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DISCUSSION PAPER SERIES

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ABSTRACT

Opting out of Workers' Compensation: Non-Subscription in Texas and Its Effects*

Texas is the only state that does not mandate that employers carry workers' compensation insurance (WC) coverage. We employ a quasi-experimental design paired with a novel machine learning approach to examine the effects of switching from traditional workers' compensation to a so-called non-subscription program in Texas. Specifically, we compare before and after effects of switching to non-subscription for employees in Texas to contemporaneously measured before and after differences for non-Texas-based employees. Importantly, we study large self-insured companies operating the same business in multiple states in the US; hence the non-Texas operations represent the control sites for the Texas treatment sites. The resulting difference-in-differences estimation technique allows us to control for any companywide factors that might be confounded with switching to non-subscription. Our empirical approach also controls for injury characteristics, employment characteristics, industry, and individual characteristics such as gender, age, number of dependents, and marital status. Outcomes include number of claims reported, medical expenditures, indemnity payments, time to return to work, likelihood of having permanent disability, likelihood of claim denial, and likelihood of litigation. The data include 25 switcher companies between the years 2004 and 2016, yielding 846,376 injury incidents. Regression findings suggest that indemnity, medical payments, and work-loss fall substantially. Claim denials increase and litigation falls.

JEL Classification: C54, C55, I13, J32, J38

Keywords: workers' compensation insurance, non-subscription, difference-in-differences, triple differences, machine learning, PDS-LASSO

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I. Introduction

Our research seeks to learn about the effects of switching from a traditionally organized workers' compensation (WC) program to a non-subscription program in the state of Texas. Texas is the only state that allows almost all private sector employers to forego WC insurance coverage for their workers.[1] Other states, including Oklahoma, South Carolina, and Tennessee have considered allowing opt-out. Oklahoma passed a law in 2013 that allowed firms to opt-out of workers' compensation, but it was ruled unconstitutional by the state Supreme Court in 2016. In recent years more employers, particularly large self-insured employers, are switching to a non-subscription model for their Texas-based operations. We employ a quasi-experimental design to examine the effects of switching from traditional WC to a non-subscription program in Texas.

In particular, we compare before and after effects of switching to non-subscription for employees in Texas to contemporaneously measured before and after differences for non-Texas-based employees of the same companies. We study large self-insured companies operating the same business in multiple states in the US; hence the non-Texas operations represent the control sites for the Texas treatment sites. The resulting difference-in-differences estimation technique allows us to control for any companywide factors that might be confounded with switching to non-subscription in Texas. The analysis also controls for a variety of other factors including injury characteristics, employment characteristics, industry, and individual characteristics such as gender, age, number of dependents, and marital status. Outcomes include number of claims reported, medical expenditures, indemnity payments, days out of work, likelihood of having permanent disability, likelihood of claim denial, and likelihood of litigation.

[1] The lone exception is for private employers engaged in public sector construction projects who must provide WC insurance coverage for all employed workers. (Texas Labor Code § 406.096). The state does not permit public sector employers from opting out of the WC program (Texas Labor Code §406.002).

Our data include 25 companies switching to non-subscribers (hereafter, switchers) between the years 2004 and 2016, yielding 846,376 injury incidents. Because switching to non-subscription program may systematically change the composition of injuries reported, the claim-level estimates conditional on the injuries reported are likely to be biased. To overcome the sample selection problem, we aggregate the data to company-state-year level. Regression findings suggest that switching to the non-subscription plan make medical and indemnity payments fall substantially while return to work increases. Claim denial rates increase, but litigation rates are unchanged.

II. Background

WC insurance is a state system of disability payments for workers injured on the job. Although the details of the programs differ across the 50 states, the District of Columbia, and the various U.S. territories, the general crux of each program is the same. Regardless of fault, an employer must pay an injured worker's medical bills and a portion of his or her lost labor income. In return for the no-fault coverage, workers give up their right to sue their employer to recover all of their lost income and any compensation for pain and suffering. As the exclusive remedy, WC shields employers from potentially expensive damage awards for negligence.

State WC laws generally dictate that all employers must provide insurance coverage to their workers by either contracting with a private insurance company or a state agency or through self-insurance. Texas is the only state that allows almost all private-sector employers to opt out of the WC program (Texas Department of Insurance: Division of Workers' Compensation 2016). By opting out of the system, employers need not pay an injured worker's medical expenses or any indemnity payments for lost income unless the worker can prove in court that the employer

was at fault. Workers can prevail if they can demonstrate that their injury was the result of their employer's failure to use ordinary care in providing a safe workplace. A worker can show that the workplace was unsafe by providing evidence that the employer failed to hire enough workers to complete the project safely, train or supervise workers adequately, warn workers of hazards, provide safe or suitable tools, inspect equipment for defects, or provide proper and complete safety training (Taylor 2015). The Texas WC Act prevents employers from raising the three common law defenses of contributory negligence, assumption of risk, and negligence by a fellow servant increasing the likelihood that a worker can demonstrate employer liability (Texas Labor Code §406.033). In 2016, 20 percent of surveyed employers in Texas purchasing WC insurance gave as their primary reason for staying in the system concern over lawsuits (Texas Department of Insurance: Workers' Compensation Research and Evaluation Group 2016).

WC insurance in Texas fully pays medical expenses resulting from a workplace injury and illness and replaces 70 percent of an injured worker's lost weekly wage for up to 104 weeks, subject to a cap of $913 (the state's average weekly wage). To receive income benefits the injury must prevent the worker from returning to work for at least eight days. No income benefit is received for the first week of lost work unless the worker is out of work for more than 14 days. If not fully recovered in the 104-week period, injured workers may apply for impairment income benefits, supplemental income benefits, or, for extremely serious injuries lifetime income benefits. WC insurance also provides income support for the families of fatally injured workers. (Texas Department of Insurance 2018).

Non-subscribing employers in Texas can, if they choose, offer injured workers disability benefits in a manner similar to those offered through the WC program. Many employers, particularly larger employers, choose to establish a private, no-fault disability program that pays

injured workers medical expenses and at least a portion of lost wages. In 2016, 65 percent of non-subscribing firms with 100 or more employees offered their workers occupational disability benefits resulting in 87 percent of employees in large non-subscribing firms being covered by such plans (Texas Department of Insurance: Workers' Compensation Research and Evaluation Group 2016). Private plans can be more generous than WC insurance, at least initially, but most private plans limit the duration of payments for medical expenses and lost income potentially making them less generous for workers with permanent partial or permanent total disabilities (Morantz 2010). On the other hand, the ability to recover full damages through a negligence lawsuit and employer payments falling outside of the formal disability plan to avoid such lawsuits, may make a worker's monetary recovery greater through non-subscription.

Subject to the Employee Retirement Income Security Act (ERISA) requirements regarding the administration of claims, non-subscribing employers have complete discretion in the design of a private disability plan, including directing where a worker can receive medical treatment.[2] The two primary reasons given by large non-subscribing employers for opting out of the WC system is the belief that they can do a better job at providing appropriate medical and wage loss benefits to injured workers and at controlling medical costs (Texas Department of Insurance: Workers' Compensation Research and Evaluation Group 2016). Still, the flexibility of a private plan allows employers to deny coverage for injuries that would be covered with WC insurance, thereby lowering disability expenses. With limited exceptions, workers whose injuries

[2] ERISA applies to all employee welfare benefit plans, including private disability plans established by firms opting out of the WC system. To satisfy ERISA requirements companies with private plans must generate a document detailing the operation and the administration of the plan and then provide each covered employee with a summary of the plan description, updates on material modifications of the plan, and any plan documents upon request. The plan administrator and other plan fiduciaries must act in the best interest of covered employees and beneficiaries. Every benefit plan must establish a reasonable set of procedures for administrating the plan. These procedures must result in workers receiving a full and fair review of their claims and benefit awards consistent with the plan document and with similarly situated claimants. Workers denied benefits have the right to an internal appeal and if not resolved, an external appeal via state or federal court. It should be noted that ERISA explicitly excludes all benefit plans established to comply solely with applicable state WC laws (Minick 2015).

or illnesses arose "out of and in the course and scope of employment" are entitled to WC medical and indemnity benefits regardless of fault (Texas Labor Code §406.031).[3] Private plans can be far more restrictive. Employers can limit coverage to injuries whose "major producing cause" is the workplace or injuries resulting "directly and solely" from an accident (Robinson 2016). Many private plans exclude diseases from airborne contaminants not commonly found in the workplace, harms caused by asbestos, degeneration (such as carpel tunnel syndrome) caused by poor posture or long-term use of a device, generalized musculoskeletal aches and pains, injuries caused by an accident that did not occur by chance or from an unknown cause, or injuries resulting from a failure to comply with safety policies or from a failure to request assistance (Morantz 2016). Additionally, coverage can be terminated for a variety of causes including the failure of the worker to submit to required medical tests, receive necessary pre-approvals for medical procedures, and follow recommended medical treatments (Morantz 2016).

The creation of a private disability plan does not shield an employer from possible liability suits for negligence. Many large non-subscribing employers attempt to reduce litigation risk by having an injury benefit plan and containing litigation expenses by requiring mandatory arbitration of negligence liability claims to resolve disputes over coverage (Morantz 2010).

In 2004, 38 percent of the employers in Texas opted out of the WC system and 23 percent of Texas workers were employed by these firms. In 2016, the fraction of non-subscribing employers had dropped to 22 percent and the fraction of workers to 18 percent. Texas reformed its WC program in 2005. The reforms allowed employers to direct injured workers to a certified WC health care network or if unavailable or impractical to contract directly with health care

[3] Non-covered injuries include injuries occurring while a worker is intoxicated, injuries resulting from a worker's own actions to injure him or herself or unlawfully injure someone else, injuries arising from the actions of someone else who intended to harm the worker for personal reasons, injuries arising from an act of God, and injuries resulting from the worker's horseplay (Texas Labor Code §406.03).

providers to treat injured workers. The reforms also established evidence-based treatment guidelines for medical care, limits on acceptable medications, and new administrative procedures for resolving disputes. The reduction in the cost of claims lowered WC insurance premiums by about 56 percent since 2003. The price reduction enticed many more small employers to purchase WC insurance resulting in the large decline in the fraction of non-subscribing employers and modest reduction in the fraction of employees working in these establishments. The fraction of large companies (500 or more employees) electing to opt out of WC system has barely budged, falling from 20 percent in 2004 to 19 percent in 2016 (Texas Department of Insurance: Division of Workers' Compensation 2016).

There is little research studying the non-subscription phenomenon in Texas. Morantz (2010) provides vital qualitative information based on a telephone survey of non-subscriber firms in Texas. Importantly, she focuses on the motivation for large, national firms. She finds that the primary motivation for opting out of WC was to achieve cost savings, control medical providers, and control program benefits. Virtually all firms in the survey reported cost savings, greater control over medical providers, greater control over program benefits, improved quality of medical care, faster return to work, and access to better doctors. Some respondents reported litigation trouble in the wake of opting out.

An earlier study by Butler (1996) used aggregate company-level data on fatality rates, nonfatal claims rates, injury durations, and rates of chronic injuries between traditional WC firms and non-subscriber firms. Butler found that fatal injury rates did not differ between non-subscribers and other firms, suggesting that the safety environments between companies were similar. He did find higher levels of non-fatal injury rates in non-subscriber firms, which he attributed to moral hazard on the part of workers given the first-day wage replacement benefit

common in non-subscription plans (versus the common seven-day waiting period in the traditional WC system).

A more recent study by Morantz (2016) found disability costs per worker hour to be 44 percent lower in Texas for 15 large multi-state employers who replaced WC coverage with a private disability plan. Costs per worker hour dropped for the employers in Texas because they had fewer more serious claims for lost wages and the cost per claim was lower, both for medical and wage-replacement expenses. All types of injuries fell for Texas non-subscribers and, not surprisingly, non-traumatic injuries dropped more dramatically than traumatic injuries. Private plans exclude many types of non-traumatic injuries, so the large drop in claims for such injuries is to be expected. But even restricting the claims data to non-traumatic injuries covered by all of the 15 private plans and WC insurance, non-traumatic injuries fell more than traumatic injuries. Texas non-subscribers also experienced a large drop in severe, traumatic injuries. As the injuries are unlikely to be subject to a reporting bias, the decrease is consistent with a real improvement in safety. Unfortunately, the data are not rich enough to exclude the possibility that the reduction even in severe, traumatic injuries is driven by non-subscribing firms more aggressively screening and denying claims.

In the final study we mention, Cabral et al. (2018) estimated that a 10 percent increase in the premium results in a three percent decline in WC coverage in Texas using the variation in insurance premiums resulting from regulatory updates. However, the demand estimate shows that adverse selection among firms opting out of WC in Texas is not evident, suggesting that adverse selection is not the driver for mandatory coverage in the WC market.

III. Theoretical Model

Below we present a theoretical framework with which to evaluate non-subscription and its effects on both workers and firms. We first present the worker's perspective and then present the firm's perspective.

A. Worker's Perspective

Following the standard approach, we assume workers choose the level of consumption spending and workplace safety to maximize expected utility subject to an overall budget constraint (see for instance, Viscusi 1979, Moore and Viscusi 1990, and Kniesner and Leeth 2014). After substituting the budget constraint in for consumption goods, expected utility becomes

$$u = (1-\pi)U(W(\pi;b)+y) + \pi\widetilde{U}(b+y), \quad \textbf{(1)}$$

where u ≡ expected utility,

π ≡ the probability of a standard workplace injury,

$W(\pi;b)$ ≡ the market wage function, observable to workers and firms, with $\frac{\partial W}{\partial \pi} > 0$, $\frac{\partial W}{\partial b} < 0$ and $\frac{\partial^2 W}{\partial \pi \partial b} < 0$

$U(\cdot)$ ≡ the worker's utility function if uninjured, $U' > 0$ and $U'' < 0$,

$\widetilde{U}(\cdot)$ ≡ the worker's utility function if injured, $\widetilde{U}' > 0, \widetilde{U}'' < 0,\ U > \widetilde{U}$ and $U' > \widetilde{U}'$,

b ≡ expected disability benefit payments, which includes possible court awards for damages, and

y ≡ nonlabor income.

Expected utility is a weighted average of the utility if uninjured and the utility if injured with the weights equaling the probabilities of the two states. The formulation in equation (1)

explicitly considers both monetary and nonmonetary losses from workplace injuries. The difference between $U(\cdot)$ and $\widetilde{U}(\cdot)$, income held constant, represents the pain and suffering resulting from an injury or illness.

In the above framework, the non-subscription option is represented by differences in *b*, (expected disability benefit payments) between a company subscribing and not subscribing to the WC program. Additionally, the model explicitly considers the tradeoff between the reward for accepting risk ($\frac{\partial W}{\partial \pi}$) and the compensation for injury by assuming $\frac{\partial^2 W}{\partial \pi \partial b} < 0$ (Moore and Viscusi 1990).

By differentiating expected utility with respect to π, setting the result equal to 0, and then rearranging, a worker's optimal level of risk (safety) occurs when

$$(1-\pi)U'\frac{\partial W}{\partial \pi} = U(W(\pi;b)+y) - \widetilde{U}(b+y). \quad \textbf{(2)}$$

The expression in (2) implies that workers attempting to maximize their expected utility with respect to the level of risk weigh the marginal benefit of increased risk against the marginal cost. The left-hand side of equation (2) represents the marginal benefit, the expected added pay from a riskier job, while the right-hand side represents the marginal cost, the greater likelihood of an injury that lowers both income and the utility from income.

Increases in disability payments reduce a worker's expected loss from injury, all else equal, and encourages the worker to take greater risk. Butler and Worrall (1991) refer to such moral hazard as risk taking moral hazard (or ex ante moral hazard).[4] The impact of non-

[4] The impact of non-subscription on a worker's acceptance of risk can be found by totally differentiating equation (2) with respect to π and *b* and rearranging terms. Specifically,

$$\frac{d\pi}{db} = -\frac{(1-\pi)U''\frac{\partial W}{\partial b}\frac{\partial W}{\partial \pi} - U'\frac{\partial W}{\partial b} + (1-\pi)U'\frac{\partial^2 W}{\partial \pi \partial b} + \widetilde{U}'}{-U'\frac{\partial W}{\partial \pi} + (1-\pi)U''\left(\frac{\partial W}{\partial \pi}\right)^2 + (1-\pi)U'\frac{\partial^2 W}{\partial \pi^2} - U'\frac{\partial W}{\partial \pi}}.$$

To assure that equation (2) represents a maximum, the second order conditions, the denominator must be negative. The first three terms in the numerator represent the impact of higher disability benefits on wages if uninjured and the final term represents the impact of higher disability benefits on income if injured. Workers will accept greater risk to

subscription on risk taking moral hazard depends on if non-subscription raises or lowers workers' expected disability benefits if injured. As discussed previously, many non-subscribing companies replace WC benefits with disability plans of their own and, as in many cases, if the private plans are more generous, particularly for less serious injuries, than WC insurance. Even for more serious injuries, such as permanent partial or permanent total, which are not formally covered under a private plan, the ability of a worker to receive compensation outside of the plan via a negotiated or litigated settlement makes it uncertain if expected disability payments with non-subscription are higher or lower than with WC. Remember workers can recover full damages via liability negligence suits, but only receive medical benefits and a portion of lost wages with WC. Further confounding the theoretical impact of non-subscription on workplace injuries is the change in firm incentives to encourage greater workplace safety, an area we will discuss shortly.

Even if workers take greater care in non-subscribing firms the ultimate impact on the reporting of injuries and the application for disability payments is still not clear-cut. A more complete model of worker decision making would include the decision to apply for disability benefits (or sue for negligence) if injured, the decision to misrepresent the nature or cause of injury, and the decision to return to work after injury. Kniesner and Leeth (1989, 1995) develop a more complete model that allows for the likelihood that the disability system does not perfectly assess the nature of injury, which permits some workers to receive disability payments for non-impairing injuries or overly generous payments for exaggerated injuries. Butler and Worrall refer to such moral hazard as claims reporting moral hazard (1991). Using plausible parameter values and a computable partial equilibrium framework that considers both worker and firm incentives,

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counter the drop in wage from higher disability benefits (the first two terms). Working in the opposite direction, higher disability benefits reduce the wage premium for accepting risk causing workers to demand greater safety (the third term). Finally, higher benefits lower a worker's expected loss from injury, encouraging workers to take more risk (the fourth term). Assuming that the impact of disability benefits on the wage premium for accepting job risk is not too large, the numerator in equation (3) is positive, meaning $\frac{d\pi}{db} > 0$.

Kniesner and Leeth find higher levels of disability benefits reduce the frequency of workplace injuries slightly, but raise applications for benefits substantially.

Although the impact of non-subscriber status on actual injuries is uncertain the impact on reported injuries, at least minor injuries, is more clear-cut. With WC insurance a worker who has an injury not requiring outside medical care and resulting in fewer than eight lost workdays has little reason to report the injury and no reason to apply for benefits. WC insurance provides no compensation for very short-term injuries. By lowering the waiting period to receive benefits, the movement to a private plan raises the expected utility of applying for temporary benefits, which increases the likelihood of such applications. Empirical studies examining the impact of lowering the waiting period to collect WC indemnity payments universally find shorter waiting periods associated with increases in the frequency of reported non-fatal workplace injuries (Chelius 1982, Butler & Worrall 1983, Krueger 1990). Additionally, when a worker is injured the extent of injury may not be known. Under WC insurance workers have up to 30 days to consider if it is worthwhile to report an injury to the firm's insurance provider or administrator to start the process of collecting benefits. Under a private plan the requirement to report an injury to receive benefits is almost immediate, meaning it is much more likely minor injuries will be reported.

Non-subscriber disability plans generally offer more generous benefits for relatively minor injuries than with WC insurance and higher benefits expand the frequency of reported injuries (Kniesner and Leeth 2014). The Texas workers' compensation insurance program replaces 70 percent of an injured worker's wage up to a statutory cap of $913, but to receive any payment for lost income the injury must prevent the worker from returning to work for eight or more days. Income payments offered by large employers in lieu of workers' compensation are generally more generous in nominal terms, but unlike payments received from workers'

compensation insurance are taxable, making the after-tax payment about the same for all but the most highly paid workers. Because most private plans do not impose a cap on income payments, a private plan is likely more generous for high-wage workers even after considering the impact of taxes. For minor injuries with shorter duration of disability, which represent a high percentage of claims, private plans are considerably more generous for all workers. Most private plans either do not impose a waiting period before receiving income payments or the waiting period is considerably shorter than the eight days required with workers' compensation insurance. And, the total length of time workers can receive payments for lost income for temporary total disabilities under private plans generally exceeds the 104-week limit imposed under the Texas workers' compensation statute (Morantz 2010).

Non-subscriber disability plans may be less generous on the face of it when it comes to compensating injured workers for permanent partial or permanent total injuries, and this may reduce the reporting of the two types of injuries. Most private plans do not cover permanent partial or permanent total disability injuries and most limit the payment of medical expenses to two years or less. Non-subscribers typically compensate workers with permanent partial or permanent total workplace disabilities for their present and future lost income and medical needs through a combination of benefits provided in the plan, supplemental benefits voluntarily offered by the employer, voluntary settlements, arbitration awards, or court judgments. More seriously injured workers can pursue a settlement or legal action against their employer to recover full damages from their injury including pain and suffering, but they may need to show that their employer was negligent by not providing a safe workplace. Such a showing may be difficult, but the employer's loss of the three common law defenses of assumption of risk, negligence of a fellow servant, and contributory negligence makes the task easier. Most large non-subscribing

employers limit their exposure to liability suits by requiring mandatory arbitration when disputes over negligence liability arise; they also can purchase stop-loss insurance to limit exposure to high cost judgments. The requirement that workers receive medical coverage through an approved network of providers also reduces the likelihood that medical providers will offer excess treatment or support exaggerated claims for income support.

With workers' compensation insurance, permanently impaired workers do not automatically receive disability benefits. The worker must demonstrate the extent of injury and show that the injury arose in the course of work, which may be questionable for impairments resulting from lower back strains or repetitive stress disorders. Still, it appears likely that the movement to non-subscriber status would lower a worker's chance of receiving permanent disability benefits, reducing the expected utility of applying for permanent benefits, all else equal.[5] Also many private disability plans exclude workplace diseases and non-traumatic injuries such as carpel tunnel syndrome and other overuse injuries resulting in generalized musculoskeletal aches and pains, which should reduce the likelihood these injuries will be reported (Morantz 2016).

B. Employer Perspective

The problem confronting the firm is choosing the level of inputs to maximize expected profit, where workplace safety is one of the inputs. Specifically,

$$\overline{g} = R(p_o, S(\pi), k, n) - W(\pi; b)(1-\pi)n - p_s S(\pi) - p_k k - P_b(\pi)bn - V(\pi), \qquad \textbf{(4)}$$

where $\bar{g}$ ≡ expected profit,

$R(\cdot)$ ≡ the expected revenue function,

[5] Proponents of non-subscription benefit plans argue that by requiring workers report and seek medical treatment quickly from an approved set of medical providers, many of whom are unavailable to workers in the WC system, fewer injuries become permanent partial or permanent total, which likewise reduces applications for permanent benefits. (Minick 2015)

p_o ≡ the per-unit price of output,

s ≡ the quantity of safety measures with $s = S(\pi)$ such that $S(\cdot)$ is the (inverse) safety production function with $S' < 0$,

n ≡ the number of workers,

k ≡ the quantity of capital,

p_s ≡ the price per-unit of safety measures (equipment),

p_k ≡ the price per-unit of capital,

$P_b(\pi)$ ≡ the price per-unit of disability benefits provided to workers, either through WC insurance or a private plan (including possible court awards), $P_b' > 0$, and

$V(\pi)$ ≡ the expected fine for violating safety and health standards with $\partial V/\partial \pi > 0$.

By differentiating equation (4) with respect to n, k, and π and rearranging terms, we can show that the optimal usage of each input occurs when

$$\frac{\partial R}{\partial n} = W(\pi)(1-\pi) + P_b(\pi)b, \tag{5}$$

$$\frac{\partial R}{\partial k} = p_k, \tag{6}$$

$$\frac{\partial R}{\partial S}\frac{\partial S}{\partial \pi} - \left(\frac{\partial W}{\partial \pi}(1-\pi) - w\right)n - \frac{\partial P_b}{\partial \pi}bn - \frac{\partial V}{\partial \pi} = p_s\frac{\partial S}{\partial \pi}. \tag{7}$$

Firms increase their use of labor and capital until the expected marginal revenue product of each input equals its expected marginal cost. In addition from equation (7), firms reduce workplace hazards until the marginal benefit of greater safety, which includes higher output from

fewer work disruptions, [6] lower wages, reduced disability costs, and lower government fines for workplace hazards, equal the marginal cost of supplying greater safety.

We do not formally examine a firm's decision to exit from the WC program. Conceptually, the expense of purchasing WC insurance must exceed the expected costs of a private disability plan, liability suits for damages, and higher wages to compensate for the lack of WC insurance protection.[7] One way for a firm to reduce its disability expenses when it exits the WC system is to require injured workers to seek medical treatment from a network of approved providers. By limiting physician choice, firms make it more difficult for their workers to file fraudulent claims or remain out of the workplace for an unnecessarily long period of time to recuperate. Physician approval also allows firms to steer workers away from physicians that over-prescribe medical procedures. To limit liability from possible lawsuits for damages, the vast majority of large non-subscribing employers in Texas also require that their workers agree to mandatory arbitration to resolve disputes regarding negligence (Morantz 2010).

It seems likely that the movement to non-subscriber status lowers a firm's expected disability expense, which from equation (7) reduces the marginal benefit of safety programs to the firm, all else equal, resulting in a less safe workplace.[8] Of course, as explained earlier,

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[6] Workplace safety programs increase output by diminishing the disruptive effects of injuries and by increasing the stability of the workforce (Viscusi 1979). In the other direction, programs such as slowing the pace of the assembly line or installing cumbersome machine guards can interfere with the work process and decrease output. On net, which effect dominates is an unresolved empirical question. For purposes of discussion, we assume that safety equipment is a productive factor. None of the conclusions we present change if safety equipment reduces output.

[7] If workers prefer the non-subscriber disability plan and/or the ability to sue for damages if injured then wages would fall.

[8] By totally differentiating the three first-order conditions, one can show that the impact of disability benefits, b, on the firm's optimal level of safety is

$$\frac{\partial \pi}{\partial b} = \frac{\left[\left(\frac{\partial^2 W}{\partial \pi \partial b}(1-\pi) - \frac{\partial W}{\partial b}\right)n + \frac{\partial P_b}{\partial \pi}n\right]\left[\left(\frac{\partial^2 R}{\partial n^2}\right)\left(\frac{\partial^2 R}{\partial k^2}\right) - \frac{\partial^2 R}{\partial n \partial k}\right]}{\boldsymbol{H}} .$$

To assure an interior maximization, the Hessian determinant of the system, $\boldsymbol{H}$, must be negative and second term in brackets in the numerator must be positive. If the impact of benefits on the wage premium for risk is reasonably small then the first term in brackets in the numerator is positive and $\frac{\partial \pi}{\partial b} < 0$.

workers may face a greater loss from injury and would desire a safer workplace. In equilibrium, it is unclear if safety would improve or deteriorate because of a firm's exit from the WC system.

Further confounding any prediction regarding the impact on safety, in Texas for a worker to prevail in a negligence lawsuit for damages he or she must demonstrate the non-subscribing employer failed to provide a safe working environment. Elements of a safe environment include, "having a sufficient number of workers for any particular project, selecting competent fellow workers, furnishing employees with safe and suitable tools, and instructing employees in appropriate safety techniques." (Butler 1996, p. 410) If improvements in safety reduce the probability of receiving permanent disability benefits, then a further gain from safety improvements in equation (7) is a reduction in expected disability payments. With WC insurance workers do not need to show negligence to receive permanent disability benefits so the movement to non-subscription status raises the value of safety programs to the firm by lowering the likelihood of negligence awards, all else equal. Leaving the WC program may cause firms, as well as their employees, to desire a safer workplace. [9]

C. Predictions

Considering the various changes affecting workers and firms, we can predict that the movement to non-subscriber status would:

1. Have an uncertain effect on worker injuries. For relatively minor injuries disability benefits are higher for workers employed by non-subscribing firms than workers employed by firms remaining in the WC system, but for more major injuries benefits are more likely higher for workers employed by firms remaining

[9] In equation (7) if $b=B(\psi)$ where ψ the probability of receiving disability benefits if injured then for non-subscribing firms an additional gain from safety programs is the resulting reduction in expected tort awards for negligence, specifically $P_b \frac{\partial B}{\partial \psi}\frac{\partial \psi}{\partial \pi} n$, where both first derivatives are positive. For firms in the WC system $\frac{\partial \psi}{\partial \pi} = 0$ and higher levels of safety have no impact on expected disability payments.

in the WC system than for workers employed by non-subscribers. Higher disability benefits reduce expected losses from injury and may encourage workers to take greater risks. But in the other direction, higher benefits encourage firms to expand their safety efforts. Non-subscribing firms have the additional incentive to engage in new safety efforts because opting out of the WC system opens up these firms to potentially costly liability awards for negligence. Considering the potentially conflicting desires of workers and firms, the overall impact on the true level of safety is ambiguous.

2. Increase reported short-term injuries. The shortening of the waiting period to receive indemnity payments increases the income support for temporary total injuries and raises the expected utility of applying for benefits. The requirement that injuries must be reported by end of shift or within 24 hours (versus 30 days with WC) will also raise the number of reported injuries and the number of injuries resulting in no recorded medical or indemnity expense.
3. Reduce applications for permanent partial and permanent total disability benefits and benefits for workplace illnesses and non-traumatic injuries. Non-subscriber status makes it less likely that workers will receive these types of disability payments reducing the expected utility from making such applications, particularly for hard to verify injuries.
4. Decrease injury duration. Tighter injury management and discretion over provider utilization will lower total work-loss due to injury. The need for employer approval should reduce medical providers' incentives to be overly cautious in recommending a return to work or prescribing unneeded treatments, which will

also lower the time away from work, all else equal. Proponents of non-subscription argue that the requirement that workers report and seek medical treatment quickly after injury from an approved set of expert medical providers, many of whom may be unavailable to injured workers employed by WC subscribing firms, results in better medical outcomes and a more rapid return to work (Minick 2015).

5. Lower indemnity and medical expenses. With lower spending on medical services and decreased injury duration, expenses will drop. Likewise, the difficulty of receiving compensation for permanent partial and permanent total disabilities and the need to frequent an approved list of medical providers will also reduce total claim expenses.
6. Have an uncertain impact on litigation. Most large non-subscribing employers have disability plans that cover lost wages and medical expenses for workers injured on-the-job regardless of fault for up to a few years, much like the coverage offered by WC insurance for temporary total disabilities. The divergence between the two systems occurs with more serious injuries. Under a private plan, to collect damages a worker may need to show in a court of law that the injury arose in the course of employment and that the employer was negligent, whereas under WC a worker only needs to show in an administrative proceeding that the injury arose in the course of employment. Although court actions are more expensive than administrative proceedings, the expense of pursuing negligence suits will discourage many workers from this course of action. Moreover, most large non-subscribing employers limit litigation expenses by

requiring that their workers settle negligence disputes through mandatory arbitration.[10]

7. Have an uncertain impact on denied claims. Private plans have greater restrictions on the types of injuries and illnesses covered and additional barriers for workers to hurdle to receive and continue to receive coverage. Moving to a private disability system may make it easier for employers to deny worker claims for disability payments, causing the denial rate to rise, all else equal. But, the reduced chance of receiving payment for an exaggerated claim lowers the expected benefit of applying in questionable cases. Depending on the strength of the two effects, the number of denied claims could rise, fall, or remain constant.

IV. Data

The data in our study were obtained from a nationwide third-party administrator that manages workplace injury claims for large, self-insured companies. For each claim, we observe information on the individual filing the claim (gender, marital status, age, and number of dependents), the company (encrypted company code, two-digit SIC), the claim type (incident report, medical expense-only, indemnity claim, and death claim), the claim status (accepted, denied, opened, closed, and litigated), the injury (nature of the injury and number of lost days), the expenses (indemnity incurred and medical expense incurred), the individual's employment status (full-time/ part time employee status, average pre-injury weekly wage, time have worked in a company), and the relevant dates (date of incident, date injury reported to the firm, date claim opened/closed, and date claimant return to work).

[10] Litigation may also be precluded if the employer provides a monetary settlement to the injured worker before litigation or arbitration commences.

A. Sample Construction

Table 1 illustrates the steps we take to produce the analytical sample to estimate the impact of companies switching to non-subscription program (hereafter, switchers). Our initial sample contains 6,397,967 workplace injuries occurring from 2004 to 2016 across the 50 states. The claimants who are above age 64 are excluded from the sample because Medicare is available once workers reach to 65 and they may use Medicare in lieu of WC if injured. We exclude incident reports because they are not claims. We further eliminate claims that incur negative expenses, which possibly were recorded in error. Together our exclusions represent 13 percent of the sample.

In the analyses, we would like to compare workers with similar wage earning ability so we control for worker's pre-injury weekly wage. Because 36 percent of claimants have missing pre-injury weekly wage, we impute the missing weekly wage value. The missing status is not correlated with the claimants' demographic characteristics.[11] We impute the missing weekly wage using workers whose pre-injury weekly wages are available. Specifically, we calculate the average weekly wages for workers with wage information available that share similar characteristics with workers with missing wage data, and use them as proxies for the missing wages. Similar characteristics are defined as workers sharing the same industry, same occupation, same gender, and same employment status; with age differences of five years or less, differences in length of time at work of three years or less. After imputation, observations with missing weekly wages are reduced down to 10 percent of the sample. We exclude observations with missing weekly wages and with values that are below $10 or above $10,000 because we suspect wages outside of this range are recorded in error.

[11] We regress the missing status on claimants' demographic characteristics. The coefficients on demographic characteristics are not statistically significant.

There are seven percent of claims in our sample that incur positive indemnity but with no lost days. Typically under WC, claimants who are totally or partially disabled and unable to work have a waiting period of three to seven days before receiving indemnity (Social Security Office of Retirement and Disability Policy, 2015). Therefore, we assume the claims with positive indemnity but with no lost days are recorded in error. To avoid dropping observations, we impute the number of lost days for claims with (apparently) missing work-loss, defined as days between the date of injury and the date that workers return to work.[12] We then exclude the claims that incur more than 365 lost days to avoid censoring and potential measurement error. Moreover, if injured, workers are required to report their work-related injuries to their employers within a pre-specified period, ranging from 30 days (New York State) to 90 days (South Carolina). Therefore, we assume the claims that take more than 90 days to report to employers are recorded in error and exclude such claims. In total the sample size drops down to 4,656,894, which is 73 percent of initial sample.

We estimate the effects of switching to non-subscription program using difference-in-differences (DID) and triple-difference (DDD) methods. There are 1,218 companies in the sample, 25 of which are observed to switch from a traditional workers' compensation program for their Texas-based operations to the non-subscription program managed by the third-party administrator from which we obtained our data; a traditional workers' compensation program remains in effect at each company's non-Texas-based operations. We restrict the sample for the DID analysis to the 25 switchers, which consists of 846,736 workplace injury claims from 2004 to 2016 across the 50 states. To control for any Texas-specific shocks that are potentially correlated with switching, we perform a DDD analysis, using the rest of companies that do not

[12] The calculation method is verified by the company from which the data were obtained.

switch to the non-subscription program (hereafter, "never switchers") as an additional control group.

As noted earlier, we are concerned that switching to the non-subscription program may systematically change the composition of injuries reported. Given the significantly shorter injury reporting window under non-subscription in Texas, workers may be more likely to file claims leading to a greater number of less severe injuries in the sample. Thus, *claim-level* estimates conditional on the injury reports would be biased. Instead, to avoid dividing by a potentially endogenous denominator, we sum the values of our outcome variables to the company-state-year level.[13] Performing analysis at the company-state-year level avoids the sample selection issue because we are able to control for injury changes within a company. The number of observations at company-state-year level is 569 for DID analysis, and 10,240 for DDD analysis.

B. Outcomes

The outcomes we examine are the number of claims/injuries (measure several ways), the medical payments incurred, the indemnity payments incurred, settlement amount, litigation expense, the number of lost days incurred, the number of permanent disability claims, the number of claims denied, and the number of litigated claims. Finally, we sum all spending into a total employer spending value. We now elaborate on our outcomes measures.

1. Number of injury claims: The total number of injuries reported during a calendar year. We use the date of the incident to identify which calendar year in which the injuries occurred. We distinguish between denied and non-denied claims as well as claims for which no medical (or indemnity) payment was incurred and claims with some positive spending. We also attempt to distinguish between

[13] State refers to Texas versus all other states. This is the case throughout the analysis.

unambiguous types of injuries that are unlikely to involve potential reporting biases.

2. Total medical spending incurred: We use four different outcomes to measure the medical spending incurred: total medical spending, which is consisted of hospital spending, physician spending, and other medical spending including fees that do not belong to the categories above, such as utilization review fee.
3. Total indemnity incurred: The cash benefit incurred due to the injury to compensate for lost wages. In our sample, it is only possible for injuries under indemnity claims to have positive amount of indemnity.
4. Number of lost days: The number of days missed from work due to the injury. The definition of what constitutes a lost day varies depending on individual state. In general, the number of lost days incurred under indemnity claims are much higher than the number of lost days under medical expense-only claims.
5. Number of permanent disability claims: Permanent disabilities are rare, but they account for a much larger share of the total WC benefit paid. The number of permanent disability claims has important implications on overall spending. Moreover, since permanent disability is more serious than other types of injury, looking at permanent disability claims sheds light on the impact of switching to non-subscriber program on the overall safety in the workplace.
6. Litigated claims: The elimination of the no-fault nature of traditional workers' compensation introduces the potential for dispute resolution by litigation for injured workers. We are interested in knowing whether non-subscribers have more claims litigated. We also sum total litigation expense and settlement amount.

C. Summary Statistics

Summary statistics appear in Table 2a-2d and are organized by outcome variables, injury characteristics, employment characteristics, claimant and claim characteristics. The claims are categorized into four groups: claims by workers outside of Texas before switching, claims by workers in Texas before switching, claims by workers outside of Texas after switching, and claims by workers in Texas after switching. Note that the non-Texas-based observations maintain a traditional WC program and thus serve as a comparison group. All the summary statistics are aggregated to the company level, so there are 25 observations in each group.

Table 2a displays summary statistics on the outcome variables. Compared to the pre-switching period, the number of claims increased by 86 percent among switchers in the post-switch period relative to 36 percent among their non-Texas-based operations. During the post-switching period, the non-Texas-based operations tripled the number of denied claims relative to the pre-switching period, while the switchers increased the number of denied claims by five times. Except for the lump sum settlement amount, there are significant reductions in expense outcomes among the switchers during the post-switching period compare to the pre-switching period, while their non-Texas-based operations experienced minor decreases to modest increases. The lump sum settlement that switchers pay to settle a claim increased from mean of $3 in the pre-switching period to $375 in the post-switching period. Switchers also experienced a significant reduction in work loss in the post-switching period, while their non-Texas-operations had a modest increase in work loss. The number of permanent disability claims remained stable in both periods among the switchers, and it increased by just under 50 percent among their non-Texas-based operations. Lastly, the switchers in general had fewer litigated claims than their

non-Texas-based operations, although both groups had more litigated claims during the post-switching period compare to the pre-switching period.

Table 2b displays the summary statistics on the nature of injury. Soft tissue injuries (strain/sprain/tear) are the most frequent (40 percent of all injuries), and easy-to-diagnose injuries such as contusion and laceration are the second most frequent across all groups (27 percent). The proportion of both types of injuries remained stable during the entire study period for both groups.

Table 2c shows summary statistics on employment characteristics. Workers from both groups shared similar patterns in employment status during the entire study period, with full time employees comprising 80 percent of all employees. The composition of industries also remained stable across both groups. Conditioning on injury, workers in switchers earned $38 higher weekly wage than workers in the non-Texas-based operations before switching, while earning $58 less after switching. Workers in switchers on average have served less time relative to the workers in their non-Texas-based operations.

Claimant and claim characteristics are shown in Table 2d. On average, slightly more male workers experienced injury. The average age was 38. The number of dependents and the proportion of workers who are married decreased for both groups during the post-switching period. The proportion of open claims increased for both groups during the post-switching period, with that among switchers increasing less—a 1.5 percentage-point increase compare to an 8.2 percentage-point increase among their non-Texas-based operations.

To summarize, although significant differences exist in some of the characteristics discussed above between the switchers and their non-TX based operations, the characteristics are

pre-determined and are likely not correlated with the action of switching. Therefore, the differences in the characteristics are not likely to bias the estimates in our DID analysis.

V. Econometric Methods

We adopt a generalized difference-in-differences framework to estimate the impact of companies switching to non-subscription program. The regression form we use is:

$$y_{cst} = \alpha_{cst} + \rho Switch_{TXt} + \beta Year_t + \eta TX_c + \gamma Company_c + \theta X_{cst} + \varepsilon_{cst} \quad (8)$$

where c denotes the company; s denotes the state, which is Texas versus other states; and t denotes the year. ρ is the coefficient of interest because it is the outcome effect of an indicator that equals to one for a company in Texas that switches from a traditional WC program to a non-subscriber during a year between 2004 to 2016 and equals to zero for a non-Texas-based operation or a Texas operation prior to switching. β represents the coefficients on the year fixed effects, which absorb the trends that are common to all years; η are the coefficients on the Texas fixed effect, which absorb the time invariant factors that lead to differences in outcomes across Texas and each company's non-Texas based workers; γ represent company fixed effects for time invariant factors affecting outcomes that differ across companies. X represents covariates at the (mean) claim level, injury level, the employment level and the claimant level, which includes claim status, nature of injury, employment status, average pre-injury wage, days of service, SIC, gender, age, number of dependents, and marital status. We aggregate the observations to the company-state-year level. If switching to non-subscription is not correlated with average claim characteristics and other observable factors then adding covariates will not affect the DD estimate substantially. The analysis in the next section shows that this is indeed the case.

Because observations within company over may be correlated, we cluster the standard errors at the company level.

The identifying assumption for ρ to be an unbiased estimate is that the switchers would exhibit the same trend as the companies that do not switch had they not switched, conditional on the fixed effects and other covariates included in the model. Theoretically the parallel trends assumption is untestable since we do not observe the counterfactual state. However, empirically we can show the trends for switchers and their non-Texas-based operations prior to switching. If both groups have similar (or at least parallel) pre-trends, it is more plausible that they would continue the trend had they not switched; thus we can plausibly attribute any differences in post-switching outcomes to the impact of switching.

Figures 1-13 display event history graphs on the trends between the switchers and their non-Texas-based operations in the outcomes of interest mentioned above. Year 0 indicates the year when a company switched from a traditional WC program to a non-subscriber. We restrict the years to be six years prior to the switching and six years after the switching because few companies switched in the beginning or in the end of the study period. Including those companies may produce noisy estimates. In the regressions, we include all 25 switchers and all the years controlling for other covariates.

Given that the pre-period trends do not look parallel for every outcome, we adopt two strategies to deal with the pre-existing differences between the treatment and control groups. The first is to include a company-specific linear time trend in the specification to allow for a linear change in the outcomes across company and across years. The second is to perform a DDD analysis, using never switchers as another control group to difference out the contemporaneous trend that is common to both Texas and the rest of the country.

The DID results are estimated conditioning on subsequent blocks of covariates. Because the model includes more than 40 controls but the sample contains less than 600 observations at the company-state-year level, we next adopt a Post-Double-Selection (PDS) Least Absolute Shrinkage and Selection Operator (LASSO) method within the same DID framework to investigate the model selection problem. The PDS-LASSO uses theory-driven method to select controls that have predictive power for the dependent variable and the main variable of interest (the switch variable in equation 8) (Belloni et.al., 2014). By selecting only necessary controls, PDS-LASSO generates good performance in estimation and imposes as few restrictions as possible on the model.

There are three steps to the PDS-LASSO estimation. The first step is to use the LASSO method to estimate the dependent variable y_{cst} using the same specification as equation (8) while excluding the main variable of interest $Switch_{TXt}$:

$$y_{cst} = \alpha_{cst} + \beta Year_t + \eta TX_c + \gamma Company_c + \theta X_{cst} + \varepsilon_{cst}. \quad (9)$$

The second step is to use the LASSO method to regress $Switch_{TXt}$ on the same set of covariates in equation (9):

$$Switch_{TXt} = \alpha_{cst} + \beta Year_t + \eta TX_c + \gamma Company_c + \theta X_{cst} + \varepsilon_{cst}. \quad (10)$$

The third step is to regress y_{cst} on $Switch_{TXt}$ and the common controls selected from steps 1 and 2:

$$y_{cst} = \rho Switch_{TXt} + w'_{cst}\beta + \varepsilon_{cst} \quad (11)$$

where w'_{cst} is the union of the selected controls from steps 1 and 2. We compare the PDS-LASSO output with the output from the standard DID model in the results section below.

VI. Empirical Results

Tables 3-14 present the DID results on the outcomes described above. Column 1 through column 6 display results as additional groups of covariates are added, while column 7 displays the LASSO results. Column 1 is the base model, which has year, the Texas versus rest of the country indicator, and company fixed effects; column 2 adds an indicator for open claims; column 3 adds a vector of injury characteristics; column 4 adds a vector of employment characteristics; column 5 adds a vector of claimant characteristics; and in column 6 we add company-specific linear time trends. Throughout the LASSO approach provides results generally consistent with the findings from the traditional approach.

We start by examining total claims for non-denied benefits that incur at least some medical expense in Table 3. We observe no statistically significant change in the number of claims reported after non-subscription. Further, we do not observe a great deal of sensitivity of the point estimates to the inclusion of additional controls, suggesting that there was not a meaningful change in the characteristics of injury claims coincident with the switch to non-subscription. However, consistent with the potential for a reporting effect under non-subscription, we see in Table 4 a roughly 165% increase in the number of denied claims after non-subscription (including zero-dollar value claims). When we look just at the number of denied claims excluding zero-dollar claims (Appendix Table 1) we see a roughly 300% increase in the number of denied claims after non-subscription. Thus, the overall picture suggests that, contrary to the concern that non-subscription might dampen the willingness to report workplace injuries, there is a tendency to over-report potential injury incidents after switching to non-subscription. However, many of the additional claims either incur zero medical spending or are denied. In Table 5 we condition on a set of plausibly unambiguous injury types from amputation to enucleation (loss of

an eye). Although the coefficients are negative, we do not observe a statistically significant difference from zero.

Table 6 presents the effect of non-subscription on total medical spending incurred. The log results suggest a 41-46 percent drop in total medical payments conditional upon reporting an injury, controlling for other characteristics. We then disaggregate the medical spending into three components. Tables 7-9 show that the reduction in total medical spending comes from 54 percent decline in hospital spending, 29 percent reduction in physician spending, and 49 percent decrease in other medical spending. The spending component reductions are consistent with the notion that non-subscription programs are better able to avoid hospitalizations of injured workers.

In terms of indemnity payment, estimates from Table 10 indicate a 70 percent decline in indemnity payment. The results are not sensitive to the inclusion of covariates, and the estimates are roughly stable when the company-specific linear time trend is included. Consistent with drop in indemnity payments, Table 11 displays regression results for the log of the number of days lost. The results show that the switch to non-subscription is associated with a roughly 80 percent reduction in work-loss. As observed in other models, results are not sensitive to the inclusion of controls for claim, injury, employment, and claimant characteristics. The data are not rich enough to determine if this more speedy return to work is the result of non-subscribing firms forcing injured workers to return to work prematurely, preventing workers from malingering after injury, or providing their injured workers more expeditious or better medical services allowing them to recover more quickly.

In Table 12 we present estimates on the number permanent disability claims. Switching to non-subscription reduced the number of permanent disability claims by 40 percent. The permanent disability claims reduction may reflect an improvement in safety at non-subscribing

firms. Alternatively, the reduction may reflect that most private disability plans do not explicitly cover injuries resulting in permanent partial or permanent total impairments. The plans also generally exclude injuries where age or other non-work conditions contributed to the impairment, which may reduce the number of permanent disability claims. Finally, workers' compensation legislation prevents firms from firing workers who file claims for benefits. No such protection is afforded workers in non-subscribing firms, meaning the reduction in permanent disability claims may simply reflect a lower willingness of workers in non-subscribing firms to file a claim fearing the possibility of dismissal. (Morantz 2016)

Table 13 presents estimates on the number of litigated claims. Under non-subscription we observe a roughly 35 percent decrease in the number of litigated claims. The litigated claims result may be somewhat surprising: the quid pro quo for workers of WC insurance is known but limited benefits if injured in return for not having to prove employer negligence in a court of law. As discussed previously, although firms must provide medical and disability benefits to injured workers regardless of fault the injuries must arise out of and in the course of employment and such determinations can result in litigation. Litigation arises in non-subscribing firms if there is a dispute over coverage or if there is a dispute over negligence. ERISA dictates that workers must appeal a denial of benefits internally before they can go externally to a court of law, reducing the number litigated claims. Additionally, the difficulty of proving employer negligence may prevent many workers from filing suits for damages, reducing the number of litigated cases. And, employers may wish to avoid negligence trials over damages, with potentially costly awards if found liable, and chose to settle before going to court. Many non-subscribing firms attempt to reduce litigation by requiring mandatory arbitration over questions of negligence. The results

indicate the combination of ERISA requirements and worker and firm incentives to avoid lawsuits have successfully limited the number of litigated claims for non-subscribing firms.

Finally, in Table 14 we present results for total spending, including all sources: medical, indemnity, settlement, and litigation. Consistent with prior results, total spending is roughly 46% lower in Texas after non-subscription.

Given the large number of outcomes studied, when we Bonferroni-adjust our standard errors to account for multiple outcomes, all our results are still statistically significant with the exception of total medical spending, which was borderline significant in unadjusted results.

How the effect of non-subscription evolves over time is of great interest. The self-insured employers might be extra cautious initially after switching to non-subscription program-leading larger effects in the first year after switching, and the effects may die out in the later years. Table 15 displays the estimates on the effects of switching over time. The model is the preferred specification including all the covariates including linear company-specific time trends. For some outcomes the effects increase over time while others diminish. Claims reporting tend to fall over time as do denials. The negative medical spending effects tend to get larger over time as do the indemnity effects. Litigated claims also fall over time. If workers with high injury risk differentially sort out of non-subscription firms we would expect to see magnified effects over time. However, such sorting is likely to be second order in nature.

Finally, we perform DDD analysis using firms that never switch to non-subscription. The results are shown in Table 16. The estimates are robust to the use of never-switchers as an additional control group. Compared to the DID results, the effect of switching to non-subscription in the triple difference approach is strikingly consistent.

VII. Conclusion

We find that switching to a non-subscription program from a traditional workers' compensation arrangement in Texas led to important changes in outcomes. While denied claims increased substantially, there was no statistically significant change in non-denied claims that incurred positive medical spending. We also examined whether unambiguous ("hard-to-fake") injury types changed after non-subscription and found no evidence of a change. The results suggest that people may have increased reporting of potential workplace injuries to insure against failing to report within the 1-day reporting period. Theory suggests that workers in the presence of reduced disability benefits might exhibit more care (ex ante moral hazard) in the workplace, but it is difficult to discern from our administrative data whether workplace safety was altered. Additionally, if worker composition changes in response to non-subscription – say to a less risk averse, healthier workforce – there could be a bias toward finding fewer severe injuries. We find some evidence for significant claim decreases 3+ years after non-subscription.

Our results indicate that total medical payments dropped by roughly 40 percent, which consisted of reductions in hospital spending, physician spending, and other medical spending. Similarly, indemnity payment and work loss also experienced significant reductions as a result of switching. Specifically, indemnity payments dropped by 70 percent and number of lost days dropped by 80 percent. Accumulating all sources of spending, we find that total expense associated with workplace injury fell by approximately 46% after switching to the non-subscription program. We find non-subscription is associated with a reduction in permanent disability claims and litigated claims. Although comparatively rare, non-subscription was associated with greater lump sum settlement payments to injured workers. This is consistent with severing the no-fault nature of the traditional WC system. We also show that in general the

effects of non-subscription on the outcomes tend to increase over time. Finally, our findings are consistent when we estimate triple-difference models using companies that never switch to non-subscription and by the use of a novel machine learning approach to estimation.

It should be noted that we cannot rule out substitution from the company disability system to treatment in the employer sponsored health insurance program, though such substitution might be unlikely given the need for cost-sharing under health insurance. Nevertheless, a claim denied under the disability program could generate spending under the health insurance program. Hence from a total cost to employer perspective we may only be observing partial effects.

Given the generally positive nature of the findings (at least from the employer perspective), it is worth questioning why more large employers do not switch to non-subscription plans in Texas. First, instituting a non-subscription plan in Texas for a national company entails the fixed costs of a second workplace injury management system operating in parallel to the traditional WC system in operation elsewhere in the United States. Second, our data suggest that Texas appeared to have very low rates (and dollar amounts) of lump sum settlement payments in the pre-period under the traditional WC system. After switching, lump-sum settlements increased in both their frequency and their variance, the exposure to which may at least partially offset the savings in medical and indemnity spending and may explain why some companies in Texas choose to remain in the traditional WC system. It could be that given earlier WC reforms in Texas, employers do not perceive of Texas as a problem with respect to WC. Third, in a large firm with a national footprint, having a different benefit structure in one state could raise equity concerns relating to benefits equivalence, which could have adverse implications for recruitment and retention in Texas. Because of the reasons just mentioned above, it may not be a

straightforward decision to choose non-subscription in a single state. In sum, the traditional workers' compensation system could likely benefit from the lessons from Texas' non-subscription experience, but more study of the effects on worker well-being is warranted.

References

Belloni, A., Chernozhukov, V., & Hansen, C. (2014). Inference on treatment effects after selection among high-dimensional controls. *The Review of Economic Studies*, *81*(2), 608-650.

Butler, Richard J., "Lost Injury Days: Moral Hazard Differences between Tort and Workers' Compensation," *The Journal of Risk and Insurance*, Vol. 63, No. 3 (Sep., 1996), pp. 405-433.

Butler, R. J., & Worrall, J. D. (1983). Workers' compensation: benefit and injury claims rates in the seventies. *The Review of Economics and Statistics*, 580-589.

Butler, R. J., & Worrall, J. D. (1991). Claims reporting and risk bearing moral hazard in workers' compensation. *Journal of Risk and Insurance*, 191-204.

Cabral, M., Cui, C., & Dworsky, M (2018). What is the rationale for an insurance coverage mandate? Evidence from Workers' Compensation [Work in Progress]

Chelius, J. R. (1982). The influence of workers' compensation on safety incentives. *ILR Review, 35*(2), 235-242.

Kniesner, Thomas J. and Leeth, John D. (1989). "Separating the Reporting Effects from the Injury Rate Effects of Workers' Compensation Insurance: A Hedonic Simulation," *Industrial and Labor Relations Review* 42(2), 280-93.

Kniesner, Thomas J. and Leeth, John D. (1995). *Simulating Workplace Safety Policy*. Boston/Dordrecht/London: Kluwer Academic Publishers.

Kniesner, Thomas J. and Leeth, John D. (2014). "Regulating Occupational and Product Risks," in the *Handbook of the Economics of Risk and Uncertainty*, *Vol. 1,* Mark J. Machina and W. Kip Viscusi, eds. Amsterdam: Elsevier, 493-600.

Krueger, A. B. (1990a). Incentive effects of workers' compensation insurance. *Journal of Public Economics, 41*(1), 73-99

McCathern Law Firm. (2018). *Importance of immediate injury reporting.* Retrieved from http://mccathernlaw.com/importance-of-immediate-injury-reporting-for-workplace-injuries/

Minick, Bill. (2015). "Options to Workers' Compensation: Public Policy Analysis," available at https://www.partnersource.com/media/1287/options-to-workers-compensation-public-policy-analysis-12-1-15.pdf.

Moore, Michael J. and Viscusi, W. Kip. (1990). *Compensation Mechanisms for Job Risks: Wages, Workers' Compensation, and Product Liability*. Princeton, NJ: Princeton University Press.

Morantz, Alison, (2010). "Opting Out of Workers' Compensation in Texas: A Survey of Large, Multistate Nonsubscribers," in Daniel P. Kessler, ed, *Regulation vs. Litigation: Perspectives from Economics and Law*, University of Chicago Press, pp. 197-238.

Morantz, Alison D. (2016). "Rejecting the Grand Bargain: What Happens When Large Companies Opt Out of Workers' Compensation?" Stanford Law School, Working Paper No. 488, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2750134##.

Social Security Officie of Retirement and Disability Policy. (2015). *Annual Statistical Supplement*. Retrieved from https://www.ssa.gov/policy/docs/statcomps/supplement/2015/workerscomp.html

Robinson, Thomas J. (2016). "Opt-Out Lessons from Lone Star State: Shining the Light on So-Called Texas Opt Outs," Legal News Room, LexisNexis, at

https://www.lexisnexis.com/legalnewsroom/workers-compensation/b/recent-cases-news-trends-developments/posts/opt-out-lessons-from-lone-star-state.

Taylor, Danielle, (2015). "Risky Business: How an Employee's Awareness of a Risk Can Destroy and Employer's Duty in Non-Subscriber Litigation," Baylor Law Review, (67), 699-720.

Texas Department of Insurance, "Workers' Compensation Income and Medical Benefits," Accessed June, 2018: http://www.tdi.texas.gov/wc/employee/benefits.html.

Texas Department of Insurance: Division of Workers' Compensation, "Biennial Report to the 85th Legislature," (Dec., 2016), available at: https://www.tdi.texas.gov/reports/dwc/documents/2016dwcbienlrpt.pdf.

Texas Department of Insurance: Workers' Compensation and Evaluation Group, "Employer Participation in the Texas Workers' Compensation System: 2016 Estimates," (Dec., 2016), available at: https://www.tdi.texas.gov/reports/wcreg/documents/nonsub2016.pdf.

Viscusi, W. Kip, (1979). *Employment Hazards: An Investigation of Market Performance*. Cambridge, MA: Harvard University Press.

Figures and Tables

Figure 1: Sum of Claims for Non-Subscribers (log estimates)

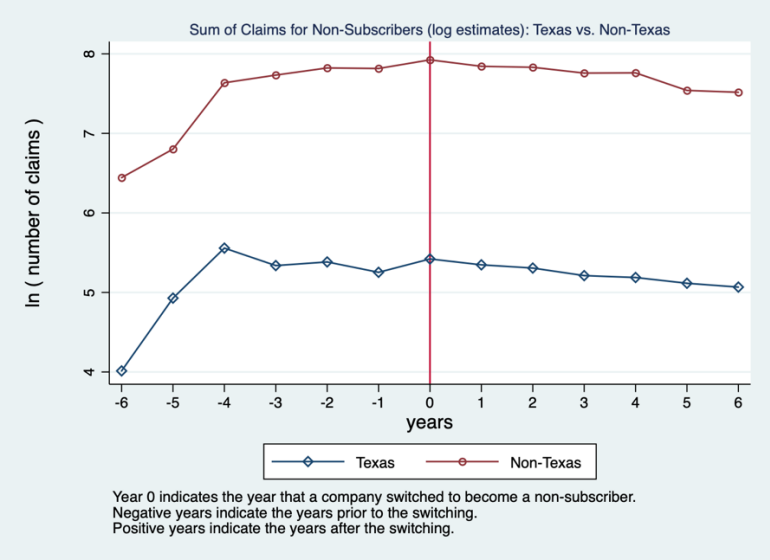

Figure 2: Number of Denied Claims for Non-Subscribers (log estimates)

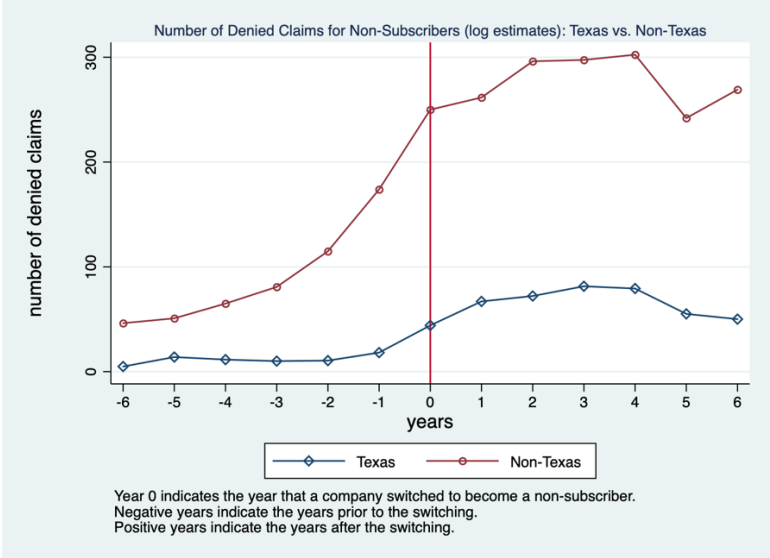

Figure 3: Number of Claims Involving Obvious Injuries for Non-Subscribers (log estimates)

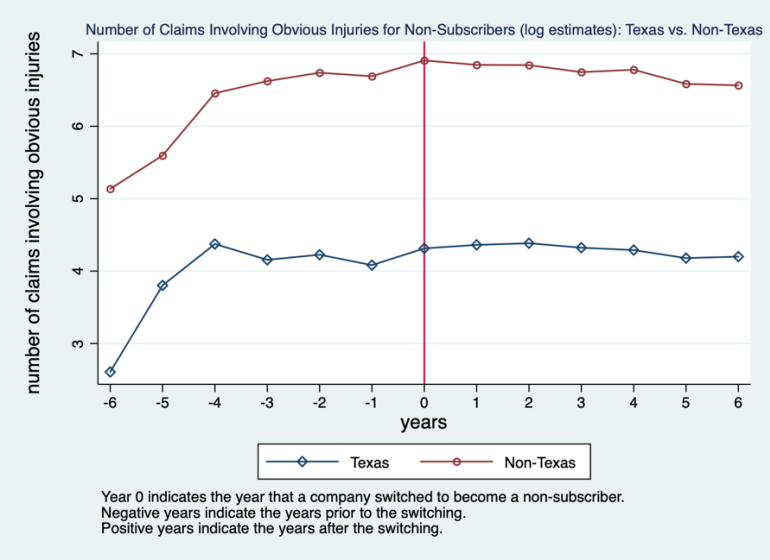

Figure 4: Total Medical Spending for Non-Subscribers (log estimates)

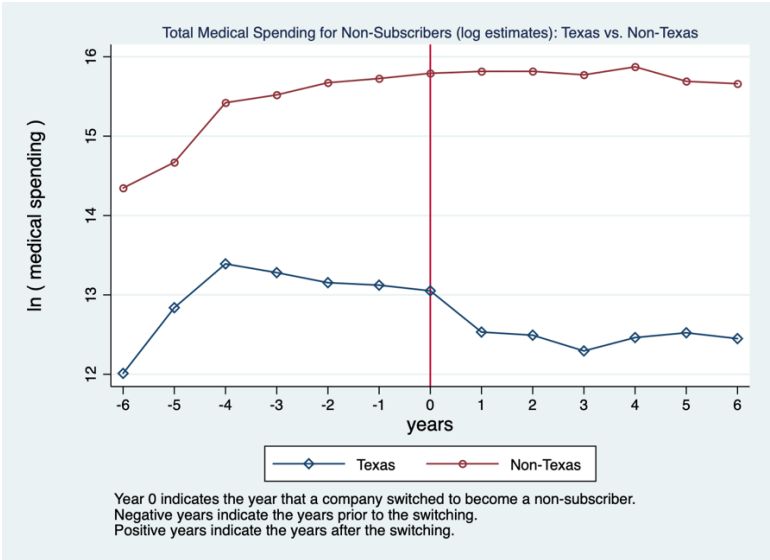

Figure 5: Mean of Hospital Spending for Non-Subscribers (log estimates)

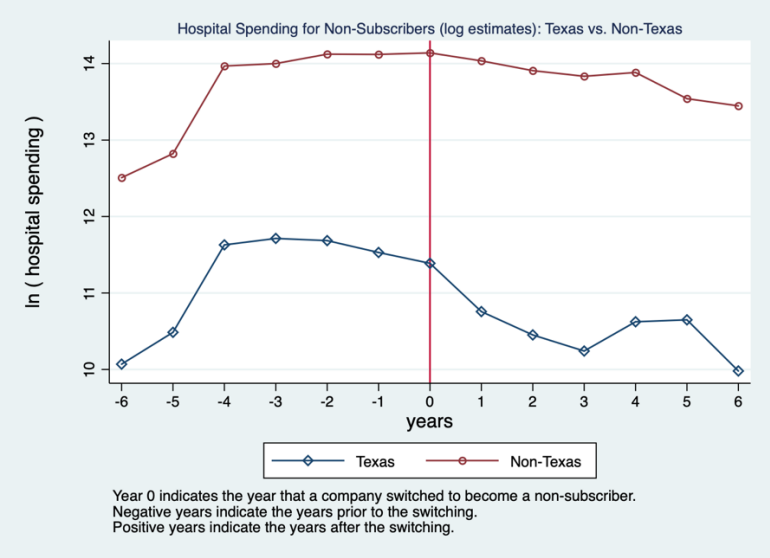

Figure 6: Mean of Physician Spending for Non-Subscribers (log estimates)

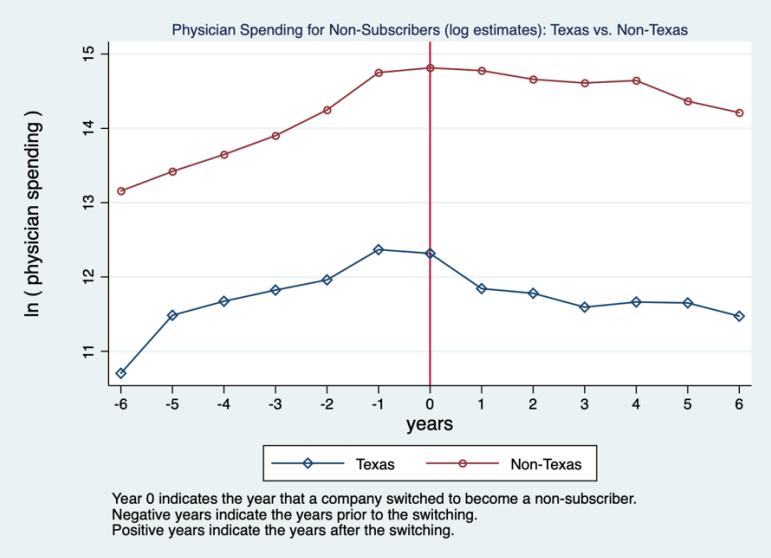

Figure 7: Mean of Other Medical Spending for Non-Subscribers (log estimates)

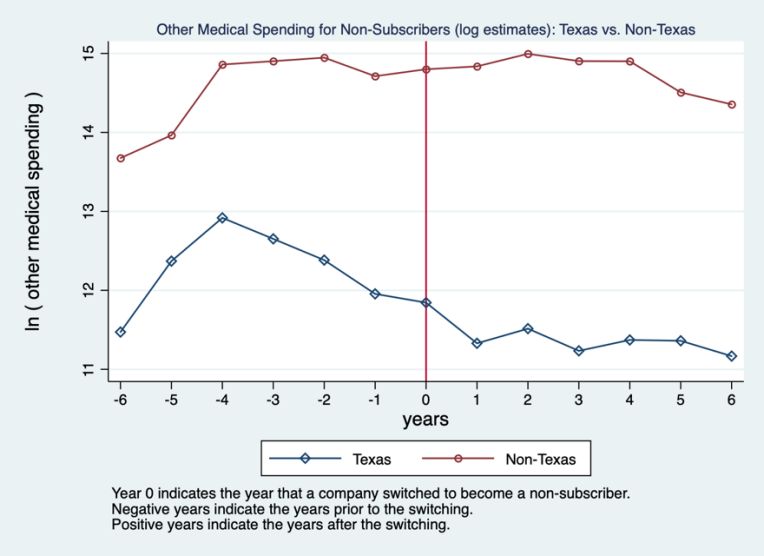

Figure 8: Mean of Indemnity for Non-Subscribers (log estimates)

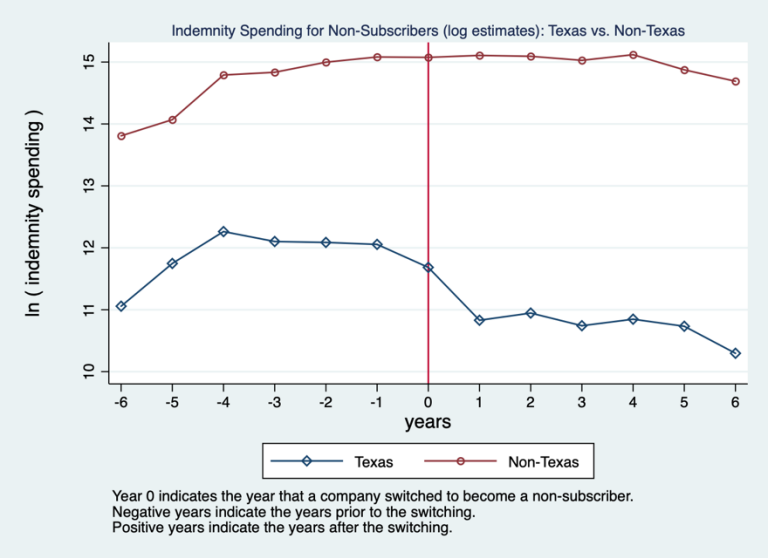

Figure 9: Mean of Settlement Amount for Non-Subscribers (log estimates)

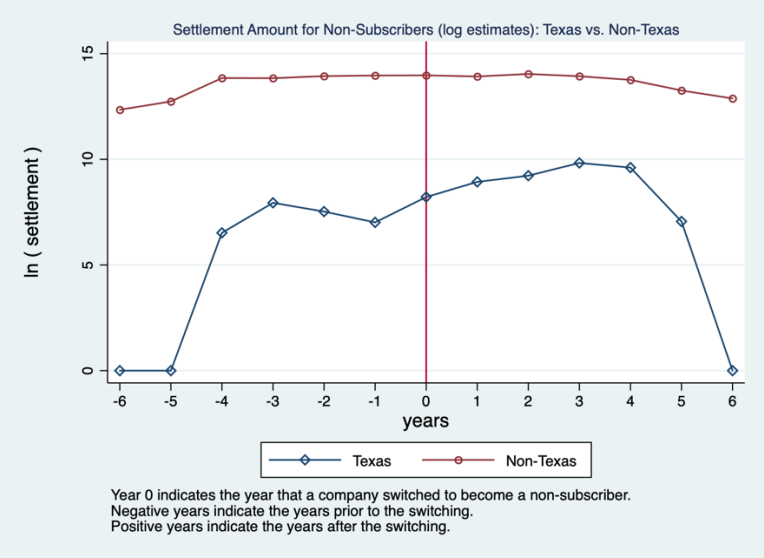

Figure 10: Mean of Employer Legal Expenses for Non-Subscribers (log estimates)

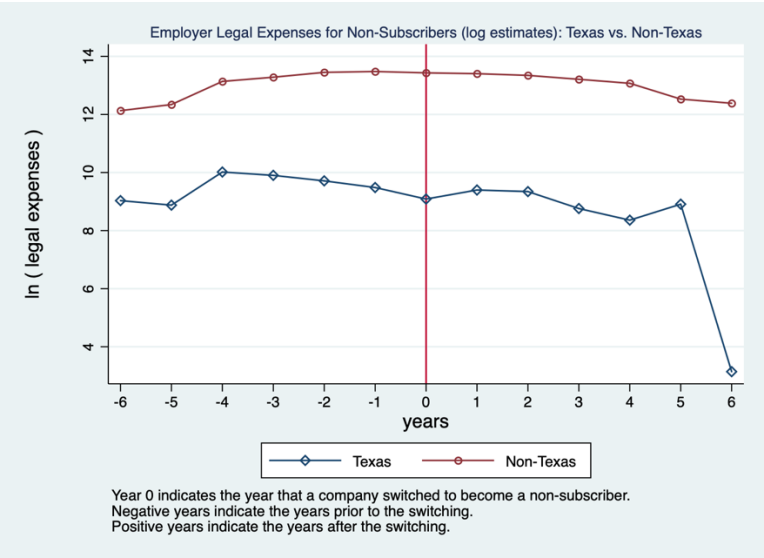

Figure 11: Mean of Lost Days for Non-Subscribers (log estimates)

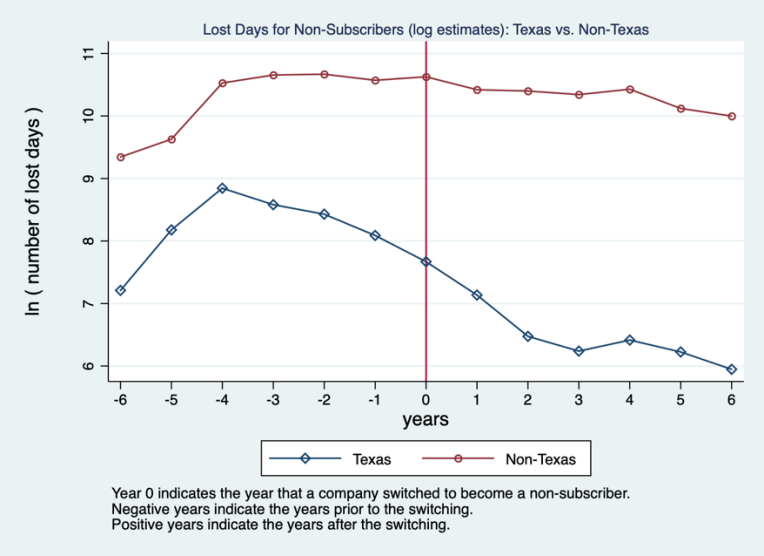

Figure 12: Number of Permanent Disability Claims for Non-Subscribers (log estimates)

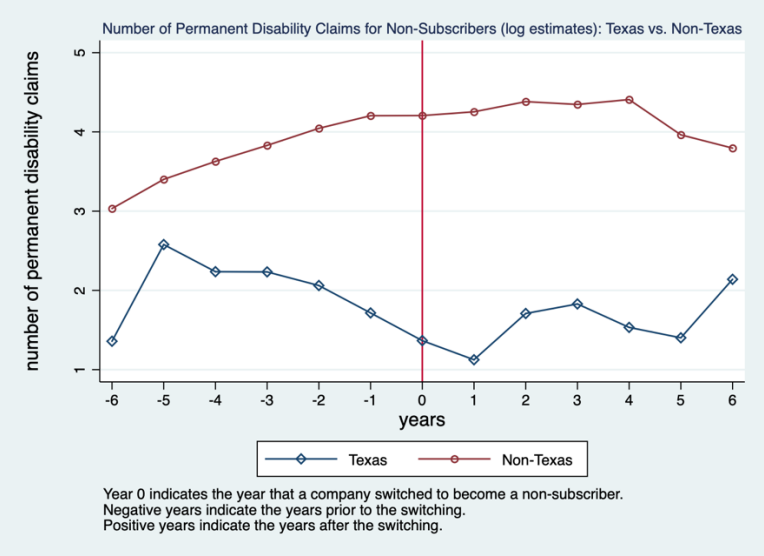

Figure 13: Number of Litigated Claims for Non-Subscribers (log estimates)

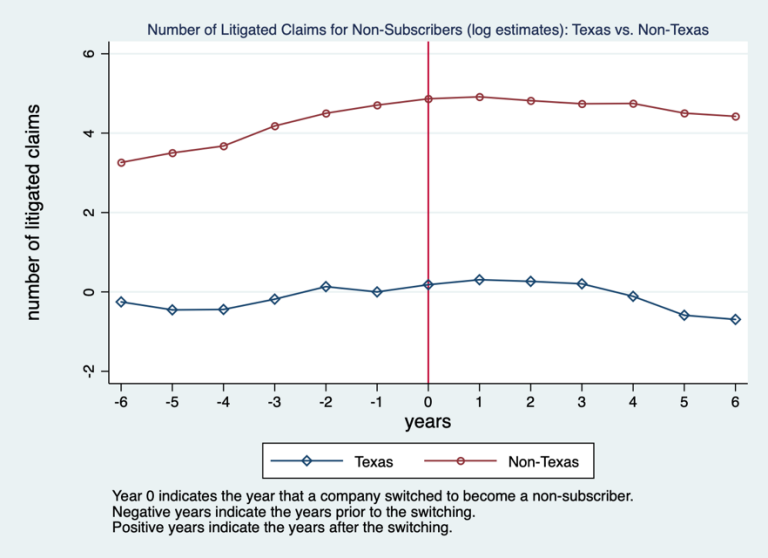

Figure 14: Mean of Total Spending for Non-Subscribers (log estimates)

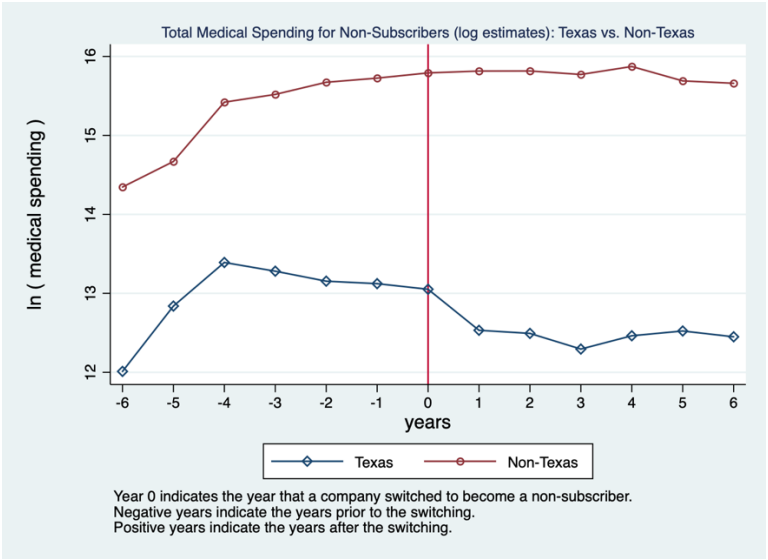

Table 1: Sample Section

Steps	Number of Observation	Comments
Step 1: Claims across 50 states, 2004-2016	6,397,967	Initial sample
Step 2: Keep claimants who are between age 16-64, and has served in a firm for at most 49 years	5,835,673	Claimants who are older than 64 are eligible for Medicare, which they may use in lieu of WC.
Step 3: Keep four types of claims: medical only, temporary disability, permanent disability, death	5,581,827	Drop claims belong to incident report because incident report is not a claim yet.
Step 4: Keep claims that incur zero or positive expenses	5,578,806	Drop claims with negative expenses potentially due to measurement error.
Step 5: Impute missing pre-injury weekly wage value and keep the weekly wage between $10-$10,000	4,977,805	36 percent of weekly wage values are missing. After imputation, 10 percent of weekly wage values are missing.
Step 6: Impute number of lost days for claims that incur positive indemnity but are recorded as having no lost days. Exclude claims that incur more than 365 lost days and claims that take longer than 90 days to report to employers.	4,627,065	Impute 7 percent of the values. Claims that take longer than 90 days to report might be recorded in error.
Step 7: Keep claims from the 25 switchers	846,376	
Step 8: Aggregate up to company-state-year level (DID method)	569	
Step 9: Aggregate up to company-state-year level (DDD method)	10,240	

Table 2a: Summary Statistics on Outcomes

		Pre-Switching		Post-Switching	
Variables	All	Non-TX	TX	Non-TX	TX
	mean/sd	mean/sd	mean/sd	mean/sd	mean/sd
Number of Claims	2898.5	2124.7	210.0	2886.0	390.8
	(5105.5)	(4425.8)	(353.7)	(4421.9)	(712.6)
Number of Denied Claims	240.9	93.88	11.09	292.0	67.35
	(458.9)	(161.5)	(16.34)	(517.6)	(107.7)
Total Medical Spending	3001.1	2910.7	2692.4	3889.5	1596.6
	(1195.3)	(1340.2)	(1776.5)	(2077.8)	(1033.9)
Hospital Spending	431.9	472.8	408.9	449.9	271.3
	(209.6)	(222.9)	(377.4)	(295.5)	(328.6)
Physician Spending	970.5	952.5	1263.8	1138.2	672.6
	(364.5)	(450.4)	(1028.6)	(532.5)	(377.4)
Other Medical Spending	1175.8	1236.9	973.2	1411.3	558.9
	(446.4)	(644.0)	(617.2)	(654.1)	(371.4)
Indemnity Payment	2006.8	2028.8	997.7	2665.1	861.3
	(1496.7)	(1693.5)	(785.5)	(1997.7)	(2064.3)
Lump Sum Settlement	482.6	563.2	3.390	565.2	374.8
	(301.6)	(563.4)	(8.524)	(287.8)	(1719.2)
Employer Legal Expenses	320.9	372.9	194.8	369.5	107.4
	(135.5)	(220.7)	(246.9)	(222.4)	(137.7)
Total Spending	5811.3	5875.6	3888.4	7489.3	2940.2
	(3015.0)	(3649.0)	(2589.1)	(4237.2)	(4587.1)
Number of Lost Days	15.98	16.32	20.62	18.48	4.918
	(6.912)	(7.258)	(12.30)	(9.452)	(4.469)
Number of Permanent Disability Claims	69.30	49.71	6.655	74.25	6.826
	(87.03)	(55.94)	(10.40)	(98.17)	(14.91)
Number of Litigated Claims	92.49	62.63	0.828	111.7	1.101
	(130.3)	(89.68)	(1.695)	(144.3)	(2.090)
Observations	25	25	25	25	25

Number of observations are aggregated to the company level.
There are 25 companies that switched to non-subscription program.
Total medical spending includes hospital, physician, and other medical spending.
Total spending includes total medical, indemnity, settlement, and employer legal expenses.

Table 2b: Summary Statistics on Nature of Injury

		Pre-Switching		Post-Switching	
Variables	All	Non-TX	TX	Non-TX	TX
	mean/sd	mean/sd	mean/sd	mean/sd	mean/sd
No Physical Injury	0.0123	0.00955	0.0133	0.0148	0.0116
	(0.0153)	(0.0114)	(0.0172)	(0.0202)	(0.0207)
Burn	0.00967	0.0102	0.00784	0.00931	0.00866
	(0.00762)	(0.00864)	(0.0110)	(0.00787)	(0.0107)
Contusion/Laceration	0.272	0.266	0.275	0.271	0.299
	(0.0958)	(0.0828)	(0.108)	(0.112)	(0.134)
Crushing	0.00663	0.00520	0.00366	0.00913	0.00667
	(0.00518)	(0.00370)	(0.00539)	(0.00856)	(0.00983)
Enucleation	0.0147	0.0144	0.0117	0.0146	0.0116
	(0.0116)	(0.0107)	(0.0164)	(0.0111)	(0.0132)
Infection/Inflammation	0.0524	0.0654	0.0514	0.0373	0.0409
	(0.0352)	(0.0570)	(0.0560)	(0.0219)	(0.0352)
Puncture/Fracture	0.0753	0.0755	0.0835	0.0760	0.0870
	(0.0688)	(0.0729)	(0.0827)	(0.0657)	(0.0834)
Strain/Sprain/Tear	0.397	0.402	0.386	0.404	0.369
	(0.134)	(0.133)	(0.148)	(0.153)	(0.146)
Unconsciousness/Strangulation	0.00363	0.00257	0.00169	0.00367	0.00583
	(0.00409)	(0.00301)	(0.00273)	(0.00599)	(0.00764)
All other Specific Injuries	0.0568	0.0655	0.0684	0.0505	0.0474
	(0.0272)	(0.0365)	(0.0606)	(0.0247)	(0.0359)
Not Provided/NOC	0.0575	0.0379	0.0374	0.0762	0.0748
	(0.208)	(0.189)	(0.186)	(0.262)	(0.258)
Mental Stress	0.00700	0.00829	0.00896	0.00563	0.00270
	(0.0136)	(0.0155)	(0.0268)	(0.0127)	(0.00623)
Multiple Physical Injuries	0.0356	0.0379	0.0510	0.0280	0.0343
	(0.0315)	(0.0440)	(0.0551)	(0.0310)	(0.0347)
Observations	25	25	25	25	25

Number of observations are aggregated to the company level.
There are 25 companies that switched to non-subscription program.

Table 2c: Summary Statistics of Employment Characteristics

		Pre-Switching		Post-Switching	
Variables	All	Non-TX	TX	Non-TX	TX
	mean/sd	mean/sd	mean/sd	mean/sd	mean/sd
Employment Status					
-regular	0.799	0.807	0.825	0.799	0.825
	(0.182)	(0.185)	(0.182)	(0.197)	(0.172)
-part time	0.156	0.145	0.138	0.160	0.143
	(0.167)	(0.167)	(0.184)	(0.180)	(0.175)
-other	0.0448	0.0484	0.0365	0.0409	0.0322
	(0.0689)	(0.0940)	(0.0608)	(0.0746)	(0.0593)
Standard Industrial Classification					
-food/kindred products mfrs	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-printing publishing	0.0367	0.0364	0.0142	0.0394	0.0372
	(0.183)	(0.182)	(0.0708)	(0.197)	(0.186)
-analyzing instruments mfrs	0.0800	0.0800	0.0800	0.0800	0.0800
	(0.277)	(0.277)	(0.277)	(0.277)	(0.277)
-motor freight transportation	0.0434	0.0435	0.0429	0.0432	0.0453
	(0.200)	(0.200)	(0.200)	(0.200)	(0.201)
-wholesale trade-durable goods	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-wholesale trade-nondurable goods	0.0869	0.0838	0.0800	0.0916	0.0837
	(0.275)	(0.275)	(0.277)	(0.274)	(0.276)
-building materials/hardware	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-general merchandise stores	0.237	0.237	0.237	0.237	0.235
	(0.430)	(0.430)	(0.431)	(0.430)	(0.427)
-food stores	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-automotive dealers/stations	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-apparel/accessory stores	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-eating/drinking places	0.0355	0.0359	0.0400	0.0341	0.0400
	(0.177)	(0.180)	(0.200)	(0.171)	(0.200)
-mis retail	0.0773	0.0800	0.0800	0.0736	0.0761
	(0.268)	(0.277)	(0.277)	(0.256)	(0.264)
-depository institutions	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-hotels rooming/camps	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-personal services	0.0400	0.0400	0.0400	0.0400	0.0400
	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-health services	0.0400	0.0400	0.0400	0.0400	0.0400

	(0.200)	(0.200)	(0.200)	(0.200)	(0.200)
-other	0.00358	0.00375	0.0258	0.00123	0.00288
	(0.0167)	(0.0180)	(0.129)	(0.00426)	(0.0138)
Average Pre-Injury Weekly Wage	569.7	559.8	598.0	587.9	530.6
	(194.3)	(194.3)	(294.2)	(238.0)	(206.5)
Days of Service	1618.0	1505.6	1338.1	1793.1	1532.8
	(1242.9)	(1184.3)	(1065.8)	(1417.6)	(1283.1)
Observations	25	25	25	25	25

Number of observations are aggregated to the company level.
There are 25 companies that switched to non-subscription program.

Table 2d: Summary Statistics on Claimant and Claim Characteristics

		Pre-Switching		Post-Switching	
Variables	All	Non-TX	TX	Non-TX	TX
	mean/sd	mean/sd	mean/sd	mean/sd	mean/sd
Male	0.526	0.533	0.500	0.524	0.505
	(0.294)	(0.292)	(0.307)	(0.293)	(0.312)
Claimant Age	37.90	37.50	37.85	38.64	38.03
	(4.172)	(3.964)	(4.079)	(4.853)	(4.435)
Number of Dependents	0.325	0.461	0.434	0.176	0.130
	(0.214)	(0.304)	(0.359)	(0.174)	(0.208)
Marital Status					
-not married	0.430	0.412	0.372	0.422	0.389
	(0.169)	(0.153)	(0.190)	(0.220)	(0.242)
-married	0.322	0.350	0.341	0.273	0.268
	(0.112)	(0.113)	(0.162)	(0.149)	(0.178)
-unknown	0.248	0.238	0.287	0.306	0.342
	(0.220)	(0.222)	(0.309)	(0.308)	(0.367)
Open Claims	0.0426	0.0140	0.0194	0.0960	0.0346
	(0.0291)	(0.0147)	(0.0794)	(0.0759)	(0.0291)
Observations	25	25	25	25	25

Number of observations are aggregated to the company level.
There are 25 companies that switched to non-subscription program.

Table 3: OLS Estimates of the Effect of Non-Subscription on Number of Claims
Log Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	0.061	-0.068	-0.021	-0.019	-0.053	-0.025	-0.069
	(0.145)	(0.147)	(0.147)	(0.169)	(0.142)	(0.137)	(0.127)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	1188.72	1188.72	1188.72	1188.72	1188.72	1188.72	1188.72
$R2$	0.848	0.855	0.867	0.872	0.877	0.928	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: OLS Estimates of the Effect of Non-Subscription on
Number of Denied Claims
Log Estimates (Number of Claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	1.053**	0.889*	0.956**	0.979**	1.016**	0.891**	0.970***
	(0.310)	(0.326)	(0.331)	(0.336)	(0.310)	(0.312)	(0.326)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	569	569	569	569	569	569	569
Mean of Dep. Var. (unlogged)	124.62	124.62	124.62	124.62	124.62	124.62	124.62
R^2	0.688	0.698	0.719	0.730	0.737	0.809	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted and denied claims, and claims incurring zero or positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: OLS Estimates on the Effect of Non-Subscription on
Number of Claims Involving Obvious Injuries
Log Estimates (Number of Claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.058	-0.157	-0.115	-0.166	-0.202	-0.133	-0.105
	(0.182)	(0.178)	(0.163)	(0.173)	(0.146)	(0.146)	(0.151)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	420.37	420.37	420.37	420.37	420.37	420.37	420.37
R^2	0.832	0.836	0.880	0.883	0.887	0.929	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Obvious injuries include amputation, crushing, enucleation, laceration and contusion, and unconsciousness.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted and denied claims, and claims incurring zero or positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: OLS Estimates on the Effect of Non-Subscription on
Total Medical Spending
Log Estimates (spending+$1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.592**	-0.678**	-0.617**	-0.574**	-0.616**	-0.536*	-0.715***
	(0.189)	(0.193)	(0.184)	(0.203)	(0.174)	(0.200)	(0.186)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	3323119	3323119	3323119	3323119	3323119	3323119	3323119
R^2	0.838	0.840	0.852	0.860	0.866	0.908	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: OLS Estimates on the Effect of Non-Subscription on Hospital Spending
Log Estimates (spending+$1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.864**	-0.962**	-0.927**	-0.876*	-0.932**	-0.770*	-0.873**
	(0.244)	(0.304)	(0.328)	(0.348)	(0.326)	(0.348)	(0.272)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	577309	577309	577309	577309	577309	577309	577309
R^2	0.657	0.659	0.686	0.703	0.720	0.778	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: OLS Estimates on the Effect of Non-Subscription on Physician Spending
Log Estimates (spending+$1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.254	-0.499*	-0.421	-0.296	-0.335	-0.346	-0.486*
	(0.269)	(0.237)	(0.232)	(0.259)	(0.220)	(0.249)	(0.232)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep.Var. (unlogged)	1006106	1006106	1006106	1006106	1006106	1006106	1006106
R^2	0.753	0.776	0.790	0.809	0.813	0.866	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: OLS Estimates on the Effect of Non-Subscription on Other Medical Spending
Log Estimates (spending+$1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.571*	-0.830**	-0.765**	-0.713*	-0.774**	-0.663*	-0.859***
	(0.271)	(0.238)	(0.257)	(0.280)	(0.244)	(0.285)	(0.249)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	1334752	1334752	1334752	1334752	1334752	1334752	1334752
R^2	0.759	0.779	0.796	0.802	0.810	0.863	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: OLS Estimates of the Effect of Non-Subscription on Indemnity Payments
Log Estimates (payment+$1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-1.326***	-1.503***	-1.408***	-1.188**	-1.319***	-1.219***	-1.408***
	(0.344)	(0.346)	(0.337)	(0.329)	(0.276)	(0.303)	(0.348)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	1575790	1575790	1575790	1575790	1575790	1575790	1575790
R^2	0.695	0.701	0.721	0.743	0.756	0.793	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11: OLS Estimates on the Effect of Non-Subscription on
Number of Lost Days
Log Estimates (lost days+1 day)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-1.665***	-1.822***	-1.749***	-1.640***	-1.716***	-1.650***	-1.876***
	(0.256)	(0.252)	(0.238)	(0.260)	(0.218)	(0.231)	(0.241)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	17524	17524	17524	17524	17524	17524	17524
R^2	0.769	0.775	0.791	0.810	0.817	0.853	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12: OLS Estimates on the Effect of Non-Subscription on
Number of Permanent Disability Claim
Log Estimates (number of claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.637**	-0.734**	-0.748**	-0.773***	-0.770**	-0.650**	-0.667***
	(0.181)	(0.198)	(0.201)	(0.205)	(0.206)	(0.200)	(0.181)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	33.14	33.14	33.14	33.14	33.14	33.14	33.14
R^2	0.731	0.736	0.741	0.754	0.757	0.816	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 13: OLS Estimates on the Effect of Non-Subscription on
Number of Litigated Claims
Log Estimates (number of claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.316*	-0.400*	-0.410*	-0.381*	-0.334*	-0.307	-0.306*
	(0.136)	(0.148)	(0.166)	(0.153)	(0.151)	(0.165)	(0.122)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	569	569	569	569	569	569	569
Mean of Dep.Var. (unlogged)	48.46	48.46	48.46	48.46	48.46	48.46	48.46
R^2	0.845	0.848	0.854	0.860	0.864	0.894	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted and denied claims, and claims incurring zero or positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14: OLS Estimates of the Effect of Non-Subscription on Total Spending
Log Estimates (spending+$1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.680**	-0.778**	-0.714**	-0.660**	-0.711***	-0.618**	-0.784***
	(0.209)	(0.212)	(0.196)	(0.213)	(0.182)	(0.209)	(0.207)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	5649966	5649966	5649966	5649966	5649966	5649966	5649966
R^2	0.835	0.838	0.851	0.860	0.865	0.903	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted claims and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15: OLS Estimates on the Effect of Non-Subscription Over Time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Non-Subscription*post yr1	0.155	0.950**	-0.306	-0.407	0.016	-0.056	-0.261	-1.036*	-1.336***	-0.793***	-0.100	-0.387
	(0.155)	(0.289)	(0.188)	(0.412)	(0.137)	(0.233)	(0.276)	(0.377)	(0.290)	(0.197)	(0.128)	(0.202)
Non-Subscription*post yr2	0.019	0.862**	-0.614***	-1.324**	-0.100	-0.282	-0.627*	-1.338**	-1.498***	-0.532*	-0.125	-0.681***
	(0.139)	(0.302)	(0.143)	(0.401)	(0.132)	(0.165)	(0.253)	(0.363)	(0.225)	(0.221)	(0.157)	(0.150)
Non-Subscription*post yr3+	-0.318*	0.635*	-0.843***	-1.347***	-0.402*	-0.639**	-1.077***	-1.448***	-1.786***	-0.463	-0.564***	-0.895***
	(0.117)	(0.290)	(0.145)	(0.351)	(0.150)	(0.199)	(0.262)	(0.285)	(0.231)	(0.252)	(0.120)	(0.156)
Observations	566	569	566	566	566	566	566	566	566	566	569	566
Mean of Dep.Var. (unlogged)	1188.72	124.62	3323119	577309	420.37	1006106	1334752	1575790	17524	33.14	48.46	5649966
R^2	0.879	0.732	0.869	0.725	0.889	0.817	0.814	0.757	0.816	0.752	0.867	0.868

Column 1: Log estimate on number of claims;
Column 2: Log estimates on number of denied claims (claims+1);
Column 3: Log estimate on total medical spending (spending+$1);
Column 4: Log estimate on hospital spending (spending+$1);
Column 5: Log estimate on the number of claims involving obvious injuries (claims+1);
Column 6: Log estimate on physician spending (spending+$1);
Column 7: Log estimate on other medical spending (spending+$1);
Column 8: Log estimate on indemnity payments (indemnity+$1);
Column 9: Log estimate on number of lost days (lost days+1);
Column 10: Log estimate on the number of permanent disability claims (claims+1);
Column 11: Log estimate on the number of litigated claims (claims+1);
Column 12: Log estimate on total payments (payment+$1)
The specification includes all covariates: year FE, Texas FE, company FE, claim status, nature of injury, employment and individual characteristics.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 16: DDD Estimates on the Effect of Non-Subscription

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Triple Difference Estimate	0.026	1.428***	-0.556**	-0.779*	-0.192	-0.239	-0.786**	-1.254***	-1.681***	-7.297	0.026	1.428***
	(0.165)	(0.317)	(0.202)	(0.324)	(0.242)	(0.259)	(0.282)	(0.327)	(0.254)	(6.333)	(0.165)	(0.317)
Double Different Estimate	-0.053	1.016**	-0.616**	-0.932**	-0.202	-0.335	-0.774**	-1.319***	-1.716***	-0.770**	-0.053	1.016**
	(0.142)	(0.310)	(0.174)	(0.326)	(0.146)	(0.220)	(0.244)	(0.276)	(0.218)	(0.206)	(0.142)	(0.310)
Observations	10137	10240	10137	10137	10137	10137	10137	10137	10137	10240	10137	10240
Mean of Dep.Var. (unlogged)	368.88	33.98	1255004	204211.5	105.34	417421.9	465095.6	867162.2	6774.40	17.23	368.88	33.98
R^2	0.813	0.732	0.745	0.580	0.831	0.679	0.685	0.587	0.662	0.583	0.765	0.742

Column 1: Log estimate on number of claims;
Column 2: Log estimates on number of denied claims (claims+1);
Column 3: Log estimate on total medical spending (spending+$1);
Column 4: Log estimate on hospital spending (spending+$1);
Column 5: Log estimate on the number of claims involving obvious injuries (claims+1);
Column 6: Log estimate on physician spending (spending+$1);
Column 7: Log estimate on other medical spending (spending+$1);
Column 8: Log estimate on indemnity payments (indemnity+$1);
Column 9: Log estimate on number of lost days (lost days+1);
Column 10: Log estimate on the number of permanent disability claims (claims+1);
Column 11: Log estimate on the number of litigated claims (claims+1);
Column 12: Log estimate on total payments (payment+$1)
The specification includes all covariates: year FE, Texas FE, company FE, claim status, nature of injury, employment and individual characteristics.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix 1: OLS Estimates of the Effect of Non-Subscription on Number of Denied Claims: Excluding zero medical spending Log Estimates (number of claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	1.559***	1.417***	1.428***	1.440***	1.428***	1.366***	1.494***
	(0.299)	(0.313)	(0.315)	(0.310)	(0.299)	(0.329)	(0.313)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	53.97	53.97	53.97	53.97	53.97	53.97	53.97
R^2	0.690	0.698	0.712	0.720	0.726	0.778	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted and denied claims, and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix 2: OLS Estimates on the Effect of Non-Subscription on
Number of Permanent Disability Claim: Including denied claims and zero medical spending
Log Estimates (number of claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.521**	-0.635**	-0.725**	-0.747**	-0.735**	-0.680**	-0.565**
	(0.181)	(0.205)	(0.209)	(0.222)	(0.222)	(0.214)	(0.186)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	569	569	569	569	569	569	569
Mean of Dep. Var. (unlogged)	36.56	36.56	36.56	36.56	36.56	36.56	36.56
R^2	0.723	0.728	0.736	0.746	0.749	0.806	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted and denied claims, and claims incurring zero or positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix 3: OLS Estimates on the Effect of Non-Subscription on
Number of Permanent Disability Claim: Including denied claims and positive medical spending
Log Estimates (number of claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.530**	-0.654**	-0.683**	-0.711**	-0.711**	-0.609**	-0.578**
	(0.180)	(0.205)	(0.198)	(0.204)	(0.210)	(0.199)	(0.186)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	35.09	35.09	35.09	35.09	35.09	35.09	35.09
R^2	0.717	0.725	0.730	0.743	0.747	0.804	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted and denied claims, and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix 4: OLS Estimates on the Effect of Non-Subscription on
Number of Litigated Claim: Including denied claims and positive medical spending
Log Estimates (number of claims+1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Subscription	-0.328*	-0.416**	-0.421*	-0.402**	-0.377*	-0.339*	-0.322**
	(0.134)	(0.145)	(0.154)	(0.137)	(0.146)	(0.162)	(0.119)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TX FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Claim Status	No	Yes	Yes	Yes	Yes	Yes	-
Nature of Injury	No	No	Yes	Yes	Yes	Yes	-
Employment Characteristics	No	No	No	Yes	Yes	Yes	-
Individual Characteristics	No	No	No	No	Yes	Yes	-
Company Linear Time Trend	No	No	No	No	No	Yes	-
Observations	566	566	566	566	566	566	566
Mean of Dep. Var. (unlogged)	45.75	45.75	45.75	45.75	45.75	45.75	45.75
R^2	0.849	0.852	0.860	0.866	0.869	0.897	-

Column 1 to 6 are estimated using the DID method. Column 7 is estimated using the Post-Double-Selection LASSO.
Claim status includes: open claims and closed claims.
Nature of injury includes: no physical injury, burn, contusion/laceration, crushing, enucleation, infection/inflammation, puncture/rupture/fracture/dislocation, strain/sprain/tear, unconsciousness/strangulation, others, multiple injuries.
Employment characteristics include: employment status, Standard Industrial Classification, average pre-injury weekly wage, length of service.
Individual characteristics include: gender, age, number of dependents, marital status.
Number of observations are aggregated to the Texas/non-Texas-company-year level.
Number of observations include accepted and denied claims, and claims incurring positive medical spending.
Standard errors in parentheses, clustered at the company level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$