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ANALYSIS OF SELECTED ISSUES IN WORKERS' COMPENSATION

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The employers in each state are required to assume the financial responsibility associated with workplace injuries. It is also mandated that they insure against this liability, and the costs of this insurance run about two percent of payroll in the typical manufacturing firm (Chelius and Smith, 1985, p. 18). Partly because the premium rates typically paid by firms of under 100 employees are about one percentage point higher than those paid by firms of over 1,000 workers, the efficiency and equity of this mandatory insurance system, particularly as it affects the small business community, continues to be an important concern.

Allowing for the relatively greater overhead costs of servicing small clients, an empirical study for the Small Business Administration recently concluded that, in general, "...small businesses are paying no more than their fair share of workers' compensation costs" (Chelius and Smith, 1985, p. 55). The report also noted, however, that the rigid nature of the heavily regulated workers' compensation insurance industry tended to "uncouple" premiums paid in from benefits paid out, especially in the small business sector. Put differently, rigid regulation causes subsidization to occur across firms within the small business sector, with the premiums of some firms (the subsidizers) paying the benefits of others. This subsidization of some small firms by other small firms raises issues of both equity and efficiency: those firms that are subsidized not only gain unfairly, they also do not have the proper financial incentives to reduce workplace risk.

There are three aspects of the workers' compensation insurance system that required further study in the context of regulatory effects on small businesses. These issues are as follows:
Open Competition

Competitive rating has worked in the nine states currently using it without the insolvency and database problems anticipated by many. The structure of the workers' compensation market has also been found to be conducive to vigorous competition among insurers. Most strikingly, the price of insurance appears to have fallen an average of 10 to 15 percent below what it would have been under administered pricing. The generalizability of this conclusion over the long-run must await evidence on comparative prices over the full underwriting cycle.

The major advantage of the competitive rating system to the small business community is the greater flexibility with which premiums could be set and policies could be written. Currently, innovation in writing workers' compensation insurance for small businesses in regulated environments appears to be flourishing only in the group self-insurance movement. However, such features as cash awards for good safety records and bonuses for inspectors based on client safety improvements may become more widespread if the insurance market were deregulated.

The movement to more explicit competition in ratemaking holds some risks for the very smallest of employers. Particularly in those states in which
premiums include an "expense constant" that has been held below the true fixed cost of writing a policy, there could be some increases in premiums for very small firms. Also, during periods of falling interest rates, competitive prices may increase more rapidly than administered prices. In the long-run, however, the economic efficiency and flexibility associated with competition will yield a system that is more responsive to the needs of small employers.

Assigned Risk Pools

Because workers' compensation insurance is mandatory, problems arise when insurance companies will not write coverage for certain firms, very often small ones. In such situations, firms unable to obtain voluntary coverage are placed in an assigned risk pool. Our study included an empirical examination of the role of insurance pricing as a determinant of the volume of business that was forced into such pools. The key variable of interest is the expense constant--a set dollar amount per insurance policy added to premiums to cover the fixed costs of administering the contract.

Each state that regulates workers' compensation insurance approves an expense constant to be used in its jurisdiction. In the years we analyzed (1980-85), expense constants averaged $55 per policy, in contrast to the $120 recommended by the National Council on Compensation Insurance. The policies most affected by this unrealistically low fixed charge are those of very small firms (three employees or fewer), and it is precisely this group of employers that is overrepresented in assigned risk pools.

If deregulation continues and insurance policies are priced by more explicitly competitive forces, the premium add-on for administrative expenses will undoubtedly rise. During our sample period, an increase of approximately
$65 (from $55 to $120) would have implied an increase of about 8 percent in the premiums of very small employers. This modest increase would have drastically reduced the size of the involuntary sector (that is, the number of firms that insurance companies are unwilling to voluntarily cover). In particular, our quantitative analysis suggests that if the expense constant were increased from $55 to $120, the usage of assigned risk pools would be reduced by at least 33 percent and perhaps by as much as 90 percent.

Experience Rating

One of the strengths of the workers' compensation insurance system is the relatively fine-tuned relationship between claims and premiums. A key mechanism for achieving that balance is the experience-rating process, which is often hypothesized to encourage accident prevention. Experience rating, however, is generally not fully available to smaller firms. In this study, we investigate the unique system of Washington State, which experience rates small businesses. Using data from the Occupational Safety and Health Administration, we examined whether experienced-rated small firms in Washington had better safety records than their counterparts in other states. We found no evidence to support the hypothesis that the experience rating of small businesses in Washington led to greater accident prevention.

While we cannot be sure why there is no observable effect, several conjectures are offered. First, the delay between the achievement (presumably at some cost) of a safer work environment and a partial reduction in insurance premiums is two years, and the delay until the full premium adjustment is five years. While perhaps not unreasonable from the standpoint of insurance carriers, who need time to process data and to acquire some sense of firms'
true risk levels, these delays do tend to diminish safety incentives for firms with managers who do not have very long planning horizons. Second, the experience-rating formula is so complicated that the average firm probably has difficulty in calculating expected premium adjustments that are attendant to any safety program it might undertake. Third, workers' compensation premiums (and adjustments) are relatively small. Even a 30 percent discount off a premium that averages 2 percent of payroll saves the firm only one-half of one percent of payroll, a sum that may seem small to most firms. Finally, the insurance companies may not "sell" experience rating as a reward for better safety or as a penalty for a poorer safety record. We believe there is a tendency for insurers to view experience rating as a procedure for bringing equity to rate making rather than as a tool for providing firms with greater safety incentives; the complexity of the formula and the delays in both rewards and penalties support this conjecture.
Chapter 1

Competitive Rating in Workers' Compensation Insurance:

A Review of Its Impact on Small Business
INTRODUCTION

Workers' compensation is an increasingly important regulatory program to the small business community. Two major factors determine the employer's cost of this system. One significant determinant of costs is the schedule of benefits and how extensively they are used by employees. The second fundamental cost factor, and the subject of this paper, is the efficiency with which a given benefit payout is financed. Most workers' compensation benefits are transmitted from employers to employees through private insurance companies. Therefore, a major determinant of the system's financial efficiency is the process by which the price of this workers' compensation insurance is established. The focus of this analysis is how the relatively new process of competitive rating has performed as a mechanism for setting prices and providing insurance coverage for workers' compensation liabilities. The analysis is a systematic examination of the experience in the nine states that have initiated competitive rating (one other state has passed a law that has not yet been implemented). Information on the operation of competitive rating was solicited from each of the competitive rating states. Published and unpublished research papers were reviewed. Individuals in government and the insurance industry who are familiar with the price setting process in each of the competitive states were also interviewed.

The paper is organized into five parts. We first describe the institutional arrangements of workers' compensation with particular attention to the rate setting procedures in both the administered pricing and open competition states. The theoretical advantages and disadvantages of administered pricing and competition are then discussed. Special attention is
given to the unique aspects of workers' compensation insurance in this theoretical analysis. The special characteristics of small business in the workers' compensation insurance system are also addressed. The evidence about how competitive rating has performed is then reviewed. A final section then draws on the theoretical and the empirical analyses to support conclusions as to the appropriate public policy for workers' compensation pricing.

INSTITUTIONAL ARRANGEMENTS

Administered Pricing

In the early part of the twentieth century, each state chose to replace the tort system for workplace injuries with a predefined statutory obligation on each employer. Under these laws, employers are required to pay income replacement and medical care benefits to their employees injured in the course of employment, without regard to fault. These benefits are the sole remedy available to eligible employees—in exchange for receiving benefits automatically, workers are prohibited from suing their employers. Since workers' compensation is the only recourse for most injured employees, it becomes a very important element of social policy to be certain that employees receive their benefits.

In order to guarantee and facilitate the payment of these socially mandated benefits, every state requires that employers insure their liability for worker injuries and diseases. Most states allow this obligation to be met by self-insurance if the employer is large. Several states also permit self-insurance by groups of small businesses (Chelius and Smith, 1985). A few states require that insurance be purchased through a state-run fund, while
others have a state fund that competes with private insurers. However, the dominant mechanism for meeting the universal employer obligation to insure their workers' compensation liabilities is the purchase of insurance from private profit-seeking companies.¹

The important social role of private insurance in paying benefits that are statutorily mandated has set the stage for extensive government involvement in this industry. State governments are involved in many aspects of workers' compensation insurance; however, no intervention is as extensive and significant as is the regulation of prices. Until quite recently, all states strictly regulated the price that could be charged for workers' compensation insurance. Since 1981, however, ten states have passed laws that, to varying degrees, encourage greater reliance on market forces in the determination of prices.²

The administered pricing process in workers' compensation insurance is much like the rate-setting processes that were used in transportation, financial services, and long distance telephone service until they were deregulated in the late 1970s and early 1980s. In the case of workers' compensation insurance, a price request is submitted to the state insurance department by the rating bureau (private organizations established by the insurance carriers). After hearings that are often quite extensive, either the original request or a modification is approved. Insurance companies are

¹ Private insurance accounts for about two-thirds of workers' compensation premiums.

² The states that have passed open competition laws for workers' compensation insurance are: Arkansas, Georgia, Illinois, Kentucky, Maine (due to be implemented in 1989), Michigan, Minnesota, Oregon, Rhode Island, and Vermont. There is substantial variation in the degree to which market forces are allowed to operate in these states (National Council on Compensation Insurance, 1983).
then required to use these rates for the premiums of individual employers.

The rate requests submitted by the rating bureau are developed on the basis of several factors. First, claims and payroll data are collected for each insured employer. The relationship between claims and payroll is then developed for each of over 600 occupational and industrial categories. Each of these "classes" thus has a basic rate that reflects the experience of its employers. This sensitivity of rates to occupation and industry (and at a later stage of the premium setting process, the individual experience of larger employers) is one of the great strengths of the workers' compensation system. A second determinant of rate submissions is an allowance for the expenses associated with servicing customers. These include factors such as commissions, safety programs, and general overhead. A third factor in rate submissions is that of allowable profits. Another factor sometimes used to determine the validity of submitted rates is the role of income from investments. Between the time premiums are collected and paid out to injured workers, insurance companies may earn income on these funds. A frequently debated issue at rate hearings is what role this income should have in determining rates.

In addition to the basic rate that is approved for each of the approximately 600 class codes, the insurance department sets other dimensions of the workers' compensation insurance contract. These include experience and retrospective rating plans by which individual employer claims are used to adjust premiums. Also subject to state approval are the general structure of dividend plans, rating adjustments schedules that allow premium adjustments based on workplace characteristics (such as safety programs and the presence of health professionals), and the use of deviations in the class rate that can
be applied to all of the insurer's customers. An important part of the debate as to the efficiency of the administered pricing system is whether these devices introduce enough flexibility into the pricing process so that a competitive result is approximated.

Open Competition

In the open competition states, insurers are generally allowed to use whatever rate they choose without the need for state approval. In some states insurers merely use their rate and then file it with the insurance department ("use and file" systems). In other states rates must be filed before they may be used ("file and use").

In all open competition states, the rating bureau (or its successor, the data service organization) still plays an important role. Rating bureaus still develop rates that are submitted to the insurance department and used as an actuarial reference point. In some states, these rating bureau submissions include the full range of loss and payroll information, expenses, and profits. In other open competition states, the bureau is limited to submissions based on loss and payroll experience and a narrow range of expenses associated with servicing claims. In the states doing the most to encourage competition, the rating bureaus are limited to pure premium rates, which are rates based solely on loss and payroll experience without allowance for expenses or profits.

3 The features of the open competition laws in each of the states are reviewed in General Accounting Office, 1986.
THE THEORY OF WORKERS' COMPENSATION PRICING

Justifications for Administered Pricing

In a society that generally relies on the forces of the competitive marketplace to set prices, why have workers' compensation insurance prices traditionally been determined by government agencies? There are two reasons widely used to explain the government's role in pricing workers' compensation insurance. First, the workers' compensation liabilities being insured are mandated by the state. As such, it is very important that workers actually receive the benefits to which they are entitled. Some people feel that if insurance companies are encouraged to be vigorously competitive, they will cut prices with troublesome results. According to this scenario, in a free marketplace, some insurers will inevitably cut prices too low in pursuit of competitive advantage. Many benefits to workers are paid out over a very long time period, and the temptation to overly discount these benefit obligations is seen as too tempting for the insurance company under strong competitive pressures. Those insurers that succumb to this temptation to cut prices below costs will then go bankrupt and their obligations to injured workers will go unfulfilled.

According to this view, the solution to this insolvency problem is to limit insurers in their pricing behavior so as to guarantee that prices fully reflect anticipated losses and that injured workers will be paid benefits. Administered pricing is seen by some, therefore, as a device to increase the certainty that injured workers or their survivors will receive their benefits.

The second major reason used to justify administered pricing of workers' compensation insurance premiums is the need for centralized collection of
data. As noted above, one of the great strengths of the workers' compensation system is its finely-tuned relationship between the amount of claims generated by an employer and the premiums paid by that employer. This serves an important role in encouraging accident and disease prevention. This close relationship between claims and premiums is achieved by using a combination of manual (or class) rates, which differ for each of approximately 600 industrial and occupational classes, and by various modification of these class rates based on individual employer experience. In order to develop a set of manual rates that accurately reflect the experience of the industry and occupation within the state, claims data must be tabulated from virtually all employers. With data from most employers, manual rates can be published that accurately reflect the relative risk of workplace injury associated with each class.

Data on the relative riskiness of various classes also allow many insurance companies to accurately assess the potential exposure associated with providing coverage to an employer. The insurer is thus readily able to offer insurance to employers with whom they have not had prior workers' compensation experience. This centralized body of data thus encourages a marketplace with numerous potential insurers, since all sellers have enough information about each class to prepare bids for any given employer.

The value of a centralized database, as a device for accurately relating claims and premiums and as a device for encouraging competition by giving widespread access to necessary information, is often used as a justification for administered pricing. The notion is that insurers must be compelled to submit data and adhere to the prices implied by the data; otherwise, the
quality and very existence of the data base will be in jeopardy. This conclusion, however, is a non sequitur. The common data base is clearly an important feature in the marketplace. While it is appropriate that all insurers be compelled to submit claims and payroll data, there is no need for mandatory adherence to the implied rates.

Insurance companies must be compelled to submit data because, under a voluntary system, each insurer's optimal strategy would be to use the information generated by the data base but not to incur the cost of submitting its own data. Of course, the quality and usefulness of the centralized data base would be lost if a substantial number of insurers pursued such a strategy.

The value of the database information to the overall workers' compensation system is in the determination of the relative riskiness of an insurance class. Once this role has been fulfilled through the mandatory submission of data, there is no need for rules that require adherence to the rates. Prescribed rates, particularly those that include expenses and "allowable" profits, are not justified by the need to obtain and disseminate high quality data on the riskiness of various industry and insurance classes within the state.

Justifications for Competitive Pricing

The rationale for competitive pricing of workers' compensation insurance is really the same as that used for competitive markets with other products and services. It is simply the empirical observation that markets with

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4 The case for administered pricing based on database issues is presented in American Insurance Association, 1982.
numerous sellers, having flexibility in pricing and independently vying for
customer favor, tend to yield the best results for customers. The most recent
dramatic examples of the efficiencies of competition come from studies that
considered those industries that were deregulated in the late 1970s and early
1980s. For example, a recent study of airline deregulation found that
customers are saving $6 billion annually as a result of competitive pricing
(Hazeltine, 1987).

In the workers' compensation insurance market, as well as other
administered pricing systems, prices are sometimes above and sometimes below
those that would occur under open competition (the empirical evidence on this
issue is reviewed in the following section). When state-established prices
are above the level that would occur under competition, insurance companies
obviously find it very profitable to sell their product to additional buyers
and accordingly attempt to do so. In this quest for additional customers,
insurers are likely to be willing to make the product more attractive or to
lower the effective price. Because the price and the basic nature of the
insurance contract are regulated by the state, insurers are limited in what
they can do to make themselves more attractive to potential buyers. However,
most administered pricing environments offer some flexibility. As an example,
insurers can increase the quality of their safety or claims handling services.
Furthermore, on the price side, they can defer the due date of premium
payments and make vigorous use of available schedule rating credits for
factors such as cooperativeness with the insurer, safety programs, or the
presence of health care professionals at the worksite. Insurers anxious to
sell can also offer employers discounts on nonregulated lines of insurance if
their purchase is tied to the workers' compensation insurance contract.
These indirect devices serve a very important social function in bringing the effective price of workers' compensation insurance closer to the competitive level when the regulated price is too high. Unfortunately, the pressure to use such price-adjustment mechanisms is limited mostly to larger firms, in part because they are large enough to make customer services or other lines of insurance viable, but also because such firms typically have the option of self-insurance. If reasonably priced commercial insurance is available, it will generally not pay to use the self-insurance option. However, when the price of workers' compensation insurance set by regulators gets substantially above the competitive level, the self-insurance option becomes attractive. For the most part, it is only the larger firms that have this option. The key feature of self-insurance is that it gives the employer an alternative to commercial insurance at the regulated price. The presence of this option thus encourages commercial insurers to use the various indirect price-cutting and quality-improving devices to make their product more attractive to potential self-insurers.

The lack of a readily available self-insurance option for small businesses serves to lock them into the regulated-price commercial insurance system and thereby reduce the pressure on commercial insurers to indirectly lower their prices to small businesses. The unpredictability of claims with a small firm does not allow risk-spreading within the firm. Therefore, to the extent administered pricing results in "list prices" that are above the level that would prevail under competition, small businesses are the most likely to be affected. While competitive rating does not enhance the ability

5 Small firms sometimes form self-insurance groups to achieve some of the advantages of this form of insurance. See Chelius and Smith, 1985, for a discussion of this issue.
of small firms to self-insure, or deny this option to large firms, it reduces the need for this form of insurance.

If the workers' compensation system is like other administered price arrangements, prices are sometimes below the level that would prevail under competition. In this situation, sellers are, of course, not anxious to extend their business. If the situation persists, insurers may even refuse to renew coverage for existing customers. Since workers' compensation insurance is mandatory in every state, a residual market mechanism (most typically an assigned risk pool) is established to provide coverage for those employers not able to obtain insurance in the voluntary market. The most obvious problem of assigned risk pools is that employers generally do not like to be forced into coverage with a particular insurer. The firm cannot expect the kind of service that would be received from an insurer anxious to have its business. More fundamentally, the problem of assigned risk pools is that they distort the relationship between premiums and claims that is so important to the workers' compensation system. Pool participants are effectively subsidized by the employers in the voluntary market since any losses above the premiums collected from pool participants are shared by insurers in the voluntary market, and thus, ultimately by the employers obtaining insurance in that market.

The workers' compensation insurance market can be seen to be distorted by the rigidities of the administered pricing system. These distortions are likely to be most damaging to small businesses because they have fewer options for amelioration of high administered prices through indirect price cutting or

6 Rates below the competitive level may not be the only reason for assigned risk pools (see Chapter 2 of this report). Under this arrangement employers are placed with a participating insurer who receives a service fee.
self-insurance.7 However, if greater reliance on market forces is to be a viable alternative, at least three conditions must be met. First, there must be a market structure that can be relied upon to encourage competitive results. A second condition must be a mechanism to guarantee that worker benefits will be paid even in the event of insurance company bankruptcy. A final condition is the maintenance of a high quality database to determine the relative riskiness of the various industrial and occupational classes. In the following section, the evidence on the operation of the workers’ compensation insurance market under competitive rating is reviewed. In this section, we examine whether these conditions have been sustained in the openly competitive markets. We also consider the impact that competitive rating has had on the price of insurance.

**EMPIRICAL EVIDENCE**

In this section, we examine the existing evidence on the impact of open competition on the workers’ compensation insurance market. Since fears of insurer bankruptcy and deterioration of the actuarial database under competition are often expressed as reasons for keeping administered pricing, we first review the experience on these issues. The structure of the workers’ compensation insurance industry is then considered. Some who feel competition

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7 In our 1985 SBA report (Chelius and Smith, 1985) we did find some evidence that "standard earned premiums" (premiums as adjusted by experience rating, but not inclusive of the expense constant or dividends) per dollar of benefits paid out were lower for medium-sized firms than for either large or small ones. However, the effective premiums of larger firms are often substantially reduced by dividends. Also, because large firms can opt for self-insurance or receive indirect price cuts, they are less disadvantaged by the administered price system than are smaller firms.
is generally a useful device for setting prices are concerned that in the
particular case of the workers' compensation market, the industry structure is
not conducive to competition. The major portion of our discussion on the
performance of open competition is directed to the issue of its impact on the
price of insurance. This is the issue that is most directly germane to the
special concerns of small business.

Insolvencies and the Database

In discussing the potential problem of insurance company bankruptcy under
vigorous competition, state insurance department officials and insurance
industry executives could identify no insolvencies that resulted from the
initiation of competitive rating in workers' compensation. This, of course,
does not mean that such a problem could not occasionally occur. Rather, it
implies that it is not a systematic problem that should hinder the use of open
competition, if it is otherwise found desirable.

Each state, regardless of its pricing system, has chosen to provide a
mechanism for guaranteeing worker benefits. The arrangement used is a
guarantee fund that is financed by assessments on the insurance industry (and,
ultimately, the purchasers of insurance). Guarantee funds are sometimes
specific to workers' compensation, although most states have funds that apply
to a broad range of insurance. Insurers may be charged on an ongoing basis or
after an insolvency occurs, depending on the specific state law.8

If insolvencies were to become a significant problem, the method of
charging successful insurers and their clients may have to be reevaluated.

8 See Larson and Burton, 1981, Chapter 6 for a fuller description of
insolvency funds.
While the obligation to injured employees must remain inviolable, it is not obvious that charging other insurers is the optimal mechanism for addressing the problem. Fortunately, at least as a matter of open competition, the issue has so far been moot.

Similarly, there does not appear to be a problem with maintaining the quality of the actuarial database under open competition. Each competitive rating state still requires all insurers to submit claims and payroll data to the rating bureau or the data service organization. Such a statutory obligation is clearly consistent with both competitive rating and achievement of the advantages of broad-based actuarial data. In none of the competitive rating states has there been a problem implementing any new database provisions of the law or, as has been done in several states, continuing the old arrangements.

As demonstrated by this review of the two issues most often used to discourage open competition laws, there has not proven to be any cause for concern. This does not mean, however, that open competition is advantageous, either in general or to small business in particular. It merely implies that it is not prone to these problems. Lack of a such problems is necessary for serious consideration of open competition, although it is not a sufficient condition for its superiority.

Industry Structure

As a generalization, it is clear that the private workers' compensation insurance industry is quite unconcentrated and thereby structurally amenable to vigorous competition. Across the nation, the largest four workers' compensation insurers account for about 25 percent of the market. The eight
largest private insurers have approximately 40 percent. Furthermore, entry into a particular state's workers' compensation insurance market is reasonably easy. The only elements of monopoly in the industry are the state insurance funds (that in six states are literally monopolies, or that in other states compete with private insurance). These state funds can be distortions in the market because they are usually subsidized at least to the extent that they do not pay taxes.

As a part of their open competition laws, three states mandate that the structure of the state's workers' compensation market be periodically assessed. These studies of Illinois, Michigan, and Oregon are an excellent source of specific information about the structure and competitiveness of the marketplace.

**Illinois.** In this state, an analysis of the workers' compensation insurance market was conducted after one year of operation under competitive rating (Illinois, 1984). The Illinois Insurance Department noted that "[t]he Federal Trade Commission has adopted a general view that if the top four sellers in an industry represent less than 50% of sales, or the top eight less than 70% of sales, it is unlikely any seller or group of sellers can control market performance" (Illinois, 1984, p.7). In 1983, the top four workers' compensation insurance companies in Illinois had only 18 percent of the market, while the top eight had 27 percent. Even the top 25 companies had

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9 Ease of entry may well be the best guarantee of a competitive market. Whatever the structure of the market, if there are extraordinary profits generated by the presence of noncompetitive prices, new insurance companies can enter and capture business by cutting prices. These "new" insurers need not even be newly formed; rather, they can be ongoing companies currently operating in other states.
only 57 percent, clearly a very unconcentrated situation. Another indication of the competitive structure in Illinois is that among the top 25 in 1983 were seven companies that had not been on that list in the prior year.

Michigan. This state has had the most complete and regular reports on the structure of the industry—each year a preliminary and final report on the state of competition in the workers' compensation insurance market is issued.10 Using the concentration ratio standard, the market appears quite decentralized (Michigan, 1986). The top four carriers had 25 percent of the market and the top eight had 37 percent. The Michigan analysis also develops concentration ratios for affiliated groups of insurers that are part of the same corporate organization.11 Concentration ratios on this basis are 30 percent for the top four and 49 percent for the top eight.

The United States Department of Justice uses the Herfindal-Hirshman Index—a more elaborate measure of market structure—in its decisions about the impact of mergers on competition. Michigan also analyzes its market structure using this more sophisticated measure.12 Using this index of the

10 As will be seen in the later discussion, the most thorough analysis of the price effect of open competition concerns Michigan. Michigan is, fortunately, a very useful reference point. Among the open competition states, its statute is one that places very heavy reliance on market forces.

11 Insurers frequently establish separate companies that specialize in particular types of business.

12 "The [Herfindal-Hirshman] H-Index is calculated by squaring the market share of each firm within an industry and summing across all firms. An important characteristic of the H-Index is that, by squaring the market share of each firm, it weights larger sellers more heavily...Under the Justice Department guidelines, a market with an H-Index in excess of 1,800 is considered highly concentrated...An industry with an index value between 1,000 and 1,800 is considered to be moderately concentrated...A market with an H-Index of less than 1,000 is considered to be unconcentrated." In 1985, the H-Index for the Michigan workers' compensation insurance market was 404.4
concentration in the market, which more heavily weights the role of the largest sellers, the Michigan Department of Insurance nevertheless concludes the market is structurally conducive to competition.

**Oregon.** A similar story of an unconcentrated market among private insurers is told in the analysis by the Insurance Commissioner's Report in Oregon (Oregon, 1985). This report finds that the largest eight sellers had only 39 percent of private market in 1983. The one disquieting note in the Oregon market share analysis is that the state fund has almost half of the workers' compensation business in the state. Although stated in the positive context of allaying fears of a private industry cartel, this large share of business by a single insurer could become troublesome (Oregon, 1985, p.30). Any competitive advantage held by a state fund is likely to be due to the implicit subsidy inherent in the fact that such funds are not liable for taxes (Worrall and Butler, 1986). With this advantage, and if it followed an aggressive pricing policy, a competitive state fund could easily come to dominate a market. At this point, this concern appears only to be a fear rather than an actual problem.

**Pricing**

The heart of the matter on the desirability of open competition is its impact on the price of insurance. The nature of the workers' compensation product is really quite straightforward—it is basically dictated by the using the corporate groups as the basis of the calculation. "The implication is that the overall degree of concentration in the workers' compensation insurance market is not high enough to generate serious concerns about the competitiveness of the market" (Michigan, 1986).
benefits and eligibility standards of the state. The question becomes one of which price determination mechanism can deliver the "product" at the lower price. Although the question is straightforward, the empirical evidence needed for an answer is quite difficult to obtain.

The fundamental problem of the empirical analysis is that the actual transaction price of insurance under an administered system may not be the price set by the state. When the forces of competition are formally ignored as they are under administered pricing, these forces may well be manifest in ways other than through the explicit "list" price. Consider the situation in which the regulated price of insurance is above the level that would prevail under genuinely open competition. With the extra profit now implicit in this price, each insurer is desirous of additional business. This extra margin of profit gives the incentive for insurers to devote extra resources to the pursuit of this attractive business.

Under normal competitive circumstances, a primary device for obtaining this business would be to cut the basic price. However, when the list price dimension of the insurance contract is constrained, other devices can sometimes be used. An important mechanism for cutting the effective price in many administered price environments is the use of schedule rating credits. Although the general structure of these credits must be approved by the state, their application to particular employers is at the discretion of the seller. Therefore, if the bidding for a particular employer's insurance business is competitive (yet constrained by administered prices), the insurer may well choose to be more generous in its willingness to give schedule credits. The credits typically are allowed for fairly subjective aspects of the employer's business—including such things as quality of safety programs and their
cooperativeness with the insurer. Therefore, the credits can usually be justified if the competitive situation warrants them. Similar competition within administered price environments can occur on the basis of dividends, discounts on nonregulated lines of insurance, and improvements in product quality such as claims service and safety consulting.

While such indirect ways of lowering the price of insurance are very desirable in that they reduce market distortions, their nature makes it very difficult to determine exactly what is the real price paid for insurance. The adjustments are often specific to individual employers. As will be demonstrated shortly, this problem of knowing the effective price has severely limited the number of studies in which one can have confidence in the results.

Unfortunately, the indirect adjustments to price are more than just an inconvenience to researchers. Their role also demonstrates one of the weaknesses of the administered pricing system. Many observers of the workers' compensation insurance market feel that there is little or no difference in the effective price under open competition and under administered pricing. They base this judgment on the fact many employers are able to obtain substantial adjustments to the administered price.13 Knowledge of the going price, however, is also an important lubricant in the competitive mechanism. When the factors that determine the effective price are hidden discounts and other informal modifications to the basic rate, it becomes difficult for other employers to know the extent of discounts for which they might be able to bargain.

This lack of explicit information about effective prices is more of a

13 If administered pricing is considered desirable because its prices are essentially competitive, it would appear useful to facilitate that result with open competition.
problem for small than for large businesses. Larger businesses, particularly with the self-insurance option, are more likely to receive bids from various insurers who desire their account. Small businesses are much more likely to have to rely on generally available information. Such information is more difficult to obtain if the effective price is hidden in a complex contract that may even include discounts on lines of insurance other than workers' compensation.

Another factor complicating the investigation of the price impact of open competition is its relatively recent introduction. It is certainly possible that the immediate price impact associated with the introduction of open competition will not be the same as the long-term impact. In the beginning phases of a newly competitive environment, insurers may attempt to maintain or expand their share of the market, even if this requires a lower price than would be acceptable in the long-run. While market-share oriented strategies that do not maximize short-term profit may be appropriate and successful for a time, they are not likely to last. It is possible that insurers may embark on such a strategy with the hope that customers will stay with them after prices return to levels that are consistent with acceptable profits.

The most complete and empirically credible studies of the price effects of open competition have come from Michigan's ongoing evaluation of various aspects of its workers' compensation system (Burton et al., 1985). As a part of this analysis, the impact of open competition in other states has been examined. These studies estimated that, as of 1984, workers' compensation insurance prices had dropped about 10 percent below what they would have been under administered pricing (Hunt et al., 1987). The estimates ranged from a drop of 34 percent in Oregon to an increase of 4 percent in Rhode Island.
Other states' effects were a 3 percent decrease in Arkansas, an 8 percent decrease in Georgia, a 12 percent decrease in Illinois, a 2 percent decrease in Kentucky, a 26 percent decrease in Michigan, and no impact in Minnesota. The basis for comparison in these open competition states were simulations of what administered prices would have been based on estimated effects of schedule rating and policy discounts.

Whereas this broad study of all states that had competitive rating at the time used simulations of effective prices under administered pricing for comparison, another study by the same researchers examined Michigan using more definitive information on what Michigan prices would have been if administered pricing had remained in effect (Hunt, et al., 1986). This analysis was based on extensive data collected by the Compensation Advisory Organization of Michigan. It was concluded in this research that in open competition's initial year (1983), insurance costs were 25 percent below what they would have been under the old system. In the second year the price reduction was 30 percent; however, in the third year the reduction declined to somewhere between 10 and 15 percent.

The evidence that workers' compensation insurance prices were lower under competitive rating than they would have been under administered pricing is quite clear. There are, however, several caveats that should be considered

14 This organization is the successor to the rating bureau. Its current role is to develop actuarial information on the claims and payroll experience across all of Michigan class codes. Michigan is unusual even within the open competition states, in that these data may not include allowances for actuarial projections or trends, profits, or expenses other than narrowly defined loss adjustment costs. In many other open competition states, the rating bureau's published rates may include such factors. Insurers may then file rates with the insurance department simply by referring to the rates developed by the bureau. Although within the open competition states insurers are not forced to adhere to the bureau's rates, some feel that this development of full rates is conducive to cartel-like pricing.
before concluding that open competition is the superior system. As noted above, the social goal for the insurance pricing system is to transmit a given package of benefits to injured workers at the lowest long-run price to employers. It is possible that the lower prices observed during the start-up phase of open competition might not be sustained over a long time period (General Accounting Office, 1986).

Coincident with the initiation of open competition was a period of very high real interest rates. One of the ways that an insurance company can make a profit is to invest the premiums that it collects during the time before the money must be paid to injured workers. If interest rates are high enough, insurance companies can still profit even if premiums are not sufficient to cover underwriting losses. In a period of high real interest rates insurance companies are very interested in collecting premiums and are willing to lower prices to increase the volume of their business (McGee, 1986). Under administered pricing, however, the inherent rigidity of the regulatory process makes prices slow to respond to such forces. Openly competitive prices can, of course, respond more quickly. The quicker response of competitive prices has another side, however, in that during low interest rate periods premium levels are going to increase more rapidly than they would under administered pricing. While the quicker response to broad economic forces is likely to serve the cause of a more efficient marketplace, a complete assessment of the price effect of competition should include periods of both high and low interest rates.

The existing evidence covers only a period of high real interest rates. Studies of the use of competitive rating in automobile insurance found that prices do respond more rapidly to interest rate changes both when interest
rates are increasing and when they are decreasing (General Accounting Office, 1986a). Anecdotal evidence indicates that during the relatively lower interest rate period of the late 1980s, the price of workers' compensation insurance has increased more rapidly in the competitive states than in the administered price states.

Another factor complicating our judgment about the price impact of competition is that insurers may have been temporarily lowering premiums in an effort to increase market share. As noted above, this might lead to a greater price reduction in the short-run than is sustainable in the long-run. Unfortunately, no evidence is available on the quantitative impact of this phenomenon.

Having qualified the conclusions of the studies on the price effects of competition, it is still apparent that, on average, competition has been associated with lower workers' compensation insurance prices. This is consistent with the price impact of competition in other areas of the economy that have been deregulated (Hazeltine, 1987). While one might quibble about the exact magnitude of the price effect, its general direction is clear. ¹⁵

A key focus of this report is the impact of this competitive process on the small business community. There have been no empirical studies that directly measure the specific impact on small employers compared to their larger counterparts. For insight into this dimension of the issue, one must infer conclusions based on the general results and the unique features of small business in the workers' compensation insurance market.

¹⁵ Our examination of expense constants in Chapter 2 indicates that premiums of very small firms would go up by about 8 percent if administrative expenses were fully covered. Therefore, if the price impact observed in Michigan is generally valid, even the very smallest firms would realize a net benefit from open competition.
Small Business

Under an administered price system, there is a standard allowance for expenses that is charged to each insurance contract. The state-approved formula for these expenses is stated in terms of a fixed amount that applies to each contract, no matter what its size, and a variable portion that is based on the amount of premiums. The expense constant, as the fixed amount is called, is a trivial concern for most employers. However, for very small employers, this constant is an important component of the premium. In most administered price states, the expense constant is significantly below the actual level of these expenses (see Chapter 2). This situation sometimes results from lobbying efforts on behalf of small businesses. In other states, it apparently arises spontaneously from the desire on the part of elected and appointed officials to curry favor with the small business community.

The establishment of the expense constant at a level below actual cost has created the impression among many observers and participants in the workers' compensation insurance market that the administered price system is advantageous to the small business community. What is really occurring, however, is that the artificially low expense constant reduces the price of workers' compensation to very small employers while causing compensatingly higher premiums to be charged to slightly larger firms that are still considered small businesses. As noted in footnote 15, this minor redistribution of premium charges should not divert attention from the apparently larger overall price reductions available under open competition.

A key feature of competitive environments generally is their greater flexibility—both in terms of price changes and the other dimensions of the
contract. An excellent example of the rigidity of contract terms under administered pricing within workers' compensation is the almost universal use of the same formula for experience rating employers. The only significant exception is in the monopoly state fund environment of Washington (see Chapter 3). While we have no actuarial problem with the conventional formula, which gives very little weight to the experience of small employers, it seems improbable that it is the only way to relate an employer's premium to its injury rate (National Council on Compensation Insurance, 1982). Yet, in the administered price environments, the conventional formula is the only one allowed.

Our use of the conventional experience rating formula as an example of the contracting rigidities of administered pricing may not be entirely compelling, because the unique small business credit arrangements in Washington have not yielded any noticeable effects on safety (see Chapter 3). Further, insurance companies in the open competition states that allow changes in the experience rating formula have not chosen to do so. Yet, a valid point remains that one of the chief weaknesses of the administered pricing system is a need for bureaucratic approval for new ways of doing business. This, of course, discourages innovation. Small businesses would appear to be the employer group with the most to gain for such innovation. Their larger counterparts with a readily available self-insurance option are positioned to obtain the most flexible responses out of the administered price system.
CONCLUSION

The focus of this study has been the impact of competitive rating on the small business community. Competitive rating has worked in the nine states currently using it without the insolvency and database problems anticipated by many. The structure of the workers' compensation insurance market has also been found to be conducive to vigorous competition among insurers. Most strikingly, the price of insurance appears to have fallen an average of 10 to 15 percent below what it would have been under administered pricing. The generalizability of this conclusion over the long-run must await evidence on comparative prices over the full underwriting cycle.

Most of those who prefer administered pricing, yet recognize that insolvencies, database quality, and market structure are not problems of open competition, base their preference on the notion that the adjustment mechanisms within administered pricing are flexible enough to yield a competitive outcome. However, if administered pricing seems to yield a competitive outcome, why not guarantee this result for small as well as large businesses by making competition an explicit part of the pricing process? Large employers are likely to receive a competitive price because of their self-insurance alternative. Policies such as legalizing and encouraging self-insurance by groups will help to yield this result for small businesses.16

The greatest advantage of the competitive rating system to the small business community would appear to be in the flexibility that would likely become a more important characteristic of the marketplace. Innovation in

writing workers' compensation insurance for small businesses currently appears to be flourishing only in the group self-insurance movement. However, features such as cash awards for good safety records and bonuses for inspectors based on client safety improvements may become more widespread if the marketplace became more thoroughly competitive.

The movement to more explicit competition in rate-making holds some risks for the very smallest of employers. Particularly in those administered pricing states where the expense constant has been artificially held below real costs, there could be some increases in premiums above those that would occur under dictated prices. Also during periods of falling interest rates, competitive prices may increase more rapidly than administered prices. In the long run, however, the economic efficiency and flexibility associated with competition will yield a system that is more responsive to the needs of small employers.
Chapter 2

The Use of Assigned Risk Pools in Workers' Compensation Insurance
INTRODUCTION

Recent publicity about the difficulty many firms and municipalities are having in obtaining liability insurance draws attention to one of the largest segments of the business insurance market and the methods it has used to cope with problems of insurance availability. Workers' compensation laws have, for most of this century, mandated that employers pay employees' indemnity and medical benefits for injuries incurred on the job. All workers' compensation laws also mandate that employers insure this potential liability to their employees. Large employers may, with government permission, self-insure their risk; however, for the vast majority of employers this requirement to insure means they must purchase commercial insurance.

There are three basic market arrangements used for the sale of workers' compensation insurance. In most states private insurance companies and self-insurance are the only means of covering one's risk. In some states, a government-run insurance fund competes with these private arrangements. Finally, in six states the government fund has a statutory monopoly over the workers' compensation insurance market.¹

Because workers' compensation insurance is mandatory, the prices that private insurance companies can charge for their policies have been strictly regulated, until very recently, in all states. While in the last five years a handful (10) of states have moved away from regulating workers' compensation

insurance prices, most states still require approval of all premium rates by a state agency. In this traditional setting, proposed rates are in most states developed by the National Council on Compensation Insurance (NCCI) based on the actual and projected loss experience within each of 600 insurance classes (industries), with allowances also factored in for taxes, profits, interest earned on invested reserves, and administrative expenses. The state regulatory boards then either approve the proposed rate schedule or make across-the-board increases or decreases in the process of setting what are known as "manual rates" in each insurance class. Because of this process, states can vary widely in the rates they allow, and the profitability of writing certain policies will consequently vary across states.

An employer may be rejected as a client by an insurance company for two basic reasons: (a) the employer's expected losses may be very high relative to what the insurance company is allowed to charge, or (b) the cost of administering the insurance policy may be high relative to what clients can be charged for insurance. When insurance is mandatory, yet insurers can reject potential clients, a mechanism must be set up to allocate the unwanted customers to insurers in some acceptable way.

In states with a governmentally-run insurance fund, either monopoly or competitive, essentially all employers can receive coverage through the state fund. In the states without a government fund, however, employers that cannot obtain coverage in the voluntary market are placed in an "assigned risk pool." Such pools are not just an incidental part of the market; in 1982, for example, they accounted for approximately 8 percent of total premium volume, with four states having pools that wrote over 20 percent of their total
premiums. If a firm is placed in a pool its coverage is assigned to a carrier that receives the premium, and a service fee is paid by the pool (typically 30 percent of premium). Any losses for that business that are greater than premiums are spread across all insurers doing business in the state in proportion to their sales -- and eventually back to the employers in the voluntary market.

As anticipated by the insurers who refused to voluntarily write their business, policies in assigned risk pools typically generate substantial net losses. In 1984, for example, the net operating loss of assigned risk pools was $263,636,000 -- a sum calling forth a significant subsidy to unwanted customers. Another interesting characteristic of assigned risk pools, however, is that the smallest firms are those most over-represented in assigned risk pools despite the fact that, as a group, they are among the safest firms in each industry. Table 2-1 documents the over-representation of very small firms, with the data displayed there indicating that such over-representation is confined to firms of 3 or fewer employees. These data suggest that many firms are placed in assigned risk pools for reasons of relatively high overhead costs, not because of adverse expected losses.

The research reported upon here involves analyzing the use of assigned risk pools, with particular focus on the insurance pricing variables causing

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3 The very smallest policies -- those with premiums under $100 -- are underrepresented in assigned risk pools. These policies are typically written for part-time household or professional workers as an add-on to property/casualty/liability policies. These add-ons cover risks that are negligible and are done as a favor to secure the other policies, according to Thomas Schell, who formerly worked with assigned risk pools managed by the NCCI.
higher uses of the pools. It is important to understand the variables causing an insurance policy to be regarded as nonprofitable, especially now that deregulation of insurance pricing is becoming more popular. Our primary interest is in identifying the pricing components especially relevant to small businesses, with a concern for trying to predict how such deregulation might affect the workers' compensation insurance costs of small firms.

UNDERLYING POLICY ISSUES

One of the primary purposes of the workers' compensation system is to charge employers for the cost of injuries generated by their economic activity. This role appears to take on added importance as we realize that governmentally-mandated standards enforced by inspections, the other major regulatory technique for controlling occupational safety, has been largely unsuccessful.4

If a firm has a workers' compensation insurance premium of at least $2500 per year (roughly, 8 employees), it is eligible for at least partial experience rating. For small employers, the influence of one's own experience is relatively modest (see Table 3-1 in Chapter 3). Larger employers, for whom past experience is a more reliable indicator of future loses, are eligible for substantial debits or credits to their manual premium. In an average classification and payroll, employers with 1750 employees have premiums based exclusively on their own previous experience. Typically, under price

regulation, carriers may not charge an extra premium beyond the standard premium allowable (with experience modifications) to an undesirable client. Four states do allow surcharges of from eight to fifteen percent of premium for those in the assigned risk pool.

Because the experience rating of premiums often does not fully reflect the loss experience of individual firms, insurers will be reluctant to write policies for imperfectly experience-rated employers with safety records that are considerably worse than the average for their insurance class. As will become clear in our analysis, users of assigned risk pools typically pay substantially less in premiums than they generate in losses. Thus the goal of encouraging prevention by requiring payment for employee injuries is systematically distorted by the extensive use of assigned risk pools.

A second issue has to do with administrative expenses. Many government regulatory programs require firms to undertake activities that are subject to economies of scale in their implementation; that is, these activities require a certain amount of overhead expenses, with the result that they are less expensive per worker or per unit of output if the firm is large. It has been argued elsewhere (Chelius and Smith, 1986) that the administration of workers’ compensation insurance policies is subject to these scale economies and that attempts to soften the burden on small businesses have led to premiums insufficient to cover costs in many cases. Hence, small firms are over-represented in assigned risk pools despite the fact that they are usually among the safest firms in each industry.

Of special relevance to small businesses is the "expense constant" that is added to each insurance policy written. This expense constant is intended to cover the fixed costs of writing and servicing each policy, and the expense
constants currently approved in most states are in the $60-75 range. The National Council on Compensation Insurance (NCCI), which calculates rates in most states, has recently estimated that the true fixed costs per policy are more like $120, but the approved expense constants typically lag behind the NCCI's recommendation by several years. The predictable result -- a prediction to be tested in this research -- is that by understating the administrative costs that can be recovered by insurers, small firms have been deemed undesirable customers and have been required to obtain insurance through assigned risk pools.

It is important to estimate how the use of assigned risk pools responds to changes in the allowable expense constant, for three reasons. First, while there has been speculation that inadequate expense constants have driven many potential clients -- especially small ones -- into assigned risk pools, the assertion has never been rigorously tested. Second, if open competition becomes more widely adopted and insurance rate-making is accomplished by competitive forces, the recoveries of overhead costs may rise for small clients, and an estimate of how large the increases might be are important to know. Finally, the NCCI's procedures for estimating required expense constants are based on accounting data sent to them by insurers. The quality of these data have never been evaluated, and it would be interesting to obtain some sense of the adequacy of expense constants from the behavior of insurance companies rather than the reports they file.\(^5\)

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\(^5\) Economists are usually more convinced by the way people behave rather than by what they say about their behavior. Accounting data on overhead costs may be kept in ways, or submitted with goals, that misstate the true fixed costs of writing an insurance policy. Our goal is to achieve some independent evidence on a component of insurance costs that is especially significant for small firms.
THE THEORY OF INSURANCE AVAILABILITY

The economics of insurance availability is, in most respects, quite straightforward. There are a set of market-clearing prices at which insurers would be willing to insure the liabilities of employers with varying expected losses. Greater uncertainty about the magnitude of these expected losses can be compensated for with a higher premiums. As noted above, however, there are institutional rigidities that may keep buyers and sellers from trading at a mutually satisfactory price. The most obvious hinderance to transacting at the market-clearing price is the rate regulation used in most states. If prices are set above the market-clearing price, insurers can adjust the non-price margins of their offered contracts or proclaim price-sensitive customers to be eligible for a discount. Payment schedules, prevention services, and quality of post-injury service are examples of non-price dimensions of the contract that can be adjusted if the state mandated price is too high. It is an empirical issue for another analysis whether such mechanisms allow buyers and sellers of insurance to exchange obligations under terms similar to those that would occur under open competition.

Similarly if state-mandated prices are set below the market-clearing level, there are adjustments that insurers can make to lower the quality of their services. However, given that the basic product of workers' compensation insurance is the promise to pay benefits that are determined by the state, the insurer has limited ability to respond to a low price. Under such circumstances, the prudent business decision may dictate refusing to write the coverage. Employers unable to obtain coverage are then placed in
the assigned risk pool. As the administered price goes farther below the market-clearing level, more employers would be considered to be bad risks.

The discussion to this point suggests that four variables will have a critical effect on the usage of assigned risk pools. Each of these variables is discussed in detail below.

**Ratio of Incurred Losses to Allowed Premiums**

We noted above that states vary considerably in the regulation of workers' compensation insurance premiums. In some states, the insurance lobby may be relatively strong, while in others there may be strong sentiment for holding rates down no matter what the circumstances. In the former states, a higher percentage of potential customers will be regarded as profitable by private insurers than in the latter states.

One way to measure the overall "adequacy" of approved premiums in a state is to calculate the ratio of incurred losses in that state to the premiums collected (we call this LPRATIO). In our sample of data, which covered the years 1980-85, LPRATIO had a mean value of .76 — meaning that in the typical state losses were 78% of premiums. However, the standard deviation was .16, which suggests that it was not uncommon to find some states with ratios of .62 and others with ratios of .94! One state had a ratio above 1.0 in all six years, while in another the ratio rose above .7 in only two of the six years. In most states the ratio varied somewhat over the period.

Our empirical measure of LPRATIO is lagged one year; that is, we hypothesize that the use of assigned risk pools in a given year is influenced by the prior year's LPRATIO. We use a lag because insurers must write policies in advance of knowing outcomes, so that their best predictions of
profitability will be dependent on prior experience.

Expense Constants

The premiums for each employer are derived by adjusting the manual premium for experience rating and any discounts and then adding the expense constant. States also vary in the expense constants they approve. In 1980, for example, the vast majority of states allowed a charge of $35 per policy despite the NCCI's recommendation in 1977 that the expense constant be $60. By 1982, $60 was the modal expense constant, with a few states charging $75 and an equal number charging $35 or less. However, by 1982 the NCCI was recommending an expense constant of $120! In our sample, which covers the 1980-85 period, the mean value was about $55 but the standard deviation was $23. Denoting the expense constant as $EXPCON$, we hypothesize that increases in $EXPCON$ will reduce the share of the insurance market in any state that is in the assigned risk pool.

Open Competition

The deregulation of insurance pricing should enable insurance companies to set rates in a more flexible, market-determined manner. Thus, whatever the states' average $LPRATIO$ or typical $EXPCON$, if it has implemented deregulated pricing we should observe reduced usage of assigned risk pools. The reason is that increased flexibility in establishing premiums -- by better tailoring premiums to each firm -- should result in charges that permit more potential clients to be profitable to the insurer.

We thus created a dichotomous variable, $OPEN$, taking the value of unity if the state had implemented open competition and zero if it had not. By 1985, eight of the 32 states for which we had information were open
competition states. The degree of deregulation in each state differs, however, so that at best it can be claimed that these states have more (often, not absolute) flexibility in setting premiums.

Interest Rate

During the early 1980's interest rates had a tremendous effect on the insurance industry. The unusually high interest rates that prevailed during most of that period emphasized the importance to insurers of investment earnings on their reserves. Policies that would otherwise have been unprofitable become appealing to insurers because of the investment income the premiums could generate.

We obtained data on two different interest rates: the annual yield on 3-month U.S. Treasury bills (SINTRAT) and the annual yield on 3-year U.S. Treasury securities (LINTRAT). Increases in both the short-term and the long-term interest rate can be hypothesized to reduce the share of the market in assigned risk pools; however, it is unclear from a theoretical standpoint whether insurers would use the long-term or the short-term rate in forecasting investment income from their reserves. Hence, we used each, alternatively, in our statistical analyses.

DATA AND STATISTICAL ANALYSES

The considerations above suggest that the share of the workers' compensation market of each state in the assigned risk pool (SHARP) can be related to the explanatory variables discussed above by the following linear approximation:
40

(2-1) \[ \text{SHARP} = a_0 + a_1 \text{LPBATIO} + a_2 \text{EXPCON} + a_3 \text{OPEN} + a_4 \text{SINTRAT} \ (\text{or LINTRAT}) + e. \]

We have hypothesized that \( a_1 > 0 \), while \( a_2, a_3, a_4 < 0 \).

The data set that was put together for this study by the NOCI contained data on 32 states over the six years, 1980-1985. We could obtain data on all six years only for 18 states; for the other 14 at least one year's data were missing. To test for how robust the results of estimating equation (2-1) were to changes in the sample, we estimated the equation on both the larger sample and on the smaller one (the latter confined to just those states with six years of data).

The dependent variable, SHARP, is measured as the proportion of annual premiums in each state that are in the assigned risk pool. All dependent and independent variables are year- and state-specific. Our larger data set had 146 observations, while the smaller had 104.

Estimates of equation (2-1) on both the larger and smaller samples are shown in columns a, b, d, and e of Table 2-2. All four sets of estimates show that the usage of assigned risk pools is significantly affected by LPBATIO and EXPCON; both variables consistently display coefficients that have their expected signs and are highly significant in a statistical sense.

The interest rate variables also have estimated coefficients that display the expected negative sign, but only the 3-year rate (LINTRAT) is statistically significant. This finding suggests that insurance companies are more responsive to medium-term investment returns than to those in the extremely near future. Finally, open competition seems to have its expected effect only in the large sample, which contains data on 8 open competition states; the smaller sample, containing only three open competition states, contains perverse (but statistically insignificant) estimates.
To further test for the robustness of these estimates we also ran an alternative specification that included a dichotomous variable for each state. The purpose for including these variables was to control for unique, state-specific factors in addition to the general incentive variables discussed above. The results of interest from these estimates are shown in columns (c) and (f) of Table 2-2. The estimated coefficients on LPRATIO, EXPCON, and LINTRAT are qualitatively similar to those reported in the other columns; however, those on LPRATIO and EXPCON are both somewhat smaller in magnitude. The open competition variable, which of course is highly correlated with the indicator variables for the open competition states, is insignificant in these specifications.

**IMPLICATIONS FOR SMALL BUSINESS**

Of special importance to the small business sector is the estimated effects of the expense constant on the usage of assigned risk pools. One can estimate, for example, what a rise in the expense constant from the $55 average in the sample to the $120 recommended by the NCCI would do to the share of business in assigned risk pools. The estimated effects of this hypothetical $65 increase in the expense constant lie in the range of a .03 to .07 reduction in the share of a state's total premiums in the assigned risk pool. Given that the mean share (SHARP) is .08-.09 in both samples, our estimates imply that increasing the expense constant to its recommended value would have reduced the usage of assigned risk pools by 33-90%.

These estimates suggest two things. First, they suggest that a substantial amount of the premiums in assigned risk pools -- perhaps over half
of the pools' premiums -- is attributable to economic, not safety, factors. That is, it seems that the failure to charge small firms for the true overhead costs of writing their policies accounts for much of the size of assigned risk pools.

Second, the estimates suggest that the expense constant calculated by the NOCI is probably a reasonably close approximation to the "true" expense constant as revealed by insurance company behavior. Put differently, insurance companies have a vested interest in distinguishing profitable from unprofitable customers. Their behavior, as observed through our estimated model (and reported in Table 2-2), suggests that their refusal of voluntary business -- and the consignment of customers to assigned risk pools -- is very sensitive to the allowable expense constant in their states. Since raising the expense constant from the sample mean to the NOCI's recommended level would reduce the assigned risk pools' premiums by a substantial (but still reasonable) amount, we can infer that their behavior is consistent with what the NOCI estimates is the true expense constant.6

The importance of these findings for small businesses is that if open competition expands and insurance policies are priced by competitive forces, the premium add-on for overhead expenses will rise -- but it will probably rise only to the level estimated by the NOCI. Thus, had pricing been deregulated in the 1980-85 period, the expense constant probably would have increased by $65 or so. This modest increase could raise the insurance costs

6 We know that even if the expense constant were completely adequate, there would still be customers assigned to risk pools for reasons of poor safety records. It is comforting that our estimated effects of a full $120 expense constant implied reductions of premiums in assigned risk pools of under 100%. That is, even if the expense constant were to rise to $120, there would still be usage -- albeit much smaller usage -- of assigned risk pools.
of very small employers (3 or fewer workers) by something like 8%. While this increase in premiums may be something of a hardship to very small employers, one should keep in mind that charging this group an unsubsidized premium will permit reductions in rates among those firms now effectively subsidizing assigned risk pools. We argued in Chapter 1 that, in regulated environments, large firms are more likely to pay the market price of insurance than are small ones (their option to self-insure reduces the chances they can be required to subsidize others). Therefore, it seems likely that the primary subsidizers of the very small firms are those that are only somewhat larger in size. Reducing the subsidies required of these latter businesses should tend to increase their profitability and make it easier for the very small firms to grow into somewhat larger ones.

7 This calculation assumes a firm of three employees, with wages of $14,000 per worker and a manual premium of 2% of payroll. Such a firm would pay $840 in basic premiums.
Table 2-1

Distribution of Policies and Premiums in Assigned Risk Pools

Compared to the Total Market, by Size of Policy, 1982

<table>
<thead>
<tr>
<th>Employment Size Group</th>
<th>Total Premium</th>
<th>Percent of all Policies in Total Market</th>
<th>Assigned Risk Pools</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0-99</td>
<td>11.8%</td>
<td>7.8%</td>
</tr>
<tr>
<td>1-2</td>
<td>100-199</td>
<td>10.9</td>
<td>14.6</td>
</tr>
<tr>
<td>2-3</td>
<td>200-299</td>
<td>9.4</td>
<td>12.4</td>
</tr>
<tr>
<td>3-15</td>
<td>300-499</td>
<td>12.0</td>
<td>16.4</td>
</tr>
<tr>
<td>5-9</td>
<td>500-999</td>
<td>16.4</td>
<td>19.3</td>
</tr>
<tr>
<td>15-30</td>
<td>1,000-4,999</td>
<td>27.1</td>
<td>22.4</td>
</tr>
<tr>
<td>30-150</td>
<td>5,000-9,999</td>
<td>5.8</td>
<td>3.8</td>
</tr>
<tr>
<td>150-300</td>
<td>10,000-49,999</td>
<td>5.4</td>
<td>2.9</td>
</tr>
<tr>
<td>&gt;300</td>
<td>&gt;100,000</td>
<td>.7</td>
<td>.3</td>
</tr>
</tbody>
</table>

Source: Unpublished data furnished by the NCCI.

a Calculated using a manual rate of .025 per dollar of payroll and an assumed salary of $14,000 per worker.

b The "total market" data are for stockholder-owned insurance companies. Because these companies tend to insure smaller clients than do mutual companies, the percentages for the smaller premium categories may be biased upward from their true values while those for the larger premium groups may be biased downward.
Table 2-2
Estimates of Equation (2-1)
Alternative Samples and Specifications

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Estimated Coefficients (standard errors)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large Sample</td>
</tr>
<tr>
<td></td>
<td>(a)</td>
</tr>
<tr>
<td>LPRATIO</td>
<td>.1956* (.0237)</td>
</tr>
<tr>
<td>EXPCON</td>
<td>-.0009* (.0002)</td>
</tr>
<tr>
<td>OPEN</td>
<td>-.0257* (.0096)</td>
</tr>
<tr>
<td>SINTRAT</td>
<td>-.0024 (.0020)</td>
</tr>
<tr>
<td>LINTRAT</td>
<td>-</td>
</tr>
<tr>
<td>CONSTANT (a₀)</td>
<td>.0078 (.0372)</td>
</tr>
<tr>
<td>STATE DICHOTOMOUS VARIABLES INCLUDED</td>
<td>No</td>
</tr>
<tr>
<td>R²</td>
<td>.47</td>
</tr>
<tr>
<td>Mean of SHARP</td>
<td>.0800</td>
</tr>
<tr>
<td>Sample Size</td>
<td>146</td>
</tr>
</tbody>
</table>

* Indicates significance at .05 level, one-tail test.
Chapter 3

Experience Rating Effects on Injury Rates in Small Firms in the State of Washington
INTRODUCTION

Workers' Compensation benefits are financed by charging each employer an insurance premium rate that is proportional to its payroll. The base rate charged differs by industry ("insurance class"), depending on the average loss experience per $100 of payroll in that industry; this rate is called the industry's "manual rate." The actual premium paid by each firm is, in most cases, a weighted average of this manual rate, reflecting the average loss experience in the industry, and the firm's own loss experience.

Very small firms -- typically those with less than 8 employees -- pay the manual rate unadjusted by any factors that reflect their own loss experience. For these firms, all the weight is put on the industry's expected losses. The premiums of larger firms, however, are derived by adjusting the manual rate for their insurance class by an experience-rating modification factor that represents the firms' own loss experience. Within a given insurance class, firms with larger payrolls have premiums that more closely reflect the firm's own losses; for firms so large that their injury-related losses over a three-year period could be expected to total $830,000, premiums are determined solely by their own loss experience and no weight is given to the industry average (these firms are said to be self-rated).

The degree to which experience rating varies by firm size is illustrated in Table 3-1, which uses the standard formula of the National Council on Compensation Insurance to calculate experience-rated premiums (as a percentage of the manual rate) for firms with injury rates 50 percent above and below average. One can observe from this table that even for firms of 175 workers,
the experience rating adjustment is less than half complete (the rates are within 23 percent of the average while injury-related losses are, by hypothesis, 50 percent above or below average).

The experience-rating of worker’s compensation insurance premiums is designed to charge employers insurance premiums that reflect their use of the system more equitably than would charging rates based solely on the industry average. Moreover, it is hoped that experience-rating will generate incentives for firms to undertake expenditures that will reduce accidents, for in addition to other cost savings from accident prevention, the experience-rated firm also receives the benefit of reduced insurance premiums.

The purpose of this study is to assess the extent to which the experience-rating of workers’ compensation insurance premiums reduces injury rates. Before discussing the details of our study, however, it is necessary to briefly describe the experience-rating formula typically used and to outline the methodologies and results of earlier research on how accident rates respond to experience rating.

THE EXPERIENCE RATING FORMULA

The insurance premiums (P) paid by a firm j in industry i are equal to a rate applicable to that firm (r_j) times the firm’s total payroll (T_j):

\[ P_j = r_j T_j. \]  

The applicable rate, however, is equal to an experience-rating adjustment factor for the firm (X_j) multiplied times the industry’s manual rate (m_i):

\[ r_j = X_j m_i \]
If firm j’s loss experience is identical to what is expected for firms of its size in industry i, Xj is equal to unity. If the firm does better than average for its industry Xj is less than one; if it does worse Xj > 1.

The exact formula for calculating Xj is complicated. First, the firm’s actual total losses are allocated into their "primary" and "excess" components: all injury loss cases of under $2000 are put into the "primary" category, while if the loss is greater than $2000 its primary component is given by the following formula:

\[ \text{Primary" Component} = \frac{\text{Loss} \times 10,000}{\text{Loss} + 8,000} \]

The maximum value per loss that can be considered "primary" is $10,000.

The purpose of the primary/excess allocation is to distinguish between the frequency and the severity of injury. The insurance industry believes that injury frequency is more controllable by firms than the severity of loss once an accident occurs (measures can be undertaken to reduce the chances of someone slipping on stairs; however, once someone has slipped, whether a mild sprain or a broken back occurs is less controllable). Primary losses are intended to reflect injury frequency, and as will be seen below, they are more heavily weighted in figuring Xj for firms that are not completely self-rated.

After the firm’s losses have been allocated to their primary and excess components, Xj can be calculated. The formula that is used in almost every state is the following:

\[ X_j = \frac{A_j^P + W_j A_j^e + (1-W_j)E_i^e + B_j}{E_i + B_j} \]

where

- \( A_j^P \) = firm j’s actual primary losses;
- \( A_j^e \) = firm j’s actual excess losses;
$E_i^e$ = the expected excess losses for a firm of $j$'s payroll size in industry $i$; and

$E_i$ = the total expected losses for a firm of $j$'s payroll size in industry $i$ (it is the sum of expected primary losses, $E_i^p$, and $E_i^e$).

The variable $W_j$ in equation (3-4) is a factor, taking values between zero and one, determining how much weight is to be given to firm $j$'s actual excess losses. For small firms $W_j$ is zero or close to it; for these firms, their own primary losses affect $X_j$ but their actual excess losses do not (it is $E_i^e$, the industry average excess losses, that are counted instead of $A_j^e$). As one moves to an analysis of larger firms, one will observe $W_j$ rising, and for self-rated firms $W_j = 1$. The most commonly-used table for relating $W$ to a firm's expected losses is reproduced in Table 3-2.

The variable $B_j$ in equation (3-4) is a "ballast" factor that moves inversely to $W_j$. When $W_j$ is small, $B_j$ is very large, and by adding the same large number to both numerator and denominator $X_j$ is biased toward unity. Therefore, the experience modification factor for small firms not only ignores, either partially or completely, actual losses ($A$), it is also biased toward unity -- which means that, despite their actual primary losses ($A_j^p$) and actual excess losses ($A_j^e$), small firms will pay a rate close to the industry manual rate ($m_i$).

As firms' expected losses rise, the ballast factor (as can be seen in Table 3-2) becomes smaller. When the self-rating point is reached (that is, when $W_j = 1$), the relevant ballast factor is zero. When $W_j = 1$ and $B_j = 0$, it is easy to see that $X_j$ is equal to the ratio of the firm's actual losses ($A_j^p + A_j^e$) to the industry's expected losses ($E_i$) for a firm of that size.
Since the manual rate, \( m_i \), reflects \( E_i \) times a factor that allows for administrative expenses, self-rating amounts to paying a premium equal to the firm's own injury losses plus administrative costs.

It should be noted that the calculation of \( X_j \) in equation (3-4) involves summing the firm's actual and expected losses over the first three years in the four-year period immediately preceding the current year. ¹ Thus, the criteria for, and calculations of, experience rating depend on loss values and payrolls over a three-year period. The intent of using the three-year period rather than just one year's data, as with the use of \( W \) and \( B \), is to prevent an unusually costly injury from unduly affecting \( X_j \), especially for the (small) firms in which losses are likely to be most variable.

PRIOR STUDIES

There have been a handful of studies attempting to measure the effect on injury rates of experience rating. One (Russell, 1973) pointed out that while the more complete experience rating of larger firms could help to explain the lower injury rates typically found among large firms, experience-rating could not explain the low injury rates among very small firms. ²

Because firms in states with relatively high workers' compensation benefits will have larger actual and expected losses for any given number of injuries, and thus will be subject to greater degrees of experience-rating, one might reasonably hypothesize that firms in those states will have greater

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¹ It should be noted, especially with reference to small businesses, that it generally takes four years before a new firm can become experience-rated.

² Injury rates within industries typically follow an inverted-U pattern, with the very smallest and the very largest firms having the lowest rates.
incentives to reduce injuries. Studies relating injury rates, by industry and state, to workers' compensation benefit levels find the opposite of what is expected; namely, states with higher benefits have higher injury rates, other things equal (Chelius, 1973, 1974, 1982). The reason for this positive relationship between injury rates and benefit levels is not known with certainty, although it is a reasonable conjecture that higher benefits increase the duration of the healing period or the probability that an injury will be reported.

To control for the above effect of benefits, yet to exploit the phenomenon that, for experience-rated firms, higher benefits are associated with larger reductions in premiums for each injury avoided, a third methodology was used (see Chelius and Smith, 1983). This research strategy analyzed the within-state differences in the injury rates of large, (experience-rated) and very small (manually-rated) firms. This methodology recognized that, to the extent that higher benefits in a state lead to higher reported injury rates, they should lead to increased injury rates in large and small firms alike; however, they lead to increased employer incentives to avoid accidents only among large, experience-rated firms. Small firms, which are only (or mainly) manually-rated, pay premiums that are set independently of their own loss experience. Therefore, it was the hypothesis of this study that, within industries and states (that is, controlling for the effects of technology and of benefits on reported injuries), large firms would have lower injury rates compared to small firms in states in which benefits are higher. Results of testing this hypothesis were generally negative, and it was concluded that if experience-rated premiums do affect injury rates, the
effects are probably small and would have to be detected by a more powerful statistical methodology.

The only research to date suggesting that experience rating reduces injury rates (Ruser, 1985) used an indirect test. This research hypothesized (and found) that the greater extent of experience rating among large firms should reduce the size of the positive relationship between workers’ compensation, benefits and injury rates for these firms. In spirit, then, this research was similar to that of Chelius and Smith; the major difference was that Chelius and Smith had more stringent controls for industry and state.

OBJECTIVES AND DATA FOR THE CURRENT RESEARCH

One of the difficulties of doing any evaluative research is to find "natural experiments" from which to observe differential responses. Put differently, policy evaluations must compare the results of one program against another; if a program is universally applicable and uniformly administered, it is impossible to observe the effects of an alternative.  

Experience-rating in the workers’ compensation system is close to being uniformly conducted. Some 35 states belong to the National Council on Compensation Insurance (NCCI), an insurance-industry service organization that uses the same experience-rating criteria in all its member states. Even states that are not part of the NCCI, however, use experience-rating formulas that are either the same or represent only minor variants of the NCCI system. States do vary in their benefit levels, so that firms in the same industry

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3 One can do a pre- and post-program comparative study if the program was recently initiated. However, in the case of workers’ compensation, which is 70 years old in most states, a before-and-after analysis would be problematic.
that are of similar size and have similar injury rates may face different
premium reductions for each accident avoided. However, as indicated in the
prior section, efforts to exploit this natural experiment have so far yielded
inconclusive results.

This paper seeks to exploit another natural experiment. The State of
Washington, which runs a monopoly state insurance fund (no private insurance
companies can write workers' compensation policies in the state), has an
experience-rating program that substantially enhances the premiums savings
attendant to injury reduction for small firms. If a Washington firm has no
lost-time injuries\(^4\) in the experience period (the first three of the last four
years), it receives a special experience-rating adjustment that has the effect
of offering the firm a much larger premium reduction than would the standard
experience-rating formula.

This alternative experience rating schedule was devised to reward small
businesses for injury-free outcomes. Table 3-3 displays the normal and the
special experience-rating factors for firms with no losses at all during the
experience period, and as one can see the largest differential between the
conventional calculations of \(X_j\) and the special alternative accrue to firms of
from 6-12 employees -- a size group that in most states is either not
experience-rated or only minimally so.\(^5\)

If the special experience-rating program in Washington were effective at
giving incentives to all firms to reduce injuries then we would expect, other

\(^4\) A lost-time injury is one in which a worker receives compensation for
time off the job caused by injury. An injury involving only medical costs is
not counted as a lost-time injury.

\(^5\) Note that in Washington, these small firms are all partially
experience-rated even if the special alternative is not used; in Washington,
unlike most states, all firms are at least partially experience-rated.
things being equal, overall injury rates in the State of Washington to be lower than elsewhere. Since a firm must be relatively small, however, to have no injuries at all, adding this special program to the normal experience-rating program characteristic of most other states will have the effect of increasing safety incentives most among Washington’s smallest firms. It is hypothesized, then, that the principal effects of Washington’s special program should be to reduce injury rates in small firms relative to large ones in that state.

The data we used to conduct tests of the above hypothesis are from the BLS annual survey of injury rates. We were able to obtain computer tapes of injury rates within states and firm size groups, as well as within industries. From these tapes we calculated injury rates in various state/size-group/industry cells. The data pertain to the years 1979 through 1981, and we combined these yearly data in order to smooth-out some of the random fluctuations in injury rates over time that are especially evident in groups of small firms. As a further control for what can be wide swings in injury rates when sample sizes are small, we required each state/size-group/industry cell in our sample to contain at least 500 workers.

DATA ANALYSIS

The first test we conducted simply involved calculating average lost workday injury rates in each size group and state at the two-digit level of industry. These data are listed in Table 3-4 for the State of Washington and all other states combined. It can be seen that injury rates in the State of
Washington are typically higher within each two-digit level industry and each size group. These data, however, are not completely appropriate to testing for the effects of the special experience rating adjustment, because there may be some factor in the State of Washington working to increase all injury rates there.

The special program, it will be recalled, should serve mainly to reduce the injury rates of small firms relative to large ones in the same industry within the State of Washington. That is, it is the ratio of injury rates in small firms to large ones that is appropriate; this ratio should be lower in Washington than elsewhere because in the typical state very small firms are not experienced-rated at all. Table 3-5 shows the ratio of injuries in the smallest firms to those in firms with over 1000 employees (these large firms are self-rated, or close to it, in all states). It can be seen from the table that Washington’s smallest firms tend to have higher lost workday rates relative to the largest than do small firms in other states.

There is no easily-observed evidence in Tables 3-4 and 3-5 that Washington’s special program has served to reduce the injury rates of Washington’s smaller firms. These tests are crude, however, in two ways. First, they combine data at the two-digit industry level, thus throwing away a wealth of data that exist at the three- and four-digit level of industry. Second, the tables compare Washington’s data with just a single aggregation of non-Washington states. A more sophisticated analysis would make use of the wealth of data we have at more disaggregated levels. Thus, we employed regression analysis to estimate the following equations across 3-digit industries for each size group:

\[ r_s = a_0 + a_1 \text{Wash} + bD + e \]
where \( r_s \) = the lost workday injury rate in size group \( s \);  
\[ \text{Wash} = 1 \text{ if the state is Washington and 0 otherwise, and} \]
\[ D = \text{a vector of two-digit industry dummy variables.} \]

The coefficient of interest is \( a_1 \) (the coefficient on Wash), and if the hypothesis about Washington’s special experience-rating program is valid, we ought to observe that \( a_1 \) becomes more negative as one moves from the larger to the smaller firm size groups. As one can see from Table 3-6, however, no such pattern exists. In fact, consistent with the data on averages in Tables 3-4 and 3-5, there is some evidence that the coefficient is larger for smaller size groups! These patterns indicate that within given industries, lost workday injury rates in the State of Washington show no tendency to be lower — and indeed, show some tendency to be higher — relative to other size groups.

A possible objection to these regression results, which basically summarize the data in Table 3-4, is that they take no account of other factors for which data might be obtained. It may be objected that the level of workers’ compensation benefits in the State of Washington may be such to create incentives for Washington’s injury rates to be higher overall. If Washington’s benefits are relatively generous or administered in a relatively generous manner, firms that are experience-rated will have relatively strong incentives to reduce injuries because by so doing they may reduce what would otherwise be a large premium. This could lower the injury rates in larger relative to smaller firms and produce the patterns noted in Table 3-6.

To take account of the above objection, we estimated the following equation by ordinary least squares regression techniques across 3-digit industries:
(3-6) \( r_1 = a_0 + a_1 \text{WASH} + a_2 \frac{r_4}{r_7} + a_3 r_7 + b D + e \)

where

- \( r_1 \) = the injury rate in the very smallest size group (1 to 10 employees),
- \( r_4 \) = the lost workday injury rate among firms with 100 - 250 employees,
- \( r_7 \) = the lost workday injury rate among firms with > 1000 employees, and
- \( D \) = a vector of two-digit industry dummy variables.

This equation assumes that industries in which large firms have higher injury rates will also have higher injury rates among small firms (that is, \( a_3 \) greater than 0). Equation (3-6) also takes into account the relationship between the injury rates in medium-sized firms and those in large firms \( \left( \frac{r_4}{r_7} \right) \). This variable attempts to capture the effects of generous benefits noted above. Firms of 101-250 employees are typically experienced-rated, but not completely so; firms with over 1000 employees are typically highly (or fully) experienced-rated. Thus, the effects of high benefits or a generously administered workers' compensation system ought to be to reduce injury rates in the largest firms relative to each of the other size groups including firms with 101-250 employees. By taking account of the \( \frac{r_4}{r_7} \) variable, it is hoped that the effect of WASH on \( r_1 \) will capture the effects of Washington's special program.

Estimates of equation (3-6) resulted in the following coefficients on the variables of interest:

- \( a_1 = 1.04 \ (t = 2.03) \)
- \( a_2 = .09 \ (t = 2.63) \)
- \( a_3 = .12 \ (t = 4.62) \)

As in the other tests, this one again reveals a positive coefficient on the WASH variable -- suggesting that Washington's special experience-rating
program did not reduce injury rates among small firms. Indeed, the evidence is that, given injury rates in larger firms within an industry, small-firm injury rates in Washington were higher than in other states!

SUMMARY AND CONCLUSIONS

This study tested the hypothesis that the extension of experience-rated insurance premiums to very small firms in the State of Washington has resulted in lower injury rates for these small firms. Put differently, we sought to evaluate the effects on injury rates of Washington’s special program to give larger-than-normal experience-rating adjustments to the workers’ compensation insurance premiums of firms that had no compensable injuries during the experience period. The purposes of this study were two-fold: to offer another test of the effects experience-rating has on work injury rates, and to assess the likely incentive effects of the often-made proposal to extend experience-rating to smaller firms.

The study involved several tests, and none suggested that injury rates among Washington’s small firms were lower than elsewhere; indeed, the evidence uniformly suggested that (a) injury rates were higher almost across-the-board in Washington, and (b) the greatest differentials between injury rates in Washington and other states were found among the smallest firms.

We are forced to conclude, therefore, that we see no evidence in this study to support the notion that the experience-rating of workers’ compensation premiums serves the goal of reducing injury rates. While we cannot be sure why this is so, several conjectures can be offered. First, the
delay between the achievement (presumably at some cost) of a safer work environment and any reduction in insurance premiums is two years, and the delay until the full premium adjustment is made is five. While perhaps not unreasonable from the standpoint of insurance carriers, who need time to process data and to acquire some sense of firms' true risk levels, these delays do tend to diminish incentives for firms with managers who do not have very long planning horizons. Second, the experience-rating formula is so complicated that the average firm probably has great difficulty in calculating expected premium adjustments that are attendant to any safety program it might undertake. Third, workers' compensation premiums (and adjustments) are relatively small. Even a 30 percent discount off a premium that averages 2 percent of payroll saves the firm only one-half of one percent of payroll, a sum that may seem small to most firms. Finally, the insurance companies may not "sell" experience-rating as a reward for better safety or as a penalty for a poorer safety record. We believe there is a tendency for insurers to view experience-rating as a procedure for bringing equity to rate-making rather than as a tool for providing firms with greater safety incentives; the complexity of the formula and the delays in both rewards and penalties support this conjecture.

In sum, then, nothing in the way of greater safety incentives would be gained by extending experience-rating to the small firms that are now either not experience-rated or are only minimally so. The evidence to date is that experience-rating does not provide its intended safety incentives to firms of any size. Whether experience-rating can ever be structured to provide such incentives is not known; our recommendation is that some alternative procedures, radically different than those currently used, be tried and
evaluated. These might include cash rebates at year's end for a better-than-expected safety record and surcharges for a worse-than-expected record (similar to insurance policies, now written only for large firms, called "retrospective rating").
Table 3-1

Experience-Rated Premiums As A Percentage of Manual Rate*

<table>
<thead>
<tr>
<th>Employment Size (No. of Workers)</th>
<th>Firms with Losses Equal to 1/2 Average</th>
<th>Firms with Losses Equal to 1-1/2 Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>10</td>
<td>95</td>
<td>105</td>
</tr>
<tr>
<td>35</td>
<td>88</td>
<td>112</td>
</tr>
<tr>
<td>75</td>
<td>83</td>
<td>117</td>
</tr>
<tr>
<td>175</td>
<td>77</td>
<td>123</td>
</tr>
<tr>
<td>375</td>
<td>72</td>
<td>128</td>
</tr>
<tr>
<td>750</td>
<td>64</td>
<td>136</td>
</tr>
<tr>
<td>1750</td>
<td>50</td>
<td>150</td>
</tr>
</tbody>
</table>

*Calculations are for hypothetical firms in which each employee earns $14,000 per year, the industry has an expected loss rate of 1.25% of payroll and a manual rate of 2.5%, and half of all losses are primary (as defined in the experience rating formula given in National Council on Compensation Insurance, An In-Depth View of Experience Rating (New York City: NCCI), 1982).
Table 3-2

Typical W and B Values in Equation (4)

<table>
<thead>
<tr>
<th>Expected Losses of the Firm over the Experience Period</th>
<th>W</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>25,000 &amp; Under</td>
<td>.00</td>
<td>20,000</td>
</tr>
<tr>
<td>25,001 - 37,074</td>
<td>.01</td>
<td>19,800</td>
</tr>
<tr>
<td>37,075 - 45,124</td>
<td>.02</td>
<td>19,600</td>
</tr>
<tr>
<td>45,125 - 53,174</td>
<td>.03</td>
<td>19,400</td>
</tr>
<tr>
<td>53,175 - 61,224</td>
<td>.04</td>
<td>19,200</td>
</tr>
<tr>
<td></td>
<td>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>423,475 - 431,524</td>
<td>.50</td>
<td>10,000</td>
</tr>
<tr>
<td>431,525 - 439,574</td>
<td>.51</td>
<td>9,800</td>
</tr>
<tr>
<td>439,575 - 447,624</td>
<td>.52</td>
<td>9,600</td>
</tr>
<tr>
<td>447,625 - 455,674</td>
<td>.53</td>
<td>9,400</td>
</tr>
<tr>
<td>455,675 - 463,724</td>
<td>.54</td>
<td>9,200</td>
</tr>
<tr>
<td></td>
<td>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>801,825 - 809,874</td>
<td>.97</td>
<td>600</td>
</tr>
<tr>
<td>809,875 - 817,924</td>
<td>.98</td>
<td>400</td>
</tr>
<tr>
<td>817,925 - 829,999</td>
<td>.99</td>
<td>200</td>
</tr>
<tr>
<td>830,000 &amp; Over</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

Table 3-3
Normal and Special Experience-Rating Adjustments for Small Firms
With No Injuries in the Experience Period, State of Washington

<table>
<thead>
<tr>
<th>Firm Size (No. of Employees)</th>
<th>Experience-Rating Factor</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Special</td>
<td>Difference</td>
</tr>
<tr>
<td>3</td>
<td>.97</td>
<td>.84</td>
<td>.13</td>
</tr>
<tr>
<td>6</td>
<td>.95</td>
<td>.75</td>
<td>.20</td>
</tr>
<tr>
<td>8</td>
<td>.93</td>
<td>.71</td>
<td>.22</td>
</tr>
<tr>
<td>12</td>
<td>.90</td>
<td>.70</td>
<td>.20</td>
</tr>
<tr>
<td>20</td>
<td>.86</td>
<td>.70</td>
<td>.16</td>
</tr>
<tr>
<td>30</td>
<td>.81</td>
<td>.70</td>
<td>.11</td>
</tr>
<tr>
<td>50</td>
<td>.73</td>
<td>.70</td>
<td>.03</td>
</tr>
</tbody>
</table>

Note: Calculations assume an expected loss ratio of .01 and annual payroll costs of $14,000 per worker. Expected primary losses for the industry are estimated from total expected losses by multiplying the latter by .4 (a factor typically used for most industries to break down total losses into their primary and excess components). The factor of .4 assumes that 40% of the typical loss is primary and that 60% is excess.
<table>
<thead>
<tr>
<th>SIC Code</th>
<th>Industry</th>
<th>Firms With &lt; 10 Employees</th>
<th>Firms With 10-50 Employees</th>
<th>Firms With 51-100 Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Printing, Publishing</td>
<td>1.0349</td>
<td>.7578</td>
<td>2.0344</td>
</tr>
<tr>
<td>33</td>
<td>Primary Metals</td>
<td>5.9279</td>
<td>4.0399</td>
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<td>.0000</td>
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* Indicates a statistically significant difference between Washington and Other states at the .05 level.
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<tr>
<th>Industry</th>
<th>&lt;10 Employees</th>
<th></th>
<th>10-50 Employees</th>
<th></th>
<th>51-100 Employees</th>
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* Indicates statistically significant difference in the Washington and non-Washington ratios at the .05 level.
Table 3-6

Estimates of the Coefficient $a_1$ in Equation (3-5)

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<tr>
<th>Employment Size Group</th>
<th>Estimated Coefficient</th>
<th>t-value</th>
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<tbody>
<tr>
<td>&lt; 10 employees</td>
<td>2.37</td>
<td>5.65</td>
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<tr>
<td>10-50 employees</td>
<td>2.23</td>
<td>5.73</td>
</tr>
<tr>
<td>51-100 employees</td>
<td>1.64</td>
<td>3.50</td>
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<td>101-250 employees</td>
<td>1.95</td>
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<td>251-500 employees</td>
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<td>501-1000 employees</td>
<td>1.37</td>
<td>1.63</td>
</tr>
<tr>
<td>&gt; 1000 employees</td>
<td>.28</td>
<td>.76</td>
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American Insurance Association

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Chelius, James R.

Chelius, James R.

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