine the degree of regulatory stringency. The possibility that regulators have depressed rates below

2) Sam Peltzman, "Toward a More General Theory of Regulation," Journal of Law and Economics 19 (August 1976): 236.

competitive levels in some states suggest that Peltzman's model may not be fully adequate to explain what dictates regulatory policy. Ideology may also play a significant role in the formation of regulatory policy in automobile insurance. (3) Petersen's research has provided an excellent start with respect to identifying potential determinants of regulatory policy in automobile insurance. The task now is to study the relationship between direct measures of regulatory stringency and these factors as well as any other variables suggested by alternative theories of regulatory behavior.

3) See for example, Joseph P. Kalt and Mark A. Zupan, "Capture and Ideology in the Economic Theory of Politics," American Economic Review 74 (June 1984): 279-300.

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