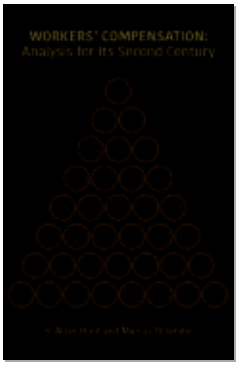
Ch 4 - Workers' Compensation and Incentives for Preventing Injuries



Chapter 4

Workers' Compensation and Incentives for Preventing Injuries

Work-related injuries and diseases are costly for both workers and firms. For workers, injuries can interfere with the ability to work, thus lowering current and future income.[1] Work-related injuries are also associated with depression and anxiety (Asmundson et al. 1998; Dersh et al. 2002) and may lead to chronic pain. For firms, injuries to workers disrupt production schedules, increase labor costs, and have the potential to increase workers' compensation costs. Injuries are also costly to firms if firms value their workers' health and happiness for nonmonetary reasons or feel that injuries lower morale and productivity. According to Leigh (2011), the total cost of work-related injuries in the United States in 2007 was $250 billion, which was more than the cost of cancer ($219 billion), coronary heart disease ($152 billion), or stroke ($62 billion).

While preventing all work-related injuries is not possible, firms, workers, and the government can all reduce their likelihood through workplace safety choices. Firms choose safety equipment, safety training, safety protocol, how much to spend on a safety department, and the method of production. Workers choose their safety effort and whether to follow the safety protocol. The federal government monitors workplace safety through the Occupational Safety and Health Administration (OSHA) and sets fees for noncompliance, while many state governments have separate OSHAs that perform similar functions. State-level governments also set workers' compensation policy. All levels of government can provide information on safety, mandate that firms use certain equipment or follow certain guidelines, or subsidize firms for following certain practices.

In 1970, the Occupational Safety and Health Act set up a National Commission on State Workmen's Compensation Laws to evaluate

workers' compensation laws. The commission issued a report that identified promoting safety as one of the main objectives of workers' compensation. Workers' compensation programs can influence work-related safety in at least three ways. One is that they can provide preventive consultation services to employers and workers. A second is that they can provide general information about safety. And third, they can alter monetary incentives for safety, which is the focus of this chapter. In this chapter, we explain how workers' compensation programs can affect safety incentives, and we provide an overview of the empirical literature on the safety impacts of workers' compensation programs.

THE ROLE OF WORKERS' COMPENSATION IN OPTIMAL SAFETY

The cost of injuries goes beyond medical expenses, disrupted productivity, and lost wages. Injuries are also costly because they cause pain and suffering and because the inability to work can harm a worker's psyche. From a societal standpoint, an injury should be prevented if the social cost of the prevention efforts is lower than the social cost of the injury. The cost of injuries includes their numerous deleterious effects on workers and their families in addition to all of their monetary costs. Although injuries clearly have random elements, through prevention efforts the various stakeholders have the ability to lower the probability that they occur. Prevention efforts should be undertaken if the cost of the prevention efforts is lower than the cost of the injury multiplied by how much the injury probability is lowered by the prevention efforts. In theoretical economic models with perfect information, no frictions, and actuarially fair insurance, workers' compensation insurance is unnecessary—optimal safety levels will be achieved through worker sorting based on job risk and individuals purchasing insurance (Rosen 1974; Thaler and Rosen 1976).

According to these economic models, firms differ in their inherent risks of injuries but can influence the probability of injuries through spending on safety. Workers differ in their baseline health endowments and in their risk tolerance but can lower their injury probability by spending more effort on safety or working for a safer firm. To induce workers to accept a job, firms that engage in risk-filled work have to pay workers more than they would earn at less risky jobs. Economists call this extra payment to accept a risky job a *compensating differential*. Since workers with higher risk tolerances need less of a compensating differential, they choose riskier jobs than risk-averse workers.

The fact that firms have to pay compensating differentials for the risks their workers face provides firms with safety incentives, because they can lower the wages they have to pay workers by making their jobs safer. Each firm has the incentive to improve safety until the cost of improving it is more than the worker values the extra safety.[2] Although workers' compensation insurance is unnecessary in these models, optimal safety will still be achieved with workers' compensation insurance as long as firms are perfectly experience rated, which means their premiums reflect their past claims. If firms are not perfectly experience rated, higher-risk firms will be implicitly subsidized by lower-risk firms, which will lead to a suboptimal allocation of resources (Ehrenberg 1988).

In reality, the assumption of perfect information is not met in the determination of workplace safety for a variety of reasons (Fortin and Lanoie 2000). Firms and insurers cannot always accurately predict the incidence of injuries, while workers and firms may be incorrect in their estimates of occupational risk and of their own influence on the level of risk. Employers and insurers cannot effectively monitor employees' precautions, and insurers cannot monitor firms' prevention efforts perfectly. Insurers and firms may not be able to determine whether an injury is work related or even whether the worker is truly injured. In addition, experience rating is not practical for small firms in reality, because a large claim could still put them out of business.

The assumption that workers could buy insurance on their own that meets their needs and is actuarially fair is not realistic either.

Moreover, some speculate that injured workers sometimes use other disability insurance or have health insurance cover some costs of work-related injuries. Access to these other insurance programs lessens the negative consequences of an injury and means that workers and firms will not focus enough on safety. As a result, more injuries occur than would if information were perfect, and work-related injuries impose extra costs on society.[3]

THE IMPACT OF THE INTRODUCTION OF WORKERS' COMPENSATION ON SAFETY

Prior to workers' compensation programs being enacted in the early twentieth century, work-related injuries were addressed by worker mutual aid organizations and through the tort system. Under the tort system, workers who were injured on the job and were seeking compensation had to prove in court that their employers' negligence caused their injuries. An employer could avoid a negligence ruling by showing that the worker's actions contributed at least partially to the injury, that the injury was an inherent job risk, or that the carelessness of coworkers contributed to the injury. Because many industrial injuries were caused by seemingly inherent dangers of work, fault was difficult to assign under this system (Fishback and Kantor 1996). As a result, workers rarely won their suits. When workers did win, the resulting awards reduced the financial stability of firms and were sometimes large enough to shut down firms.

In systems with negligible transaction costs and perfect information, liability rules have no impact on the allocation of resources (Chelius 1976). But as has been already discussed, information asymmetries abound with work-related injuries. The assumption of no transaction cost is not met under the tort system either, because law-

suits are expensive. Therefore, safety was suboptimal under the tort system.

Given that most people tend to be risk averse, they would prefer reliable payments after injuries rather than the rare possibility of a large payout. By making the consequences of work-related injuries less severe for workers, the introduction of workers' compensation programs theoretically decreased safety incentives for workers on average. For firms, safety under workers' compensation programs versus the tort system is less clear. If firms are risk neutral, they would prefer whichever system had the lowest expected payout. Since payouts were lower on average under the tort system (Fishback and Kantor 1996), injuries would be cheaper for firms under the liability system than through workers' compensation. Thus, workers' compensation would likely increase safety incentives for risk-neutral firms. However, the many firms that are too small to be risk neutral may prefer workers' compensation insurance to the tort system, since one large payout could force them out of business.

Most research on the safety effects of workers' compensation programs has focused on changes to various aspects of the programs rather than on what the introduction of the workers' compensation system did to safety levels, which means that the effect of switching from a tort system to workers' compensation on safety levels remains an open question (Morantz 2010). The research that exists on the safety effects of the shift to workers' compensation reports mixed results. Although Chelius (1976) finds that the passage of workers' compensation laws in the early twentieth century reduced non-motor-vehicle deaths, Fishback (1987) finds that the introduction of workers' compensation to coal mining resulted in a rise in fatal accidents, because workers' compensation increased the median compensation award, which presumably led to workers' being less safe.

Butler and Worrall (2008) argue that workers' compensation improves safety when firms are the low-cost providers of safety but reduces safety when workers are the low-cost providers of safety.

They study the impact of federal workers' compensation introduction in 1911 on four classes of railroad workers in New Jersey and find that workers' compensation reduced injuries for outside workers, who are high-cost providers of safety, and increased injuries for inside workers, who are low-cost providers of safety. These results suggest that there was heterogeneity in the responses of different industries and of different types of workers to the introduction of workers' compensation programs a century ago.

As Texas is one of the only states where firms do not have to purchase workers' compensation insurance, as well as the state that has had nonmandatory workers' compensation the longest, comparisons between Texas firms with workers' compensation insurance and those without it (nonsubscribing firms) can provide valuable insights into the role of workers' compensation in achieving a safe work environment. Butler (1996) studies differences in injury rates between firms that purchase workers' compensation insurance and firms that do not and finds that both types of firms have similar fatality rates. He finds that nonsubscribing firms have slightly higher nonfatal injury rates and argues that this is likely because nonsubscribers tend to offer occupational injury plans that provide first-day wage-replacement benefits, which encourage workers with minor injuries to report their injuries. Butler concludes that safety levels are likely similar between subscribing and nonsubscribing firms in Texas.

In her survey of large firms who opt out of workers' compensation insurance in Texas, Morantz (2010) confirms that most firms that opt out have alternative occupational-injury insurance plans. That most firms have an alternative occupational injury plan suggests that firms prefer having insurance to the possibility of being sued. Morantz finds that the majority of large firms that opt out do it to save money, and that about one-third of firms report that they have better safety outcomes with occupational injury plans than they did with workers' compensation insurance.

MEASURING OCCUPATIONAL SAFETY

Measuring workplace safety is necessary for benchmarking safety levels and for determining what factors affect workplace safety, but collecting useful and reliable safety measures is a major challenge. Most research focuses on rates of reported injuries or on workers' compensation claims. The most commonly used data are the injury rates collected by the Bureau of Labor Statistics (BLS) through the Survey of Occupational Injuries and Illnesses (SOII). The SOII collects injury counts from a sample of firms that are required by OSHA to maintain records of injuries. The SOII also collects the number of employee hours worked at establishments and uses this information to construct injury rates. The published data set includes the number of injuries with lost workdays, the number of injuries with no lost workdays, and the number of workers at the establishment. An advantage of these data is that the record keeping is required by the federal government, which means the data include information from all states.

While the BLS data are likely the best available measure of occupational health and safety outcomes, the SOII has three major shortcomings. First, the survey does not include all workers. Specifically, the survey does not include self-employed workers, farm workers, firms with 10 or fewer employees, or any government workers. Second, the survey misses many occupational diseases, especially those that take a long time to develop. Finally, as with any data on injuries, injuries in the OSHA logs must be reported by workers and recorded by firms, which means misreporting is a concern. For more information on these data, refer to Ruser (2008).

Another way to measure workplace safety is to examine workers' compensation claims. An advantage of these data is that they are more detailed than the BLS data, in that they contain more information about the injury, its treatment, and characteristics of the worker. Workers' compensation data may also include injuries and illnesses

not contained in the SOII. But as with the BLS data, misreporting is also a concern with workers' compensation claim data.

Injured workers may not file for workers' compensation because of concerns associated with filing a claim. Filing a workers' compensation claim may be costly if employers dissuade people from filing for workers' compensation because they fear workers' compensation claims will increase their premiums. Injured workers also might not want to deal with the paperwork and bureaucracy of workers' compensation, or they may fear that they will be called on to prove that their injury was caused by work.

Some workers may feel there is a stigma associated with filing for workers' compensation, while others may worry that their standing with the employer will depreciate while they recover from their injuries. Finally, receiving workers' compensation benefits is not guaranteed even if one files a claim. Biddle (2001) shows that high denial rates of workers' compensation claims are associated with lower application rates. In their survey of injured Michigan workers, Biddle and Roberts (2003) find that a majority of injured workers with work-related injuries do not file for workers' compensation benefits. Lakdawalla, Reville, and Seabury (2007), using data from the National Longitudinal Survey of Youth, confirm that many workers who report being injured on the job to the survey report that they did not file for workers' compensation. Another issue with workers' compensation data is that the data typically come from one particular state, which makes generalizing the results difficult. States also have different reporting and data collection procedures, which complicates efforts to combine workers' compensation data from multiple states. The National Council on Compensation Insurance (NCCI) provides one of the few publicly available resources on different states' workers' compensation premiums and claims. To produce these data, NCCI surveys workers' compensation insurers each year about the premiums they receive and the claims they pay. NCCI publishes these state averages each year for most states in its Annual Statistical Bulletin (NCCI 2014).

Individual-level government-collected survey data, such as the National Health Interview Survey (NHIS) and the March Current Population Survey (CPS), provide other measures of safety in the United States and have several advantages over other data. Unlike workers' compensation data, survey data contain detailed information about a sample of all workers, regardless of whether they claim workers' compensation. This more detailed information about workers includes demographics, education, and sometimes information on family members, work, and medical histories.

The NHIS is collected by the National Center for Health Statistics and asks various questions about injuries, including whether injuries are work-related, the types of injuries, whether the injuries caused individuals to miss work, and what types of medical care workers received. The NHIS also collects other relevant demographic and health information. In addition to relying on proxy respondents, the public-use NHIS does not contain state identifiers, meaning cross-state comparisons are not possible. Because much of workers' compensation research focuses on differences across states, the lack of state identifiers greatly reduces the NHIS's use to researchers.

The March CPS asks respondents if they have received workers' compensation income in the past year. This information has been frequently used by researchers. Although it is not a panel data set, respondents can be linked across surveys, which gives the data a panel component. A shortcoming of CPS data is that they contain no details about injuries, workers' compensation payments, or medical treatment. Other individual-level surveys with injury and workers' compensation information are the Survey of Income and Program Participation, the Panel Survey of Income Dynamics, and the National Longitudinal Surveys of Youth.[4]

While injury rates and workers' compensation claims are a natural measure of workplace safety, the fact that workers, treating physicians, or firms have to report these injuries is problematic. As will be explained later, any factor that affects safety incentives also influences the decision to report injuries, which means reported injury rates are

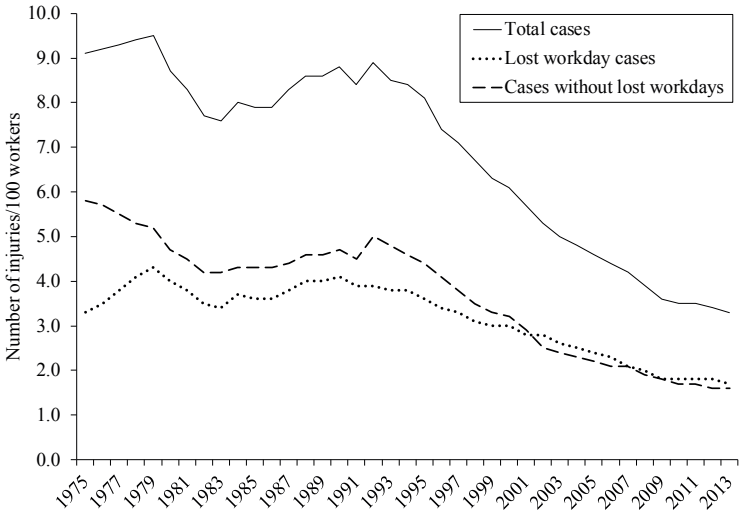
a flawed measure of safety. As Morantz (2010) explains, "Probably the single most important obstacle [to estimating the effect of workers' compensation on safety] is the paucity of truly exogenous safety metrics that are invulnerable to changes in over- or under-reporting."

One measure that may have fewer reporting concerns than injuries is occupational deaths from traumatic injuries, which are impossible for workers to misreport and difficult for firms to misreport. In addition to collecting injury information, the BLS also maintains a census of occupational deaths, called the Census of Fatal Occupational Injuries (CFOI). Federal law requires firms to notify OSHA within eight hours of an occupational death. The BLS collects this information from OSHA and supplements it with other data sources such as death certificates and workers' compensation records to produce the CFOI. Unlike with the SOII, the CFOI includes public-sector and self-employed workers. Prior to the BLS producing the CFOI, the National Institute for Occupational Safety and Health (NIOSH) produced the National Traumatic Occupational Fatality surveillance system, using death certificates. Although occupational deaths from traumatic events are more likely to be reported correctly, occupational deaths from slowly developing diseases are still subject to substantial reporting biases.[5]

TRENDS IN WORK-RELATED INJURIES

Figure 4.1 plots injury rates from the BLS data since 1975 and shows that reported work-related injury rates in the United States have been falling since the 1990s. The 1.7 injuries with lost workdays per 100 workers in 2013 is 59 percent smaller than the equivalent 1990 rate, while the 1.6 injuries without lost workdays per 100 workers in 2013 is 66 percent smaller than the 1990 rate. The injury rate for men is approximately 23 percent higher than for women, likely reflecting that men are in jobs with more manual labor. Sprains, strains, and tears account for roughly 40 percent of injuries.

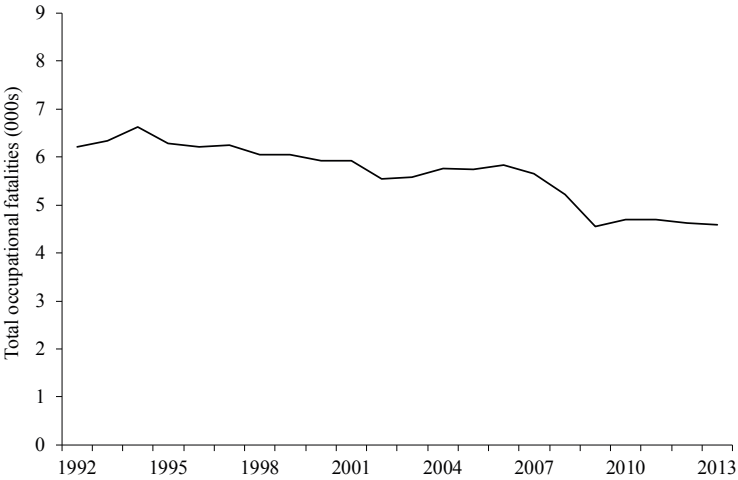
Figure 4.1 Occupational Injuries per 100 Workers in Private Industry, 1975–2013



NOTE: The y axis represents number of injuries of each type per 100 workers. Total lost workday cases include those with days away from work and those with restricted work activity. For 1978, 1979, 1983, and 1984, the BLS did not include small employers in low-risk injuries in the survey, so the BLS imputed these data. Beginning in 1992, the data exclude fatalities.
SOURCE: Survey of Occupational Injuries and Illnesses, from the BLS.

As with occupational injuries, occupational deaths have fallen since the 1990s. Figure 4.2 shows the number of occupational deaths each year reported in the CFOI from 1992 to 2013. In 2013, 4,585 occupational deaths occurred. Of these, 41 percent occurred because of transportation injuries; 17 percent from violence by people or animals; 16 percent by contact with objects and equipment; 16 percent from falls, slips, and trips; 7 percent from exposure to harmful substances or environments; and 3 percent from fires and explosions. Men account for the vast majority of occupational deaths (93 percent). The highest death rates come from agriculture (23.2 deaths per 100,000 full-time equivalent [FTE] workers), transportation and

Figure 4.2 Number of Fatal Work Injuries, 1992–2013



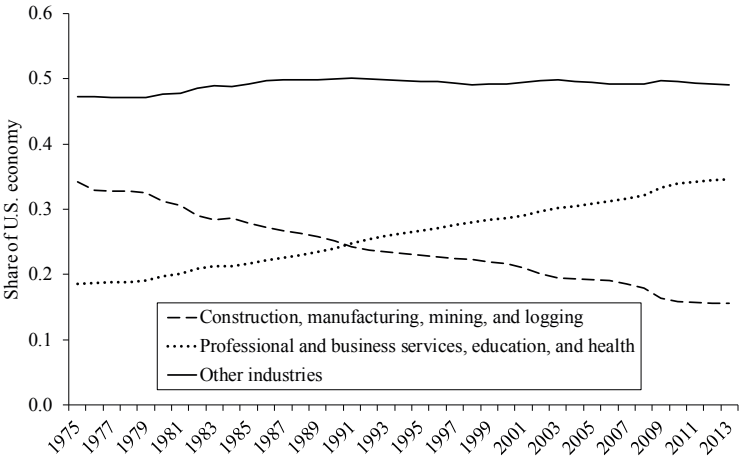
SOURCE: BLS Census of Fatal Occupational Injuries. Data from 2001 exclude occupational deaths from the September 11 terrorist attacks.

warehousing (14.0 deaths per 100,000 FTE workers), mining (12.4 deaths per 100,000 FTE workers), and construction (9.7 deaths per 100,000 FTE workers).

No consensus has been reached about why injury rates and deaths have fallen so dramatically. Some have speculated that the decline in injuries comes from shifts in what types of industry are most prevalent. Indeed, the injury rate varies a lot by industry, and the industrial mix of the United States has changed over the past few decades. Figure 4.3 illustrates the U.S. economy's transition to being more service oriented. In 1975, there were approximately 85 percent more workers in construction, manufacturing, mining, and logging than there were in professional services, education, and health. By 2013, the share of workers in professional services, education, and health was more than double the share in construction, manufacturing, mining, and logging.

Although these patterns are consistent with shifts in industry driving the lower injury rates, the significant decline in injury rates

Figure 4.3 Private Industry Shares, 1975–2013



SOURCE: BLS Current Employment Statistics.

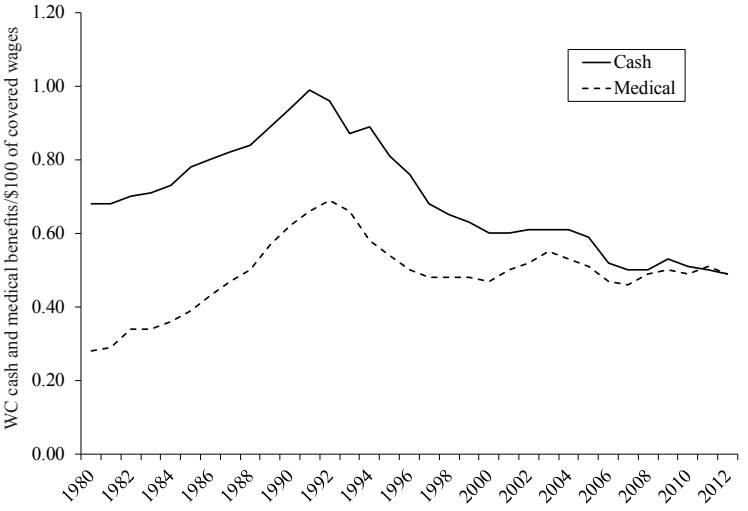
has also occurred *within* industries, which suggests that changes in the industrial composition have not, by themselves, driven the fall in injury rates. For instance, manufacturing was one of the more dangerous industries in 1994, with 12.2 injuries per 100 workers. By 2013, the injury rate had fallen to 4.0 injuries per 100 workers in manufacturing. Furthermore, it is not clear that the industries that dominate the U.S. workforce now are safer than the industrial composition of past decades. While the professional and business services sector had an injury rate of less than 2.0 injuries per 100 workers in 2013, the health care sector had an injury rate of 4.7 injuries per 100 workers, which is the highest of any of the BLS's broad injury categories.

Researchers have offered multiple alternative explanations for declining injury rates and occupational deaths. Boden and Ruser (2003) argue that workers' compensation reforms that made filing for workers' compensation more difficult suppressed the reporting of injuries, while Barkume and Ruser (2001) contend that deregulation of workers' compensation increased safety. Conway and Svenson

(1998) argue that workers' compensation reforms decreased injury rates and that unions, employers, and workers' compensation insurers have developed a better understanding of workplace hazards. Ussif (2004) claims that the gradual improvement over time of technology, information, and safety initiatives is what has been responsible for the decline in injury rates.

Regardless of the reason for the decline, the fall in the number of reported injuries and illnesses has translated into workers' compensation insurers paying less in benefits. Figure 4.4 shows cash and medical payments from 1980 to 2012. From the early 1990s, when benefits reached a maximum, until 2012, workers' compensation cash benefits per $100 of covered wages fell by 48 percent, which mirrors the trend in lost workday injuries. Workers' compensation medical benefits per $100 of covered wages fell only by 21 percent during this

Figure 4.4 Workers' Compensation Medical and Cash Benefits per $100 of Covered Wages, 1980 to 2012



SOURCE: Estimates from the National Academy of Social Insurance.

time period, likely because the price of medical care rose dramatically over the period.

THE THEORETICAL EFFECT OF WORKERS' COMPENSATION BENEFITS AND EXPERIENCE RATING ON SAFETY

The benefits paid from workers' compensation programs have the potential to influence safety incentives, since they change the cost of injuries for workers and for firms. Higher medical or wage-loss benefits make injuries less costly for workers, which gives them incentives to take more risks and to pay less attention to safety. Therefore, higher benefits have the potential to lead to lower safety efforts by workers and higher injury rates from these lower efforts.

The incentive effects of workers' compensation benefits for firms come from the fact that many firms are experience rated, meaning their premiums are based on their previous claims experience. The premium of an experience-rated firm is a weighted average of the premium based on the risk of the occupations of workers at a firm and the firm's actual loss experience, where the weight placed on actual loss experience grows with firm size. Firms that self-insure bear all of the costs of workers' compensation benefits directly, which is essentially full-experience rating.[6] For experience-rated firms, anything that raises the amount paid out to workers through workers' compensation will lead to higher workers' compensation premiums, which gives firms an incentive to increase safety efforts.

These countervailing influences of benefits on workers and firms mean the net effect of higher workers' compensation benefits on safety is theoretically ambiguous; therefore, determining the net effect requires empirical tests. However, research that studies how features of workers' compensation affect safety runs into a major empirical challenge, in that any factor that makes receiving workers'

compensation more attractive to workers or that increases the cost of workers' compensation claims for firms may have reporting effects in addition to safety effects. Workers have greater incentives to file for workers' compensation when benefits increase, because filing is now more valuable for them. Similarly, benefit increases provide experience-rated firms with incentives to discourage workers from filing and to increase claims management practices, which are strategies to reduce workers' compensation costs without increasing safety. Beneficial claims-management practices include taking proper care to make sure workers fully recover from injuries and accommodating workers as they return to work. Perverse claims-management practices include pressing workers to return to work before they have fully healed and contesting workers' valid injury claims.

These reporting incentives mean that studies that examine how injury rates change after workers' compensation benefits change are estimating the net effect of benefits on firms' and workers' safety and reporting actions. Estimating the effect of benefits on claiming rates is the goal for many studies because they are interested in understanding the financial impact of benefit changes on workers' compensation claims and costs, but these empirical challenges complicate studies examining the effects of workers' compensation benefits on safety.

THE EFFECT OF WORKERS' COMPENSATION BENEFITS ON SAFETY

The Effect on Nonfatal Injury Rates

A large empirical literature has examined the effect of workers' compensation benefit increases on injury rates and claiming behavior. Chelius (1982) and Ruser (1985) both use BLS data aggregated by industry classification to study how differences in workers' compensation benefits are correlated with injury rates. Chelius finds that an

industry having 10 percent higher workers' compensation benefits is associated with a 1.2 percent higher rate of lost workday cases. Ruser finds that having 10 percent higher benefits is associated with 1.2 to 3.1 percent more lost workday cases. Both studies find suggestive evidence that there is a smaller positive correlation between benefits and rates of injuries without missed days of work.

Butler and Worrall (1983) estimate the effect of benefits on workers' compensation claims in 35 states by using workers' compensation data from NCCI, aggregated at the state and year level. They find that 10 percent higher benefits are associated with a 4.1 percent increase in claims. They also find that the length of the waiting period before workers can receive cash benefits lowers the frequency of temporary total and minor permanent partial disabilities but not major permanent partial disabilities. These early studies all imply that workers' claiming or safety decisions are influenced by benefit levels.

The conclusions of these first studies are based on differences in benefit rates across states and industries and do not control for unobserved differences across states that may lead to high workers' compensation benefits and high injury rates. An issue with these methods is that high-risk industries or states may offer more generous benefits as a way of enticing workers into risky jobs, which would lead to a positive correlation between benefits and injuries even if benefit rates had no independent influence on injury rates.

Later research examines injury rates after states change their benefits, so the results are robust to unobserved differences across states. Krueger (1990) uses data from the March CPS matched with workers' compensation benefits in the mid-1980s and estimates that a 10 percent increase in workers' compensation benefits increases workers' compensation receipt by about 7 percent. Thus, even after accounting for unobserved differences, early studies found that workers' compensation benefits have a larger impact on workers' actions than on firms' actions, since claims and benefit payments increased in response to a rise in the schedule of benefits. If firms' actions had dominated, there would have been a decrease.

Despite the results of early work, more recent research that studies longer periods of data and also uses state benefit changes in workers' compensation benefits does not find large impacts of benefit increases on injury rates or workers' compensation claims. Guo and Burton (2010) study BLS injury data from the 1980s and 1990s and find that a 10 percent increase in benefits has little or no impact on injury rates. Bronchetti and McInerney (2012) use 25 years of March CPS data and find that a 10 percent increase in workers' compensation benefits increases workers' compensation receipt by less than 1 percent. Bronchetti and McInerney attribute their smaller estimates of the effect of benefits on workers' compensation receipt to more flexibly controlling for a person's past wages, but they also find that workers have been less responsive to benefit changes since 1990.

These more recent results suggest no significant effect of benefit rates on workers' safety choices. One possible reason that workers may not respond to benefit changes by altering their safety effort is that the changes to workers' compensation benefits, while large in some ways, are small compared to the effects on workers' health. For instance, a 10 percent increase in the maximum weekly benefit could have a major impact on workers' compensation costs for firms but would be less than $100 per week for workers in most states, which may not be enough to affect safety decisions when considering the long-term impact of an injury or disease on the worker's health.

Studying benefit changes is a common and generally accepted research method in economics. Given that there are vast unobserved differences across states and industries, research that can compare a treatment group to a control group is a major step forward over early research. However, studies using these methods make the critical assumption that no other unobserved changes are correlated with workers' compensation benefit increases. Benefit increases that accompany other policy changes would muddy the estimates of the effect of benefit increases. For instance, if states increase benefits while also passing other workers' compensation policies to increase nonmonetary benefits for workers, the effect of benefits on workers'

compensation claims or injuries would be overestimated. But if states increase benefits and cut costs in other ways to keep employer costs down, the effect of benefits on workers' compensation claims or injuries would be underestimated.

Heterogeneous Effects for Experience-Rated Firms

Regressing injury rates or workers' compensation claims on benefit levels reveals the net effect of workers' compensation benefits on reported injuries resulting from both firms' and workers' responses to benefit increases. To study the effects on firms and workers separately, researchers test for different effects for experience-rated firms. Experience-rated firms have an incentive to improve safety and decrease injury reports after benefit increases, while only workers have safety and reporting incentives from benefit changes at non-experience-rated firms.[7] In studying experience rating, researchers run into another data limitation in that data sources do not typically contain information on which firms are experience rated. This limitation results in researchers having to infer whether firms are experience rated, typically by using firm size. Even though firm size is likely a good proxy, data still do not include information about the degree of experience rating, leading to measurement error.

In their studies, Chelius and Smith (1993) and Ruser (1985) both use the average number of employees at firms within industries as a proxy for firm size and assume that industries with higher average workers per firm are subject to a greater degree of experience rating. Chelius and Smith do not find that industries with large firms have different responses to benefits in terms of their injury rates, compared to industries with smaller firms. Ruser, however, uses a finer industry classification and finds that the effect of the interaction between firm size and benefits on injury rates is negative. This means that higher benefits have less of an effect on the frequency of injuries in industries with firms that are more likely to be experience rated.

In another study, Ruser (1991) constructs a panel data set by matching the BLS's injury data to the BLS Current Employment Survey for manufacturers, which allows him to estimate panel models because he can examine how injury rates change within firms after benefits change. He finds that a 10 percent increase in benefits increases injury rates by 3.8–7.7 percent in establishments with fewer than 100 employees, but only by 1.8 percent in establishments with more than 500 workers. The large positive effect of benefit increases on injury rates suggests that benefit increases do cause workers to report more injuries. The smaller interaction of benefits and firm size indicates that firms that are likely experience rated take actions to reduce reported injuries, either by improving safety or by discouraging reporting.

Effects on Occupational Deaths and on Different Types of Injuries

While studies focusing on heterogeneity between small and large firms allow for testing whether experience-rated firms take actions to lower reported injuries, these studies still cannot determine whether the observed changes result from firms improving safety or from firms discouraging workers from reporting injuries. To separate safety effects from reporting effects, studies examine different types and severities of injuries. Presumably, misreporting would be more difficult for workers with severe injuries or injuries that are easily verifiable.

One set of studies focuses on death rates. With deaths, workers make no reporting decisions, so benefit increases do not result in workers being more likely to report injuries or firms being more likely to discourage reporting. Moore and Viscusi (1989) study the effect of benefit rates on death rates using NIOSH's National Traumatic Occupational Fatality data on workplace fatalities, while Ruser (1993) studies the effect of benefits on death rates from the BLS injury data matched to firms.

Both Moore and Viscusi (1989) and Ruser (1993) find that death rates decline with benefits and interpret their results as evidence that increasing benefits increases safety. This in turn reinforces the conclusion that the increase in occupational injuries accompanying higher benefits may be from reporting effects on workers.

Another set of studies argues that if workers' compensation claims increase only because of reporting, then harder-to-diagnose injuries would respond to benefit increases, while easier-to-diagnose injuries would not. Ruser (1998) uses BLS data and finds that higher benefits increase the number of hard-to-verify injuries relative to easy-to-verify injuries. Using panel data on the Quebec construction industry, Bolduc et al. (2002) also find that workers' compensation benefits increase the reporting of difficult-to-diagnose injuries but not easy-to-diagnose injuries. These results indicate either that workers have more control in avoiding easy-to-verify injuries like strains and sprains or that reporting incentives dominate safety incentives for workers.[8]

THE EFFECT OF EXPERIENCE RATING

A variety of papers focus on the direct effects of experience rating rather than on the heterogeneous effects of benefit increases on experience-rated firms. Most of these studies cover Canadian workers' compensation, likely because several recent Canadian reforms have shifted experience-rating arrangements and provide natural experiments.

Bruce and Atkins (1993) examine the impact of the introduction of experience rating in Ontario's construction and forestry industries on fatality rates. They find that experience rating is associated with declines in fatality rates, which suggests that experience rating improves safety. Campolieti, Hyatt, and Thomason (2006) examine the impact of the introduction of experience rating on workers' compensation claims in British Columbia. After British Columbia

introduced experience rating, lost-time claims, medical claims, and short-term disability claims all fell, while long-term disability claims increased. Campolieti, Hyatt, and Thomason argue that the increase in long-term claims might arise because most of the benefits for these claims are not paid until after the experience-rating window has closed, which suggests firms might save money by shifting workers with more severe injuries to long-term claims so that their experience-rating factor is not affected.

Tompa et al. (2013) study the effect of a 2004 Ontario policy change that increased the degree of experience rating. They find that experience rating decreases the number of reported injuries, especially for injuries that are easy to dispute. Tompa et al. interpret this result as evidence that firms rely on perverse claims management practices to lower costs rather than on safety improvements.

Other research surveys firms directly. Although surveying employers has a disadvantage in that firms may not be forthcoming in their responses, it has the advantage of providing information on actual safety efforts rather than on proxies for safety. Kralj (1994) surveyed Ontario employers with experience rating and finds that these firms report expanding both safety efforts and claims management efforts because of experience rating. Thomason and Pozzebon (2002) surveyed Quebec manufacturers to explore the relationships among experience rating, investment in occupational safety and health, and claims management practices. They find that experience-rated firms appear to devote more resources to safety practices, such as having injury prevention staff and incentivizing safety for their workers. But they also find that firms increase claims management by challenging more claims and encouraging workers to return to work sooner after injuries.

In addition to providing firms with incentives to discourage the reporting of work-related injuries, another shortcoming of experience rating is that it may not provide proper incentives for firms to focus on preventing occupational diseases that may take several years to develop.

Firms would underinvest in preventing slow-to-develop diseases if they expected workers to retire or change employers before the occupational disease manifests or if it would not surface until after the experience-rating period ended. For these reasons, even a perfectly experience-rated firm may have more workers with occupational diseases than would be optimal. For similar reasons, firms may not have proper incentives to make sure workers recover fully from their injuries.

EFFECTS OF OTHER ASPECTS OF WORKERS' COMPENSATION ON SAFETY

In addition to the level of workers' compensation benefits and the impact of experience rating, any aspect of workers' compensation that makes obtaining workers' compensation benefits easier or improves workers' experience with workers' compensation has the potential to affect safety incentives. In response to the National Commission report, mentioned on pages 65–66, which found that workers' compensation benefits were inadequate, many states increased workers' compensation benefits in the 1980s. As a result, the benefits paid from workers' compensation rose dramatically in the 1980s, which can be seen in Figure 4.4 on page 78. These increases in the amount of benefits paid resulted in large increases in workers' compensation premiums for employers. In response to these rising premiums, many states introduced workers' compensation reforms in the 1990s to lower workers' compensation costs. These reforms included the following six:

1) Requiring workers to demonstrate disability with objective medical evidence
2) Restricting or eliminating workers' choice of physician
3) Capping legal fees or shifting the payment of attorneys' fees from insurers to injured workers

4) Eliminating compensation for the aggravation of a preexisting condition or for a condition related to the aging process
5) Increasing fraud detection by raising the penalties for fraudulent claims or by establishing fraud investigation units
6) Requiring that work be a major or predominant cause of the injury

Ruser, Pergamit, and Krishnamurty (2004) study the effects of restricting physician choice, increasing fraud detection, and restricting the types of injuries eligible for workers' compensation. Since these changes make filing for workers' compensation more difficult and lower the probability of receiving workers' compensation benefits, these laws increase workers' safety incentives while reducing firms' safety incentives. Despite the theoretical basis for safety changes, Ruser, Pergamit, and Krishnamurty find no change in the likelihood that individuals in the 1979 National Longitudinal Survey of Youth were injured or filed for workers' compensation benefits, suggesting either that the reforms had no safety effects or that the counteracting effects offset each other. The 1979 National Longitudinal Survey of Youth has the appealing advantage of following individuals over time, meaning compositional changes to the labor force cannot drive the effects.

Boden and Ruser (2003) study those states that restricted provider choice as well as states that began requiring objective evidence for workers' compensation claims using BLS establishment-level data. They compare how injury rates changed over time in states that modified their laws compared to how injury rates changed over time in states that did not modify their laws. They find that provider choice has no appreciable effect on injury rates, while more stringent evidence requirements significantly decrease reported injury rates and can account for between 7.0 and 9.4 percent of the decline in reported injuries from 1991 to 1997.

Workers' compensation insurance has traditionally been subject to a variety of price regulations, but, beginning in the 1970s, some

states began to relax these regulations. Barkume and Ruser (2001) assess the effects in states that no longer require preapproval of insurance prices and the effects in states that no longer have rating bureaus that determine all workers' compensation insurance prices. They find that in addition to lowering workers' compensation premiums, states no longer requiring preapproval also led to reductions in BLS injury rates.

Barkume and Ruser (2001) interpret these results to mean that allowing insurers to charge rates that more closely reflect firms' risk of losses encourages firms to improve safety. These results provide more evidence that having firms pay premiums that reflect their own risk factors encourages firms to improve safety.

However, as discussed throughout this chapter, having premiums that more closely match expected losses also encourages firms to increase claims management practices. Thomason, Schmidle, and Burton (2001) consider how competition influences safety by comparing BLS injury rates in states with three different insurance systems: 1) states with exclusive-fund workers' compensation insurance, 2) states that permit only private insurers to issue policies, and 3) states with competitive state funds. They find that states with exclusive-fund workers' compensation insurance have the highest injury rates, followed by states with only private insurers and then by states with competitive state funds. These results provide more evidence that competition in the insurance market can lower reported injury rates. The likely mechanism is through improving risk-based rating and more accurate insurance pricing, but we still cannot determine whether the lower injury rates are from safety effects or reporting effects.

Another study examines the safety effects of firms having large deductibles for their workers' compensation policies, which a majority of states permit. With large deductibles, even smaller firms are essentially self-insured until they reach the deductible, which gives them an incentive to improve safety levels. Although large deductibles may still carry too much risk for small firms, medium-size

firms can realize lower premiums from investing in safety but still be covered in the case of a catastrophic event. Shields, Lu, and Oswalt (1999) use Texas workers' compensation claims data and find that firms that adopt high-deductible policies experience immediate declines in large indemnity claims and delayed effects on reducing other workers' compensation claims. They interpret these results to suggest that improving safety takes time but that firms can increase claims management practices quickly. At any event, the evidence is very strong that more direct employer incentives lead to lower workers' compensation claims incidence, whether from improved safety or from more aggressive claims management.

DIRECT WORKERS' COMPENSATION SAFETY INTERVENTIONS

Many states take a more direct approach to promoting safety by encouraging or requiring firms to develop their own safety and prevention programs. In several states, incentives provided through workers' compensation are instrumental in encouraging these programs. Examples of workers' compensation programs encouraging or requiring safety programs include the following:

- In Massachusetts, assigned risk firms receive a workers' compensation premium credit for enrolling in a loss management program.
- North Dakota offers a 5 percent annual discount on workers' compensation premiums for firms that enroll in a risk management program.
- Pennsylvania workers' compensation offers a 5 percent discount on workers' compensation insurance premiums for firms with a certified joint labor management safety committee.
- From 1991 to 2005, Texas workers' compensation had a program that mandated that the most hazardous workplaces im-

plement illness and injury prevention programs. This program was dropped when Texas made its law nonmandatory.

Although state workers' compensation programs generally report that these programs reduce injuries, very few of these programs have been studied by independent researchers. An exception is the Pennsylvania program, which Liu et al. (2010) study by examining factors that affect program participation and by estimating the impact of safety programs on injury rates. To do this, they combine Pennsylvania workers' compensation data with unemployment insurance data and use propensity score matching to create a control group. They find that large firms, firms with higher injury rates, firms in high-risk industries, and firms without labor unions were more likely to join the safety committee program and less likely to drop out. Although their results show that firms that complied with the requirement to train their safety committee members experienced reductions in injuries, noncompliance with this requirement was too high for them to be able to detect an overall effect.

CONCLUSION

This chapter has discussed the role of workers' compensation programs in preventing occupational injuries and illnesses. As we explained, factors that make workers' compensation better or easier for workers have the potential to decrease workers' safety incentives. Factors that increase the cost of workers' compensation increase experience-rated firms' safety incentives.

Experience rating, as well as any other strategy to make workers' compensation premiums reflect employers' past claims histories, also has the potential to improve safety and bring it closer to optimal levels. In addition to creating safety incentives, worker-friendly workers' compensation policies and benefits also have reporting incentives. This complicates empirical research on the role of workers' compensation in encouraging injury prevention.

Although much of the research is conflicting in its findings or cannot adequately deal with all of the empirical challenges, we consider the following conclusions to be warranted. First, having firms' workers' compensation premiums reflect previous claiming history appears to improve safety. Having workers' compensation premiums reflect prior losses can be achieved through experience rating or through encouraging price competition in the workers' compensation insurance market, both of which align premiums with claims experience. Also, high-deductible workers' compensation policies can give even smaller employers the same incentives for prevention as experience rating.

While making premiums more closely match claims history increases firms' attention to safety, it also increases firms' incentives to discourage workers from claiming workers' compensation benefits and to encourage workers to return to work before they are ready. As workers likely already underreport work-related injuries, workers' compensation programs must make sure that incentives to improve firm safety do not result in workers being left out of the workers' compensation safety net.

Another shortcoming of experience rating is that it does little to prevent occupational disease injuries, which develop over long periods of time. As workers have shorter tenures with firms now than they had in the past, firms can expect that other firms will have to deal with the increased workers' compensation costs from such occupational injuries, which reduces their incentives for prevention.

Although much evidence documents a positive relationship between injuries and workers' compensation benefits, we think the evidence is inconclusive that workers' compensation benefits encourage workers to act more recklessly, despite the theoretical basis.

Even given the vast improvements in the empirical sophistication of research methods and in precautions taken for workers over the years, separating out the reporting effects and safety effects for workers and firms remains a major challenge. Similarly, better data

on injuries is vital in determining whether workplace safety is driving down injuries or whether workers are just reporting fewer injuries.

Finally, we conclude that more direct and innovative research is needed on the impact of safety programs and on workers' compensation incentives to encourage firms to implement them. However, it is clear that even the best-designed safety programs will require compliance for them to succeed.

Notes

1. For ease of exposition, we use the term *injuries* throughout the chapter to refer to any compensable claim, including occupational diseases.
2. Broad empirical support is found in economic research that shows workers are paid a wage premium for working in riskier jobs. Refer to Viscusi and Aldy (2003) for a thorough review of this literature.
3. While McInerney and Simon (2012) find no evidence that making workers' compensation more difficult to obtain increases take-up of federal disability insurance, Dillender (2015) and Heaton (2012) both find evidence that workers' having health insurance results in less medical care being paid for by workers' compensation. Dillender (2016) discusses the potential influence of the Affordable Care Act's expansion of health insurance on workers' compensation insurance.
4. See Reville, Bhattacharya, and Weinstein (2001) for a review of possible sources.
5. It should also be noted that occupational deaths and diseases have benefit-adequacy concerns, as many surviving spouses entitled to benefits do not receive the benefits due them.
6. Retrospective rating is another type of insurance policy that has incentives similar to experience rating. With retrospective rating, firms' premiums depend on their claims during the policy period. Retrospective-rated firms pay their premiums at the start of the policy period. Firms with high losses will have to pay additional premiums, while firms with low losses will receive refunds on their premiums. Retrospective rating is less common than experience rating, and we are unaware of research into the safety effects of retrospective rating.
7. If all small firms improved safety, WC claims and costs would fall, since premiums for small firms are based on all similar firms' previous claims experience. In the absence of experience rating, however, one firm's actions cannot have a noticeable effect on its own premiums.

8. Comparisons of hard-to-diagnose injuries and easy-to-diagnose injuries originate from a set of papers that study increased claiming on Mondays as a way to test whether workers' compensation benefits induce people to claim that non-work-related injuries are work related. Smith (1990) pioneered this research by showing in workers' compensation claims data that harder-to-diagnose injuries such as strains and sprains are more likely to be reported on Mondays than easier-to-diagnose injuries like cuts and fractures. Smith interprets his findings as evidence that workers purposefully misreport some non-work-related injuries from the weekend as being work related. However, in their studies of the Monday effect, Campolieti and Hyatt (2006) and Card and McCall (1996) find evidence that is inconsistent with Smith's interpretation.