Commission on Health and Safety and Workers' Compensation

The Impact of Occupational Injury and Illness on Pricing an Integrated Disability Benefit

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Abstract

Across the United States, occupational injuries receive near universal coverage under state-regulated workers' compensation programs. However, California is one of only six jurisdictions that provides workers with a near universal non-occupational disability program, called State Disability Insurance (SDI). While workers' compensation is entirely financed by employers, SDI is solely supported by workers through automatic payroll deductions.

The workers' compensation system is increasingly dominated by disputes over whether cumulative injuries and illnesses should be considered occupational or non-occupational. Because occupational and non-occupational causation is difficult to define, it is possible that the current methods of sorting injuries and illnesses into the appropriate program (often through litigation) is biased, leading one program to subsidize the other.

We use a virtually unexplored data set from the California SDI system in conjunction with California occupational injury data from the Bureau of Labor Statistics to conduct a first-of-its-kind study to estimate the direction, existence, and size of cross-subsidization between these two systems. We find that 8.4% of occupational injuries and nearly two-thirds (66.2%) of occupational illnesses are incorrectly classified as non-occupational in origin. We further estimate that 0.08% of workers' wages are being shifted to employers and insurers. Finally, we argue that the integration of occupational and non-occupational systems may be an efficient solution to eliminating cross-subsidization, reducing costly litigation, and encouraging efficient investment in safety.

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Executive Summary

Introduction

Across the United States, occupational injuries receive near universal coverage under state-regulated workers' compensation programs. However, California is one of only 5 states that provide workers with a near universal non-occupational disability program, called California State Disability Insurance (SDI). While workers' compensation is entirely financed by employers, SDI is supported entirely by workers through automatic payroll deductions.

The workers' compensation system is increasingly dominated by disputes over the whether cumulative injuries and illnesses should be considered occupational or non-occupational. Because occupational and non-occupational causation is difficult to define, it is possible that the current methods of sorting injuries and illnesses into the appropriate program (often through litigation) is biased, leading one program to subsidize the other.

Cross-subsidy

We use a virtually unexplored data set from the California SDI system in conjunction with California occupational injury data from the Bureau of Labor Statistics to conduct a first-of-its-kind study to estimate the existence, direction, and size of cross-subsidization between these two systems.

We reach the following important conclusions:

- 13.1% of SDI claims should be defined as occupational, this includes,

    - 7.4% of SDI claims for illness and

    - 21.0% of SDI claims for injury

- 9.7% of employee contributions to SDI are going to subsidize workers' compensation injuries misclassified as occupational.

- This represents a transfer of $400 million, or about 0.08% of employee wages to subsidize employers' cost of workers' compensation

Correcting the Problem without Raising Costs to Employers

Accurately assigning all individual disability cases to the occupational or non-occupational systems is nearly impossible to accomplish given the difficulty in determining causation. Even if it were possible to achieve near perfect sorting of conditions by causation, it would probably be very expensive, administratively, to implement such an effort. On the other hand, reducing workers' contribution to SDI and substituting an employer contribution of

the same amount would likely be politically unpopular or at least difficult to reach consensus on.

However, integration of workers' compensation temporary disability into the State Disability Insurance (SDI) system offers an opportunity to accomplish three important public policy goals:

- Eliminate the employee subsidy of the workers' compensation system,

- Reduce the cost to workers of non-occupational disability insurance, and

- Reduce the employers' cost of temporary disability for occupational conditions, including those currently covered by SDI.

How can we decrease the cost to employers while eliminating the current subsidy of the workers' compensation system by SDI? The key is the administrative costs. State Disability Insurance has very low administrative costs. It costs about $0.05 to deliver a dollar of wage-loss benefits to disabled workers through the SDI system. By comparison, it costs between $0.80 to $2.42 for the workers' compensation system to deliver the same dollar of wage-loss benefits.

If workers' compensation temporary disability was merged into the State Disability Insurance system and the cross-subsidy by workers eliminated, based on 2006 injuries and illnesses:

- Workers would pay $400 million less in payroll taxes (0.08% of payroll)

- Employers would pay $2,050 million into SDI

- Employers would pay at least $2,800 million less in workers' compensation costs

- Net savings for employers, at least $750 million (0.13% of payroll)

Employers could fund the current portion of SDI that workers are subsidizing and still save $750 million annually by integrating all temporary disability under the SDI program instead of retaining separate temporary disability programs under SDI and workers' compensation.

Methods

In order to assess the amount and direction of cross-subsidization between the occupational and non-occupational systems in the state of California, we look for an association between the incidence rates of non-occupational injuries and illnesses and the incidence rates of occupational injuries and illnesses after controlling for factors that could possibly explain the association between the two.

In theory, if we meet the following three conditions then there should be no or at most a minimal relationship between occupational and non-occupational incidence rates:

1) the characteristics of the population that drive non-occupational disability rates for the working population are the same across industries or adequately controlled for in the analysis;

2) work-related conditions are accurately assigned to the workers' compensation system, and

3) non-work-related conditions are accurately assigned to the non-occupational, disability system.

If under these conditions we observe that occupational and non-occupational incidence rates are correlated, it would suggest that there is cross-subsidization occurring. If the correlation between the two is positive (the higher the occupational incidence rates, the higher the non-occupational incidence rates), it indicates that the non-occupational disability system is subsidizing the workers' compensation system. If on the other hand, the correlation is negative (the higher the occupational incidence rates the lower the non-occupational incidence rates), it indicates that the workers' compensation system may be subsidizing the non-occupational disability program.

Findings

Percentage Misreported

If we have appropriately controlled for disability related to population characteristics within each industry, and if the current administrative process accurately sorts conditions into the appropriate system, we would expect a correlation between the occupational and non-occupational incidence rates to be near zero and/or not statistically significant. However, we in fact find a moderate, positive correlation between occupational and non-occupational rates for all three categories (injuries, illnesses and the combined rate for injuries and illnesses). The relationship appears to be stronger for injuries than for illnesses, but both trend in the same direction.

Three regression models (for injuries, illnesses, and combined injuries and illnesses) predict non-occupational (SDI) incidence rates from occupational (BLS) incidence rates. The regression coefficient for the occupational incidence rate in each model represents the expected change in the non-occupational incidence rate when the occupational incidence rate changes one unit, with all other independent variables (such as survey year) held constant.

The coefficients in our regression models confirm the correlation statistics. The coefficient on the occupational incidence (BLS) rate variable indicates that the portion of occupational injuries that are being reported as non-occupational is relatively low, about 8.4%. However, for every occupational illness reported under workers' compensation, nearly two (1.96) illnesses are misreported as non-occupational. That is, nearly two-thirds of occupational

illnesses are being reported as non-occupational. This is consistent with the greater difficulty in defining the occupational nature of most illnesses, especially those with long latency or multiple or poorly defined causation.

Proportional Impact of Misreporting

We use the results from our regression models to estimate the proportion of non-occupational injuries and illnesses reported in the SDI data that should instead be attributed to occupational causation. While the under-reporting of occupational illnesses is much greater than the under-reporting of injuries, we can see that the much higher frequency of occupational injuries relative to illnesses makes the proportional impact of under-reporting on non-occupational injuries and illness incidence rates more similar. We find that 7.4% of non-occupational illnesses should be classified as occupational and that 21.0% of non-occupational injuries are more appropriately considered occupational. 13.1% of all conditions, currently called non-occupational, would more accurately be defined as occupational.

Re-Estimate of the Composition of Disabling Conditions

These data allow us to make the first estimate of the distribution of disabling occupational and non-occupational conditions in a US system with universal coverage for both sets of injuries and illnesses. The composition of reported disabling conditions is very different between occupational disability (BLS) and non-occupational disability (SDI). Approximately 82% of occupational disabilities are injuries compared to about 18% that are illnesses. The opposite is true for non-occupational disabilities, of which approximately 79% are illnesses and 21% are injuries.

We find that approximately 35 percent of injuries have non-occupational causes while the majority of illnesses (91%) are non-occupational in nature. Combined, we estimate that approximately two-thirds (69%) of all disabilities (injuries and illnesses) are reported as non-occupational in nature.

Caveats on Integration

Integration, while conceptually simple, is more difficult in practice because SDI and workers' compensation eligibility rules and benefits are not identical on duration of benefits, amount of benefits, eligibility, and benefit exhaustion. However, as shown in the table below, the differences between the systems affect a surprisingly small fraction of claims.

Comparison of Benefits: SDI vs. Workers' Compensation			
	State Disability Insurance	Workers Compensation	Portion of cases affected
Duration of benefits	52 weeks	104 weeks	6.6% of WC TD claims exceed 52 weeks
Benefits/weekly wage	60%	66.7%	
Eligibility	Minimum of $300 wages in base period	Full benefits from first day of work	Unknown
Benefit exhaustion	Can occur if wages in base period are too low	Not applicable	3.9% of SDI claims exhaust benefits prior to return-to-work

We conclude that the differences between the systems are not large and the savings are substantial. This should allow employers and labor to work out a compromise that improves benefits while reducing costs to both parties.

The Impact of Occupational Injury and Illness on Pricing an Integrated Disability Benefit

1. Purpose of the Study

Occupational and non-occupational disability programs are meant to be separate and to compensate different sets of injuries and illnesses. Because the cause of many conditions is difficult to determine, it is possible that current approaches to sorting injuries and illnesses into a specific program are making systematic errors, leading one program to subsidize the other. The main goal of our study is to assess the existence, direction, and amount of any cross-subsidization between non-occupational and occupational disability programs in California.

If cross-subsidy exists, our goal is to examine the feasibility of assigning the costs accurately between the two systems. Reallocating the costs could be a function of more accurately assigning cause. Alternatively, costs could be reassigned without changing assignment of cause. A third possibility is that all claims could be assigned to a single integrated system and the necessity of determining cause eliminated. We would like to place the efficiency of the current system in perspective with these several other approaches.

The existence and direction of cross-subsidy is difficult to predict. Doctors might be more likely to mistakenly assign a non-occupational disability to the occupational system if the workers are in high risk occupations. Workers may have an incentive to file a non-occupational injury or illness in the occupational system because of the access to generous health benefits (no co-insurance, co-pays, or deductibles) especially if they do not have health insurance coverage. Conversely, workers might be less likely to file an occupational injury within the occupational system because of stigma or fear of retaliation. It is also plausible that workers' compensation costs, particularly when they are high or increasing, give employers an incentive to attribute employee injuries to non-occupational causes in order to avoid increased workers' compensation costs.

Assigning total financial responsibility to one party (employer or worker) in any individual case based on a set standard is difficult and can impose highly variable costs on individual employers and workers.[1] It may also be administratively expensive. Similarly, assigning partial financial responsibility to both parties based on contribution to causation can be expensive and is substantially beyond current medical and scientific knowledge (Guidotti, 2006; Neuhauser, 2008(a)).

In addition, if we observe any biased sorting of medical conditions, in either direction, we should also assume that additional, unobserved, imperfect sorting (mistaken sorting in both

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[1] The near universal standard for identifying a condition as occupational is referred to as "contributing cause." The contributing cause standard is a very low threshold and is met if work contributed at all to the condition, even if only 1%. For some specific classes of conditions (e.g., psychiatric or stress cases) jurisdictions have adopted a higher standard, requiring that work be the "majority cause," that is, greater than 50%. Oregon is the only state that has adopted the "majority cause" standard for all injuries and illnesses.

directions, some of which may cancel out) is also occurring. In this case, a strong argument for integration could be made around the issue of appropriate investments in worker safety. To the extent that cases are imperfectly sorted, even if they do not result in an overall shifting of costs, parties will under invest in safety because they do not realize the full impact of the benefits. For example, if a fraction of occupational cases are inappropriately classified as non-occupational (even if exactly counter-balanced by non-occupational injuries misclassified as occupational), employers will observe less than the full impact of any investment that affects occupational safety. A portion of the impact of the investment will result in reductions in non-occupational injuries, benefits the employer does not realize.

Because these incentives frequently work in opposite directions, and, even without incentives, determination of cause is an inexact science, the questions of cross-subsidy can only be answered by empirical analysis. This paper is the first analytic effort to examine the cross-subsidy between occupational and non-occupational temporary disability programs.

If our analysis finds that there is in fact cross-subsidization occurring between the occupational and non-occupational systems, and we ascertain that one system delivers benefits at a much lower cost, then integrating all benefits under the more efficient system may offer substantial savings that can be used to reduce costs or enhance benefits. Integrating benefits and assigning average causation between parties across all conditions may offer a fair and efficient solution to the most serious challenges to our current occupational and non-occupational disability programs. We will present evidence that such administrative efficiencies are available and are large relative to the total cost of both systems.

The remainder of this paper is structured as follows: Section 2 offers a brief history and description of occupational and non-occupational disability programs nationally and in California. Section 3 provides a review of several key research studies on cross-subsidization. Section 4 presents the data and methodology used in our analysis. Section 5 reports the results of the analysis, and Section 6 discusses the implications of the analysis for the structure of disability programs in the state of California and nation-wide.

2. Occupational and Non-Occupational Disability Programs

2.1 Occupational Disability – Workers' Compensation System

The no fault workers' compensation system was first adopted in the United States in 1911. Until the adoption of this new system, workers had very limited access to medical insurance and disability payments. Social insurance and social welfare programs were still decades in the future. If benefits were not volunteered by the employer for a workplace injury, workers had little choice but to sue in civil court arguing the employer was negligent. This led to extensive and costly litigation, frequent and lengthy delays, uncertain recovery for workers, and unpredictable costs for employers.

The main litigated issue under the civil litigation system was assigning negligence to the employer or worker. Initially, negligence was treated as a yes/no question. If the employee contributed any negligence, no matter how slight, all responsibility of the employer was eliminated.[2] Civil courts did not evolve case law permitting apportionment of damages according to relative fault of the plaintiff and defendant until the latter half of the 20th century – well after the workers compensation system was implemented.[3] In addition, negligence was often very difficult and complex to adjudicate. When an injury arose in the course of employment, often neither party was negligent, but the worker still suffered a catastrophic injury.

The solution to high litigation costs and inconsistent and unpredictable outcomes for both workers and employers was a "bargain" between the parties. Employers accepted responsibility for virtually all workplace injuries and workers gave up their right to potentially large recoveries under civil suit in exchange for sure payment of medical treatment and limited indemnity benefits.

The first (no-fault) workers' compensation system was adopted in Wisconsin in 1911. The success of the no-fault solution was demonstrated by the rapid adoption of workers' compensation insurance programs by all states in the small span of a less than two decades.

Under the workers' compensation system, employers are required by state law (in all states except Texas) to purchase insurance for workers' compensation or obtain a certificate of self-insurance by posting sufficient collateral against expected losses. In California, workers' compensation insurance is sold by private property and casualty insurers along with a quasi-public insurer that is required to write insurance for any employer. Workers' compensation insurance pays for a worker's medical treatment, wage loss replacement while the worker is temporarily off work, and compensation for any permanent impairment as a result of an injury or illness.

Since the inception of the worker's compensation system, the landscape of injuries and disputes has changed dramatically. When workers' compensation was adopted and for several decades thereafter, workplace accidents were largely defined by traumatic injuries. The sentinel occupational accident was a fracture or contusion to a worker in manufacturing or transportation. Causation for traumatic injuries was relatively simple to define, even when determination of negligence proved difficult.

Today's landscape is dominated by cumulative injuries and occupational illnesses where the contribution of employment to the disability is often poorly defined. The sentinel occupational condition is now low back pain, typically with unclear or multiple causes. In addition, there is now a well developed network of social-insurance programs such as unemployment insurance, employment-based group health, Social Security Disability

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[2] Sometime referred to as the "unholy trinity" of affirmative defenses, even the negligent employer could avoid liability if 1) the employee's own negligence contributed to the injury, 2) the employee "assumed the risk" knowing that it was a risky job, or 3) the injury was caused by the negligence of a fellow employee.

[3] *Li v. Yellow Cab Co*. (1975) 13 Cal.3d 804.

Insurance (SSDI), and Medicare. There are also social-welfare programs such as Aid to Families with Dependent Children/Temporary Aid to Needy Families (AFDC/TANF), Supplemental Security Income (SSI), and Medicaid. Social insurance programs, primarily supported by employers but also by workers, form an extensive safety net for workers who are ill or injured. Social welfare programs are supported from "General Fund" tax dollars and form a secondary safety net for injured or ill persons that have limited workforce attachment or exhaust social insurance benefits.

Workers' compensation litigation today is heavily focused on the issue of causation, not negligence. In all US jurisdictions, for virtually all injuries and illnesses,[4] employers are responsible for the entire cost of medical treatment and disability payments when work is found to be a "contributing cause." The contributing cause standard is not specific, but has been interpreted by the courts to mean if work contributed at all to the condition, even just 1% of the cause, the employer is responsible for the entire cost of the condition.

The state of California requires that causation be determined through a legal process if it is not initially agreed upon by the parties. Currently the determination of causation does not assign financial responsibility between parties based on relative causation except for a subset of specific benefits.[5] Rather, legal determination is based on statute and case law which may clash with the perception of the parties. To the extent that perceptions clash with legal definitions, the system can potentially create additional "frictional costs" when the employment relationship is put under stress. Consider the quintessential example of a cumulative injury or illness, a psychiatric claim. Nearly all jurisdictions have adopted some limitations on the compensability of psychiatric claims that are stricter than the contributing cause standard. California's standard requires that work be the majority cause of a psychiatric condition. Even with this standard, or possibly because attribution of proportional causation is nearly impossible given the current level of knowledge, these cases are frequently litigated and workers reporting psychiatric injuries rarely continue employment with the at-injury employer (Reville et al., 2005).

2.2 Non-Occupational Disability – Social Insurance Programs

While occupational disabilities receive near universal coverage in the United States, legislated and regulated on a state-by-state basis through workers' compensation, non-

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[4] There is a growing body of exceptions that are carved out by individual jurisdictions for specific conditions (see Burton and Spieler, 1998). The most frequent and restrictive are for psychiatric conditions (see Neuhauser 1999), but a number of jurisdictions have excluded classes of conditions, like cumulative injuries, or other specific conditions, e.g., carpal tunnel syndrome.

[5] Recent legislative reforms in California, SB-899, made California the first state to attribute proportional liability for the permanent disability portion of benefits. However, all other benefits, particularly medical and temporary disability benefits are still assigned to the employer, in their entirety, based on the "contributing cause" standard. For an analysis of the impact of SB-899 on permanent disability see (Neuhauser 2008(a)).

occupational disability programs are much less common, coverage is less complete, and, with a few exceptions, they are virtually unregulated at the state level. In the United States, non-occupational disabilities are only insured universally at the federal level through Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) programs, and then only for long-term or permanent conditions resulting in total disability. When covered, non-occupational short to medium-term disabilities are typically insured via employer-based insurance programs, similar to group health, but these programs are infrequently offered to workers and often require substantial if not complete employee funding of premiums. According to the Bureau of Labor Statistics March 2007 National Compensation Survey, short term disability benefits were available (but not necessarily taken up by the worker) to approximately 39 percent of workers in private sector employment.

Estimates of the portion of injures among adults that are attributable to non-occupational causation vary widely. Miller (1995) estimated that just over one-half (55%) of non-fatal injuries resulting in lost workdays were non-occupational in nature. Salkever et. al. (2001) found that for injury-related paid claims for long-term disability benefits by workers in 271 U.S. firms, the vast majority (over 80%) were for non-occupational injuries.

All of the research we reviewed focused strictly on injuries and did not attempt estimates for illnesses. Although some efforts have been made for selected conditions (Leigh and Robbins, 2004), in this study we create the first estimate of the average incidence rate across the whole distribution of illnesses by occupational and non-occupational cause.

Uninsured, non-occupational injuries pose a serious economic hazard to workers. According to Kerns (1997), in 1994, wage and salary workers in the private sector lost $55.2 billion in wages because of non-occupational illnesses or injuries, of which only $19.0 billion (34.5%) were replaced through benefit and insurance programs. Kerns found that wage replacement rates varied greatly by demographic characteristics. Coverage was higher for full-time professional and technical employees with longer-tenured employment in large or medium-size firms, especially those who worked in the public sector. The lowest level of coverage was for part-time employees, with limited tenure, working in production and related areas within smaller, private firms.

California is one of only six jurisdictions that has legislated near universal non-occupational disability insurance for its work force. The other jurisdictions are Rhode Island, New Jersey, New York, Hawaii, and Puerto Rico.[6] In California, State Disability Insurance (SDI) is paid for by employees, at a tax rate of 0.8% on income up to $86,698 per year (for 2008). SDI replaces a portion of wages for all disability days after the 7th day and up through the 365 days of benefits. SDI does not cover medical expenses.

To cover wage loss beyond the 365th day, California workers may apply for Social Security Disability Insurance (SSDI) or Supplemental Security Income (SSI). Workers who become eligible for SSDI and SSI benefits are also eligible for Medicare after a statutory waiting

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[6] SSA Publication No. 13-11758, July 1997, p. 44-45.

period. Disabled workers are eligible to receive Medicaid if they demonstrate sufficient financial need.

In California, SDI is the "default" system. If there is a dispute over the cause of an injury, SDI pays benefits while the dispute is being resolved. If the claim is ultimately determined to be occupational, SDI recovers any benefit payments from the workers' compensation insurer or the employer if self-insured.

The California SDI system covers more than just injuries and illnesses. The most common reason (23% of claims) for claiming benefits is pregnancy and childbirth. Women are entitled to six weeks pregnancy leave with extensions possible for cases involving complications. California is the only state that also mandates paid family leave. Workers are eligible for up to 12 weeks of SDI benefits to care for a sick spouse, parent, or child. This program is funded through SDI, entirely from worker contributions.

SDI benefits are very similar to workers' compensation temporary disability benefits, but there are a few subtle but important differences. 1) By statute, both systems' weekly benefit amount is subject to the same minimum and maximum benefit levels. However, workers compensation pays two-thirds of the workers average weekly wage, subject to the minimum and maximum, while SDI pays 60% of average weekly wage, subject to the same minimum and maximum levels. 2) Workers' compensation currently pays temporary disability for up to two years, but during the period covered by this study (2000-2002) benefits were paid for up to five years. SDI pays benefits for 365 days. 3) Under workers' compensation, an injured worker is eligible for full benefits, even if the worker is injured on her first day of work. A worker's eligibility for SDI benefits is contingent on having an earnings history (minimum $300) in the 12-month period covering the four calendar quarters not including the quarter of injury and the immediately preceding quarter (similar to unemployment insurance benefits except that the minimum earnings for UI is $1200). 4) Finally, workers with very limited work histories or very low earnings in the base period may exhaust their benefits before they are able to return to work or reach the 365 day limit. Workers' compensation benefits are not subject to any prior earnings requirement and workers do not exhaust benefits, if needed, prior to the statutory maximum.

3. Review of the Literature on Cross-Subsidy

The relationship between occupational and non-occupational temporary disability incidence and duration has received very little attention in economics and policy literature, particularly in the U.S.. No research has examined industry-level, non-occupational injury incidence rates in the U.S. And, no research we are aware of has examined the question of cross-subsidy between the two systems.

The lack of research in this area results from several causes. First, in the United States, non-occupational, temporary disability programs are infrequent, virtually undirected at the national or state level, inconsistently distributed among workers, and driven by private insurance. Second, data sources, even when available, are usually unrepresentative, subject

to severe selection bias, and proprietary. Finally, any bias driven by theses non-representative samples is directly associated with most characteristics across which public policy research traditionally focuses: worker demographics (age, gender, race/ethnicity, region, wage, occupation, etc.) and employer characteristics (size, region, industry, etc.). Consequently, until the California SDI data was developed for this project, there have been virtually no publicly available resources for analysis of important questions involving non-occupational, temporary disability programs.

Studies on the topic of disability often have one or more of the following limitations: They focus on differences in total incidence rates rather than separately evaluating occupational and non-occupational rates (Iams 1986); they attribute all differences between rates for different occupations directly to the occupation or industry (Hannerz, et al. 2004, Cooper, et al. 1993), focus only on injuries and ignore illnesses (Miller, 1995; Salkever, et al., 2001) or they ignore important issues like short and medium-term disability incidence rates or duration and look only at special outcomes such as total disability or disability retirement (Hannerz, et al. 2004, Murphy and Brackbill 1989, Daly and Bound 1996, Magee 2004, Trupin and Yelin 2003, Guo and Burton 2008).

Additionally, much of the research in this area has been conducted outside of the United States (in Europe or Canada) where non-occupational disability is more commonly a broad-based benefit on a national level rather than the haphazard patchwork of programs characterizing the United States (Stattin, et. al 2005, Allebeck and Mastekaasa 2004, Andren 2001, Gulbrandsen and Bragem 1998, Bekkelund, et. al. 2001, Meerding, et. al; Hamilton & Hall 2003, Magee 2004, Menard, 1996). Generalization of international results to the US may be problematic if factors such as universal healthcare or labor's political and economic strength impact disability policy decisions and benefits. Even though several states, like California, have non-occupational insurance benefits, virtually no research has been conducted on these programs and, until this study, none of the programs has made broad administrative databases available for research efforts.

There are two studies that look at non-occupational incidence rates among the working population that are important to discuss in more detail. Using both occupational (workers' compensation) and non-occupational (group health insurance) data, Tsai, Bernacki, and Dowd (1989) found that the incidence rate of non-occupational injuries (21.1 per 100) was twice as high as occupational injuries (10.8 per 100) among a working population. While per-capita costs were similar at first glance for both non-occupational and occupational injuries, if only health care expenses were included in this calculation, non-occupational injury healthcare costs became 3 times as high as occupational injury healthcare costs. The authors conclude that these findings argue for increasing the share of employer resources for non-occupational injury prevention programs. Although this study differentiated between occupational and non-occupational causes of injury for a working population and the types of injuries sustained, they were not able to examine differences in non-occupational injury rates by industries and occupations. The sample used for the study covered full-time employees at a single large manufacturing firm. The only occupational variation within the industry was between hourly and salary workers.

Salkever, Shiogle, and Purushothaman (2001) analyzed data on more than 1000 injury-related paid claims for long-term disability (LTD) benefits by workers in 271 U.S. firms. They found that less than 20% of these injuries were work-related. Employer characteristics (industry type, selected disability management practices, and recent exposure to layoffs) were significant predictors of non-occupational injury claims rates. In addition, the authors found that the availability and generosity of workers' compensation impacted the claim rates for non-occupational injuries. Because of this finding, Salkever et. al. conclude that workers' compensation may be serving as a substitute for non-occupational (LTD) benefits.

A recently finished study addresses a special case of cross subsidy in the other direction. Guo and Burton (2008) argue that long-term, there is a shifting from workers' compensation to Social Security Disability Insurance (SSDI). This is a special case of the issue that we address in this paper, the cross-subsidy across all disabling conditions.

4. Data and Methodology

In order to assess the amount and direction of cross-subsidization between the occupational and non-occupational systems in the state of California, we look for an association between the incidence rates of non-occupational injuries and illnesses and the incidence rates of occupational injuries and illnesses after controlling for factors that could possibly explain the association between the two.

In theory, if we meet the following three conditions then there should be no or at most a minimal relationship between occupational and non-occupational incidence rates:

1) the characteristics of the population that drive non-occupational disability rates for the working population are the same across industries or adequately controlled for in the analysis;

2) work-related conditions are accurately assigned to the workers' compensation system; and

3) non-work-related conditions are accurately assigned to the non-occupational disability system.

If under these conditions we observe that occupational and non-occupational incidence rates are correlated, it would suggest that there is cross-subsidization occurring. If the correlation between the two is positive (the higher the occupational incidence rates, the higher the non-occupational incidence rates), it indicates that the non-occupational disability system is subsidizing the workers' compensation system. If on the other hand, the correlation is negative (the higher the occupational incidence rates the lower the non-occupational incidence rates), it indicates that the workers' compensation system is subsidizing the non-occupational disability program.

4.1 Calculating Comparable Incidence Rates

The first step in our analysis is to create comparable measures of occupational and non-occupational incidence rates. We use a number of primary data sources to achieve this goal. For occupational injury and illness incidence rates we use data for California from the Bureau of Labor Statistics (BLS). BLS conducts an annual Survey of Occupational Injuries and Illnesses (SOII) for California establishments. Rates for 2000 and 2001 are listed separately for injuries and illnesses and given as total incidence (injuries and illnesses combined). For 2002, rates are only available for total incidence. The rates are calculated as injuries and/or illnesses per 100 full-time equivalent employees (FTEs). An FTE is 2,000 hours per year.

Unlike occupational incidence rates, there is no single data source that offers an estimate of non-occupational incidence rates in the state of California. Therefore we make the first effort to construct such an estimate. We start with the formula:

$$Non-Occupational\ Incidence\ Rate = \frac{Number\ of\ Non-Occ\ Disability\ Claims}{Workers\ Exposed\ to\ Risk\ of\ Non-Occ\ Disability}$$

In order to construct this rate, we use the State Disability Insurance Single Client File (SCF) and the Employment Development Department, Employer Address File (ES-202).

4.2 Calculating Non-Occupational Incidence Rates – Numerator

We use the Single Client File (SCF) to identify the number of non-occupational disability claims in the state of California. The SCF is a 20% sample of all recipients of California's State Disability Insurance (SDI) program.[7] The SCF contains information on individuals who had disability insurance claims between 1990 and 2002. Each claim is associated with a diagnosis (ICD-9 code), which allows us to separate claims into injuries and illnesses. Other information in this file includes: claimant status code;[8] employment status code;[9] beginning and end dates of disability payments; weekly benefit rate; days paid; total amount paid; benefits exhaust code;[10] highest quarterly wages in base period; total wages in base period (four quarters); disability code;[11] ICD-9 codes for up to two medical diagnoses;

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[7] The Single Client File is constructed like several UI related files. The sampling is randomized by sampling all cases where the client SSN ends in 0 or 5. Two advantages to this strategy are 1) we can link, with confidence, all disability spells for a subset of workers; and 2) we can, if the opportunity arises, link to other EDD datasets like UI which is sampled in the same way. The SCF is available with a lag of about 18 months after the end of the calendar year of claim.

[8] Categories are: Inactive claim, returned to work, disqualified when eligible, exhausted claim.

[9] Categories are: Employed, unemployed, employer is non-subject, and voluntary plan.

[10] If exhausted before 52 weeks.

occupational title; and 4-digit Standard Industrial Classification (SIC) code. The SCF also contains demographic information on the claimant including gender, birth year, and zip code.

We limit the years we use from the SCF to 2000, 2001, and 2002 because we could only obtain "denominator" data (as described below) for those years. We exclude claimants who had "disability" due to pregnancy, which is a major reason for SDI receipt (23% of claims). Expecting mothers are universally covered in California if working and not self-employed. Since pregnancy related disability should be unrelated to occupational injury risk, this exclusion is appropriate. A small number of other recipients were excluded because the conditions, based on ICD-9 code, were considered independent of any occupational risk factors (e.g., transplant donors, fertility treatment, etc.). We also exclude self-employed claimants with voluntary plans.[12] Finally, a small number of claimants had ICD-9 codes that could not be conclusively assigned to either injury or illness. We only include these claimants in analysis of total incidence. The number of SDI claims was multiplied by 5 to bring the 20% sample in the Single Client File up to 100% SDI claims.

4.3 Calculating Non-Occupational Incidence Rates – Denominator

Next we calculated the denominator for exposure to non-occupational risk, which we define as the number of employees at risk for an injury or illness and covered by state disability insurance. While California's non-occupational disability program is near universal, some workers are outside of the state-administered system, and consequently the SCF, because their some large employers opt for private coverage and a small number of employers are exempt.[13] Consequently, the denominator of exposure to risk of non-occupational disability, workers eligible for SDI, cannot be based on employment within any industry segment without segregating the employment into that which is covered by SDI and that which is covered through alternative programs. As a result we had the Employment Development Department, Labor Market Information Division create a special extract derived from the ES-202 file that records all wages for each employee at each employer in California.

The file we obtained included data by employer status (whether the employer participated in SDI), on the number of employees, number of employers, the amount of employee contributions, and taxable wages reported. Only workers at employers who were flagged as being in the state SDI system were retained in our final data set. Each employee could be

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[11] Categories are: agriculture worker, pregnancy, state plan, recovery home, drug free home, public entity bargaining unit, elective coverage claim, domestic servant worker, prior drug free home, prior recovery home.

[12] Voluntary plans may be subject to moral hazard issues and are also subject to different eligibility rules and waiting periods. Voluntary plan participants make up a very small portion (less than 1%) of all SDI participants.

[13] Coverage for these employers and their workers is required to be at least as generous as SDI but can be supplied by an alternative program, private insurer, or self-insured.

linked to a 2-digit industry (SIC code) based on the establishment at which they were employed. We excluded government-related employers and employees (SIC codes in the 90s), even when the government agency nominally participated in SDI, because we determined that injuries and wages were being inconsistently reported in this group (taxable wages for these SIC codes were very low as were injuries).[14] A very small number of records with missing SIC codes were excluded as well.

4.4 Adjustments to Non-Occupational Incidence Rates – Turnover and Average Hours

EDD data reflect the total number of unique employees (Social Security Numbers) who were employed at SDI covered establishments at some point during the year. For our calculations we are interested in the average employment (exposure) over the year in each 2-digit SIC defined industry. The number of unique SSNs observed over the year does not account for the amount of turnover in the industry each year, particularly the variation in turnover across industries. For example, an employee that switches employers will appear twice in the EDD data, but does not have twice the risk of a non-occupational injury. And an employer with high worker turn-over will be observed to have a large number of unique SSNs relative to the average employment over the year. The average employment is the figure we wish to use, reflecting the average number of employees at risk over the year.

It was necessary that we adjust the non-occupational incidence rates to reflect relative turnover across industries. This is because industries with high turnover will show lower non-occupational incidence rates than industries with low turnover.

To estimate turnover rates for 2-digit industries, we used the Current Population Survey (CPS) for the period 2000-2002. We determined the average number of respondents observed in each 2-digit industry for a given month relative to the number of unique respondents we observed in the industry over an entire 4-month, CPS interview period. From these data we estimate the turnover rate for a twelve-month period. The estimated turnover factors vary from 1.42 (Electrical, gas, and sanitary services [public utilities]) to 3.74 (fabricated metal products) and center on an average, weighted by employment, of 1.86.

Industries may also vary by the number of hours that people spend at work. This number will affect the risk of experiencing an occupational versus a non-occupational injury or illness. BLS incidence rates are standardized using full-time-equivalents (FTEs). We need a similar adjustment for non-occupational incidence. Therefore our second adjustment is for the number of hours worked on average in a particular industry compared to the average for all industries. This ratio is calculated for each industry as follows:

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[14] When an employer (for example the State of California) opts to self-insure instead of participating in SDI, the employees can still opt to be covered under the SDI system if they make contributions. This may be driving the unusual data in government SIC codes. State government is the primary self-insuring entity.

$$Average\,Hours\,Ratio = \frac{Non-Occ\,Hours\,Actual}{Non-Occ\,Hours\,Average} = \frac{115.5 - Average\,Hours^{i}}{115.5 - Average\,Hours\,All\,Industries}$$

Where 115.5 is our estimate of the number of total waking hours in a week -- 168 total hours in a week minus 52.5 (7.5*7) hours of sleep per night (Kripke, et al., 2002; Lauderdale, 2006) and average hours[i] is the average hours worked per week in industry *"i"*.

4.5 Adjustment to Non-Occupational Incidence Rates – Population Characteristics

Demographic characteristics (such as age, sex, race, and education) affect the frequency of non-occupational disabling conditions independent of occupational risk. For example, Figures 4.1 and 4.2 contrast the age distribution of 2000-2002 SDI claimants by injury and illness with the age distribution of the California workforce. As these figures show, injuries are more common among older women than younger women, and more common among younger men than older men. Illnesses are more common among older workers for both men and women. Because industries differ in the demographic composition of their workforces, some differences in the rates of non-occupational injuries and illnesses across different industries can be expected simply because their workers have different demographic characteristics. For instance, if a particular industry has a younger, predominantly male workforce, we might expect higher rates of non-occupational injuries and lower rates of non-occupational illness compared to the average of all industries. Because of the possible confounding of worker characteristics with non-occupational disability, we adjusted non-occupational incidence rates to account for differences in worker demographics prior to comparing non-occupational incidence rates with occupational incidence rates by industry.

Figure 4.1 Age of Workforce vs. Age of Claimants for Women Aged 18-85, 2000-2002
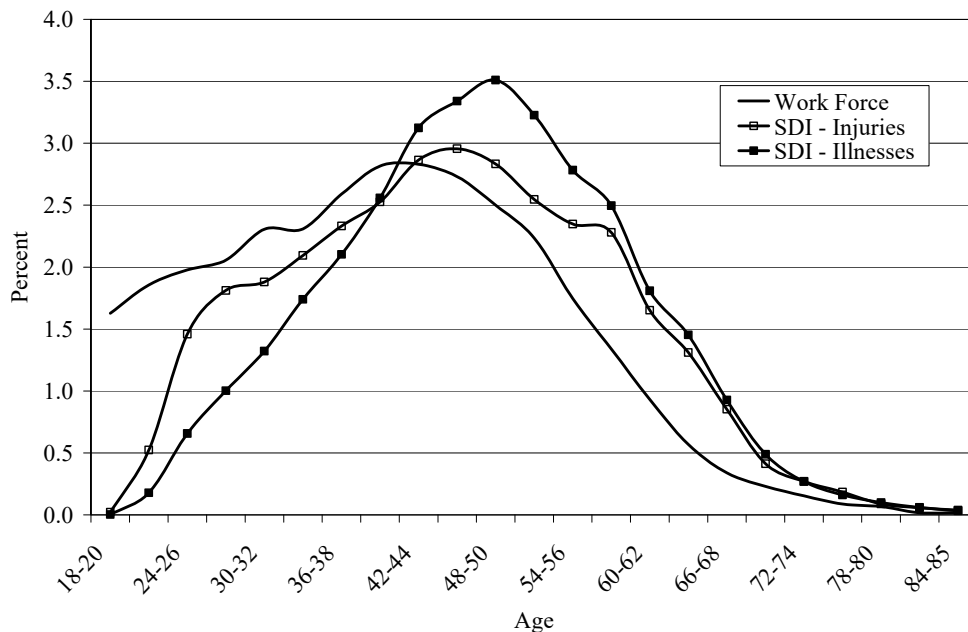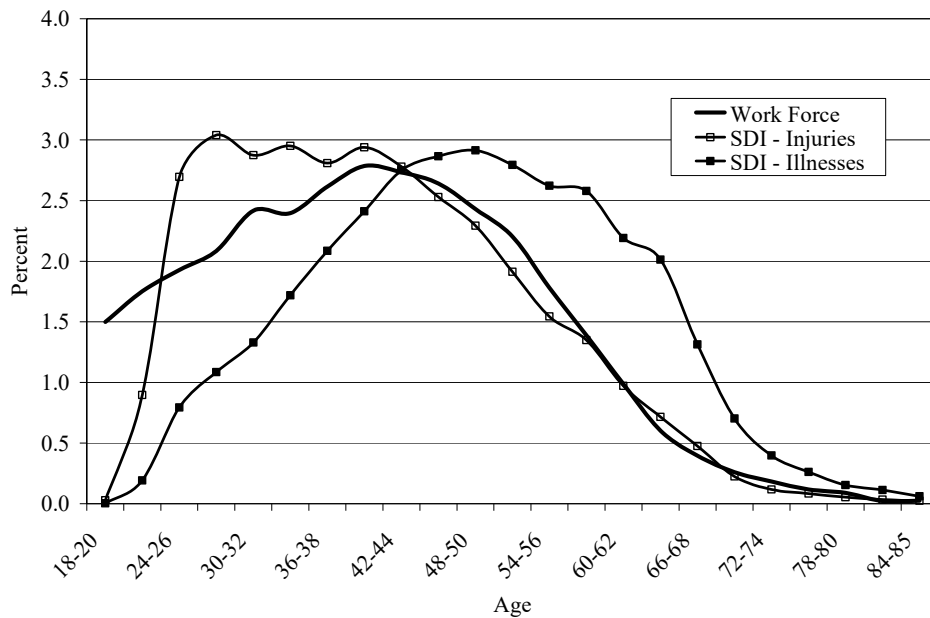
Figure 4.2 Age of Workforce vs. Age of Claimants for Men Aged 18-85, 2000-2002

The SDI data does not include sufficient information on worker demographics to adjust non-occupational injury and illness rates to account for demographic differences between industries. In particular, the SCF contains data on the claimants but not the population at risk. In order to adjust rates of non-occupational injuries and illnesses, we use several other sources. First we estimated the non-occupational injury and illness rates by age, sex, race and education using data from the National Health Institute Survey (NHIS), a large cross-sectional household survey that collects health-related information on the civilian, non-institutionalized population of the United States. We estimated the rates separately for injuries and illnesses.

Although the NHIS contains the necessary demographic characteristics and also contains related information on injuries and illnesses for those individuals, it does not contain information on their industry or occupation. To derive industry-specific estimates, we apply the estimated disability rates by demographic characteristic to the workforce distributions from the Current Population Survey (CPS), a monthly survey of approximately 50,000 households conducted by the Census Bureau.

Estimated rates from the NHIS data are matched to the CPS data by sex, age, race, and education. We then use the CPS data (with associated disability probabilities) to calculate the average probability of non-occupational disability, predicted by demographic characteristics within each industry, and across all industries combined.

To standardize for the differing demographic composition of the workforce in each industry, we calculate an "adjustment ratio" which reflects the extent to which a non-occupational disability is more or less common in each 2-digit industry relative to all industries

combined. That adjustment is the predicted probability of having a non-occupational disability in a particular industry divided by the observed probability of having a non-occupational disability across all industries:

$$Adjustment\ Ratio^{i} = \frac{Average\ probability\ of\ disability\ in\ industry^{i}}{Average\ probability\ of\ disability\ across\ all\ industries}$$

The adjustment ratio equals 1 if the predicted probability of non-occupational disability for the particular industry is equal to the observed probability across all industries. The ratio is greater than 1 if the predicted probability of disability for a particular industry is greater than the observed probability for all industries, and is less than 1 if the predicted probability of disability for a particular industry is less than the observed probability for all industries.[15] Finally, we translate the adjustment ratio into a "population effect" by subtracting it from 1 and then multiplying that number by the SDI incidence rate (after adjusting for turnover and average hours). This is the portion of the observed incidence rate for the 2-digit industry that can be attributed to the population characteristics of that particular industry, *"i"* relative to all industries combined.

$$Population\ Effect^{i} = SDI\_Incidence\ Rate^{i} * \left(1 - Adjustment\ Ratio^{i}\right)$$

A negative value for the population effect in a particular 2-digit industry reflects the fraction of the observed SDI incidence rate that results from the workforce being more likely to have a disability based on demographic characteristics, while a positive population effect reflects the extent to which an industry's workforce tends to have a lower incidence rate of disabilities as a result of their demographic characteristics.

We then add the population effect to the incidence rate to adjust for the "population effect" of workers in each industry. If the population effect is negative, the SDI incidence rate will be lowered; if the population effect is positive the incidence rate will be increased. For industry *"i",*

$$Population\ Adjusted\ Incidence\ Rate^{i} = SDI\ Incidence\ Rate^{i} + Population\ Effect^{i}$$

4.6 Adjustment to Non-Occupational Incidence Rates – Days of Disability

A difficulty in comparing BLS and SDI incidence rates is that BLS incidence rates are given for disabilities lasting one or more days while SDI rates are for eight or more days of disability. In order to make these two rates comparable by days of disability, we create an adjustment factor for the SDI data. We evaluated two data sources for this effort. First we examined the fraction of the fraction of BLS claims with 1-7 lost work days, separately for

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[15] For example, if the average probability of a non-occupational injury among workers in industry *"i"* in a given year is found to be .066 based on personal characteristics, and the probability of all workers having an injury is .058, then the adjustment ratio for that industry is .066/.058 or 1.14.

injuries and illnesses. We also had a state workers' compensation system that pays disability from day 1 examine the fraction of cases that had 1-7 days disability. Both of these factors necessary to translate the incidence of disabilities greater than 7 days to the incidence for 1 or more days were similar for total incidence (injuries + illnesses), but we chose to use the BLS factors (2.027 for injuries; 1.756 for illnesses) because the state data was not from California and was not available separately for injuries and illness. We give both the unadjusted non-occupational disability incidence (SDI, >7days) and the adjusted disability incidence (SDI, estimated 1+ days) in Section 5, Table 5.1.

5. Results

These data allow us to make the first estimate of the distribution of disabling occupational and non-occupational conditions in a US system with universal coverage for both sets of injuries and illnesses. Table 5.1 gives the incidence rates for injuries and illnesses in both systems.

Table 5.1 Average Incidence Rate (All Industries)

	Non-Occupational (SDI) (Per 100 Workers adjusted to 40hr/week)		Occupational (BLS) (Per 100 FTE)	Total Incidence (Occupational & Non-Occupational
	> 7 days	1+ days	1+ days	1 + days
Injuries 2000-01	0.70	1.42	1.75	3.17
Illnesses 2000-01	2.63	4.62	.10	4.72
Total Injuries and Illnesses 2000-01	3.33	6.04	1.85	7.89
Total Injuries and Illnesses 2000-02	3.48	6.89	1.83	8.72

5.1 Composition of Disabling Conditions

As shown in Table 5.2, the composition of reported disabling conditions is very different between occupational disability (BLS) and non-occupational disability (SDI). Occupational disability incidence is dominated by injuries, with almost 95% of occupational incidence

defined as injuries and 5% defined as illnesses. Conversely, non-occupational disability is dominated by illnesses with more than three-quarters (76.5%) of non-occupational incidence falling into ICD-9 codes for illnesses, and less than a quarter (23.5%) falling into injury ICD-9 codes.

Table 5.2 Percentage Injuries or Illnesses among Non-Occupational and Occupational Disability

	Non-Occupational (SDI)	Occupational (BLS)
Percentage Injuries 2000-01	23.5%	94.6%
Percentage Illnesses 2000-01	76.5%	5.4%
Calculations for above percentages taken from data in Table 5.1		
Percentage Injuries 2000-01	$\frac{1.42}{6.04}*100 = 23.5\%$	$\frac{1.75}{1.85}*100 = 94.6\%$
Percentage Illnesses 2000-01	$\frac{4.62}{6.04}*100 = 76.5\%$	$\frac{0.10}{1.85}*100 = 5.4\%$

Table 5.3 gives the percentage of disabling conditions that are attributed to non-occupational causes for conditions lasting one or more days. These numbers allow us to narrow the range of estimates reported in previous literature of the portion of disabling conditions that are non-occupational.

Table 5.3 Percentage of Disabling Conditions Attributed to Non-Occupational Causes (Persons in the Labor Force)

Injuries & Illnesses 2000-02	Injuries 2000-01	Illnesses 2000-01
79.0%	44.9%	97.9%
Calculations for above percentages taken from data in Table 5.1		
$\frac{6.89}{8.72}*100 = 79.0\%$	$\frac{1.42}{3.17}*100 = 44.9\%$	$\frac{4.62}{4.72}*100 = 97.9\%$

Our estimate of non-occupational injuries (44.9% for the years 2000-01) is somewhat lower than the non-occupational injury estimates of 55% offered by Miller (1995) and 82% offered by Salkever et. al. (2001). Miller's estimate is higher in part because the sample is the working age population and ours is labor force participants. About 30% to 40% of the working age population is not in the labor force and, hence, not at risk for occupational injuries.. The estimate by Salkever et. al. may be particularly high because the data used in the study were only for injuries that resulted in long-term disability. Non-occupational injuries may comprise a larger fraction of this particular subset of particularly severe disabilities than they would of a broader range of disabling injuries.

This study further adds to the literature by creating the first separate estimates for illnesses and for injuries and illnesses combined. Previous studies have not included illnesses, either separately or in combination with injuries. Unlike our findings for injuries, we find that the vast majority (97.9%) of illnesses are reported as non-occupational. Because nearly all illnesses are reported as non-occupational, approximately two-thirds of all disabilities (injuries and illnesses combined) are being reported as non-occupational in nature.

However, these estimates do not take into account any misreporting of occupational and non-occupational conditions into the wrong system. This cross-subsidy is estimated in the following sections. Later we will return to the question of the distribution of the cause of conditions between work and non-work and re-estimate the distribution after accounting for misreporting between systems.

5.2 Correlation Results

As mentioned earlier, if we have appropriately controlled for disability related to population characteristics within each industry, and if the current administrative process accurately sorts conditions into the appropriate system, we would expect the correlation between the occupational and non-occupational incidence rates to be near zero and/or not statistically significant. However, we in fact note a moderate, positive correlation between occupational and non-occupational rates for all three categories (injuries, illnesses and the combined rate for injuries and illnesses).[16] The relationship is stronger for injuries than for illnesses, but both have signs in the same direction. Figures 5.1 to 5.3 show the correlation graphically and Table 5.4 gives the correlation coefficients for the data plotted in the figures. Correlation coefficients (which can take a value from -1 to +1) indicate the strength and direction of a linear relationship between two variables. A positive value (between 0 and 1) indicates a positive relationship (when one variable increases so does the other). A negative value (between 0 and -1) indicates an inverse relationship (when one characteristic increases, the other decreases). A value of 1.0 or -1.0 indicates that that the two characteristics are perfectly correlated while a value of 0 indicates the complete absence of a linear relationship. Any value between 0 and 1 (or 0 and -1) shows the relative strength of the relationship within that range. The closer the number is to 1 (or -1) the stronger the relationship.

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[16] The adjustments for population characteristics reduce the correlation for injuries by about 13% but have no affect on the strength of the correlation for illnesses.

Figure 5.1 Occupational and Non-Occupational Incidence Rates for Injuries and Illnesses by Industry, 2000-2002
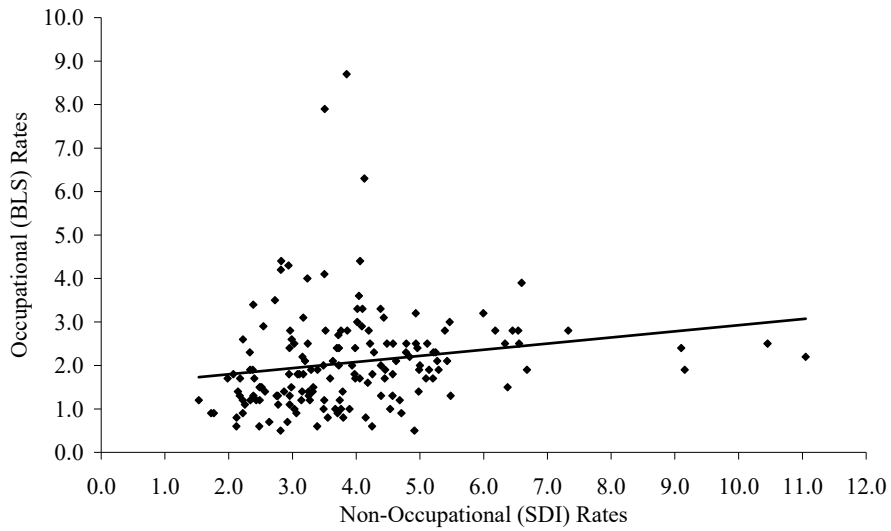

Figure 5.2 Occupational and Non-Occupational Incidence Rates for Illnesses by Industry, 2000-2001
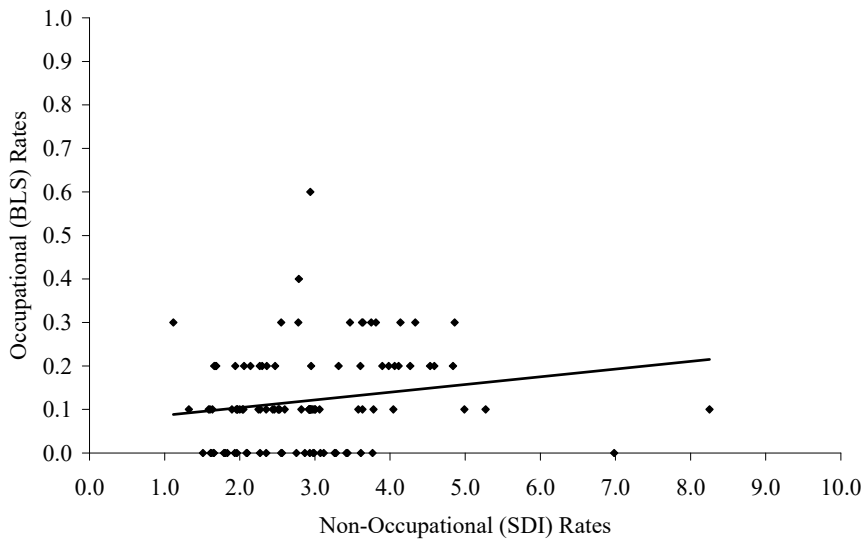
Figure 5.3 Occupational and Non-Occupational Incidence Rates for Injuries by Industry, 2000-2001

Table 5.4 Correlations between Non-Occupational (SDI) and Occupational (BLS) Incidence Rates

	Injuries and Illnesses 2000-2002	Injuries 2000-2001	Illnesses 2000-2001
Pearson Correlation	0.184* (0.020)	0.316** (0.001)	0.182 (0.065)
N	160	104	104

t-statistic (statistical significance) in parentheses

 *Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.001 level (2-tailed).

5.3 Regression Results

Correlation coefficients are useful in that they give us a general sense of how strong a relationship is between two characteristics. In order to predict more precisely how the two elements are correlated, we turn to regression analysis. Three regression models (for injuries, illnesses and combined injuries and illnesses) predict non-occupational (SDI) incidence rates from occupational (BLS) incidence rates.

$$R_{non}^{i} = \alpha + b_1 * R_{occ}^{i} + b_2 * Y + \varepsilon_1$$

Where:

R_{non}^i = the incidence rate of non-occupational disability in industry i,

R_{occ}^i = the incidence rate of occupational disability in industry i, and

Y = year of the data

ε_1 = an error term associated with the estimation of industry level non-occupational disability rates

The regression coefficient for the occupational incidence rate in each model represents the expected change in the non-occupational incidence rate when the occupational incidence rate changes one unit, with all other independent variables (such as survey year) held constant. As with the correlation coefficients, a positive beta coefficient indicates a positive relationship between the two rates while a negative coefficient indicates an inverse relationship.

These coefficients (shown in Table 5.5) confirm the correlation statistics. The positive, statistically significant coefficients for occupational (BLS) incidence rate in all three models indicate that the probability of a worker claiming a non-occupational injury or illness increases with the occupational incidence rate in that worker's industry. Because the non-occupational rate is correlated with the occupational rate in this way, it would appear that a portion of occupational disabilities are in fact being misreported as non-occupational and that the worker financed, non-occupational disability system in California is subsidizing the employer financed workers' compensation system. The coefficient on the occupational incidence (BLS) rate variable indicates that the portion of occupational injuries that are being misreported as non-occupational is relatively low, about 8.4%. However, for every occupational illness reported under workers' compensation, nearly two (1.96) illnesses are misreported as non-occupational. That is, nearly two-thirds of occupational illnesses are being reported as non-occupational. This is consistent with the greater difficulty in defining the occupational nature of most illnesses, especially those with long latency or multiple or poorly defined causation.

Table 5.5 Regressions Predicting Non-Occupational Incidence Rates (SDI) from Occupational Incidence Rates (BLS)

	Injuries and Illnesses 2000-2002		Injuries 2000-2001		Illnesses 2000-2001	
Constant	3.399	(0.240)	0.645	(0.066)	2.555	(0.202)
Year	0.272	(0.144)	0.027	(0.061)	0.228	(0.219)
Occupational Rate (BLS)	**0.250	(0.101)	**0.084	(0.025)	*1.957	(1.000)
R^2	0.055		0.102		0.043	

*Significant at the .05 level of confidence, standard errors in parentheses.

**Significant at the .01 level of confidence, standard errors in parentheses.

We use the results from our regression models to estimate the proportion of non-occupational injuries and illnesses reported in the SDI data that should instead be attributed to occupational causation. We use the following formula to arrive at the percentages shown in Table 5.6:

$$Fraction\ Misrepresented = \frac{(average\ occ\ incidence)*(occ\ regression\ coefficient)}{average\ non-occupational\ incidence}$$

Table 5.6 Percentage of Occupational Incidence Rates Misreported as Non-Occupational

Injuries and Illnesses 2000-2002	Injuries 2000-2001	Illnesses 2000-2001
13.1%	21.0%	7.4%

Calculations for above percentages taken from data in Table 5.1

$$\frac{(1.83)(.250)}{3.48}*100 = 13.1\% \qquad \frac{(1.75)(.084)}{.70}*100 = 21.0\% \qquad \frac{(.10)(1.957)}{2.63}*100 = 7.4\%$$

While the under-reporting of occupational illnesses is much greater than the under-reporting of injuries, we can see that the much higher frequency of occupational injuries relative to illnesses makes the proportional impact of under-reporting on non-occupational injury and illness incidence rates more similar. We find that 7.4% of non-occupational illnesses should be classified as occupational and that 21.0% of non-occupational injuries are more appropriately considered occupational. When examined together in the 2000-2002 data, the combined figure is slightly lower at 13.1% of all conditions, currently called non-occupational should more accurately be defined as occupational.

5.4 Re-estimating Composition of Disabling Conditions

Tables 5.2 and 5.3 estimated the percentage of injuries or illnesses among non-occupational and occupational disabilities and the percentage of disabling conditions attributed to non-occupational causes. These estimations did not take into account possible misreporting between occupational and non-occupational systems. As seen in the previous sections, we estimate that about 7.4 % of illnesses are misreported and 21% of injuries are misreported. Re-estimates of Tables 5.2 and 5.3 (depicted in Tables 5.8 and 5.9) show how the composition shifts after the percentage of misreported occupational disabilities is accounted for. Table 5.9 shows that the percentage of disabling conditions attributed to non-occupational causes shifts downward after accounting for misreporting. Only about 35% of injuries are found to be non-occupational in causation after re-estimation, which is 10 percentage points lower than prior to re-estimation. The percentage of illnesses found to be non-occupational declines by about seven percentage points (from 98% to 91%) after accounting for misreporting.

Table 5.7 Re-Estimated Average Incidence Rate (All Industries)

	Non-Occupational (SDI) (Per 100 Workers)		Occupational (BLS) (Per 100 FTE)	Total Occ and Non-Occ
	> 7 days	1+ days	1+ days	1 + days
Injuries 2000-01		1.12	2.05	3.17
Illnesses 2000-01		4.28	0.44	4.72
Total Injuries and Illnesses 2000-01		5.40	2.49	7.89
Total Injuries and Illnesses 2000-02		5.99	2.73	8.72

Table 5.8 Re-Estimated Percentage Injuries or Illnesses Among Non-Occupational and Occupational Disability

	Non-Occupational (SDI)	Occupational (BLS)
Percentage Injuries 2000-01	20.7%	82.3%
Percentage Illnesses 2000-01	79.3%	17.7%

Calculations for above percentages taken from data in Table 5.7

Percentage Injuries 2000-01	$\frac{1.12}{5.40}*100 = 20.7\%$	$\frac{2.05}{2.49}*100 = 82.3\%$
Percentage Illnesses 2000-01	$\frac{4.28}{5.40}*100 = 79.3\%$	$\frac{0.44}{2.49}*100 = 17.7\%$

Table 5.9 Re-Estimated Percentage of Disabling Conditions Attributed to Non-Occupational Causes

Injuries & Illnesses 2000-02	Injuries 2000-01	Illnesses 2000-01
68.7%	35.3%	90.7%

Calculations for above percentages taken from data in Table 5.7

$\frac{5.99}{8.72}*100 = 68.7\%$	$\frac{1.12}{3.17}*100 = 35.3\%$	$\frac{4.28}{4.72}*100 = 90.7\%$

6. Discussion

The implications of these findings are that a substantial fraction of cases that are occupational in causation are being paid as non-occupational disabilities. This in turn suggests a substantial subsidization of the occupational insurance system by the non-occupational disability system. Since employers pay the cost of reported occupational injuries and worker payroll contributions are the sole support for the SDI system, these data suggest a significant shift of assets from workers to employers. The shift (13.1% of reported non-occupational conditions), at current SDI rates (0.8% of payroll) and excluding the fraction of benefits due to pregnancy (19.4%) and Paid Family Leave (6.8%), represents 9.7% of employee contributions to SDI and a transfer of 0.08 percent of worker income to employers, or about $400 million at the current SDI annual cost of $4.08 billion.[17]

Reducing the employee contribution to SDI by this amount would reflect statutory intent (workers pay the full cost of disability through SDI for non-occupational conditions; employers pay the full cost of work related conditions through workers' compensation). However, substituting an employer contribution to SDI of the same amount would likely be politically unpopular or at least difficult to reach consensus on. On the other hand, accurately routing these cases to the workers' compensation system is nearly impossible to implement given the difficulty in determining causation. Even if it were possible to achieve near perfect sorting of conditions by causation, it would probably be very expensive, administratively, to implement such an effort.

Is there a solution that would save employers money while eliminating the subsidy of workers' compensation system by employees? We believe there is. Integration of workers' compensation temporary disability into the State Disability Insurance (SDI) system offers an opportunity to accomplish three important public policy goals:

- Eliminate the employee subsidy of the workers' compensation system,

- Reduce the cost to workers of non-occupational disability insurance, and

- Reduce the employers' cost of temporary disability for occupational conditions.

How can we decrease the cost to employers while eliminating the current subsidy of the workers' compensation system by SDI? The answer is surprisingly simple in concept, if not in the details. The key is that the administrative cost associated with delivering

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[17] The transfer percentage of 0.08% is calculated as follows: For every $100 of worker payroll 0.8% (or 80 cents) is put toward SDI. 26.2% of the 80 cents (about 21 cents) goes toward pregnancy and paid family leave, leaving the remaining 59 cents to finance coverage of disabilities resulting from injuries and illnesses. We estimated that about 13.1% of non-occupational injury and illness incidence rates are incorrectly assigned and should instead be covered by the employer-funded workers compensation system rather than by the employee-funded SDI system. Thirteen percent of the 59 cents is 8 cents, which represents .08% of worker payroll up to the maximum wage base of $86,698 (2008).

temporary disability payments through the workers' compensation system is much higher than delivering the same benefits through the administratively streamlined SDI system.

We define the administrative cost in each system as the difference between the premiums collected and the benefits paid, that is all administration and overhead costs (claims handling, defense, profit, premium taxes, etc.) other than the direct wage replacement payments to workers.

Our metric is the administrative cost of delivering one dollar of wage loss benefits to disabled workers.

6.1 Administrative Cost of Benefit Delivery—SDI vs. Workers' Compensation

State Disability Insurance has very low administrative costs similar to other "single-payer," government-administered benefit systems. For 2006, SDI benefit payments were $3.9 billion and administrative costs were $191 million or 4.6% of total costs (EDD, 2007). Hence, SDI paid $0.05 in administration costs to deliver a dollar of benefits to disabled workers.

We will offer two measures for workers' compensation. The first measure will cover the four years (2004-2007) since dramatic reforms were made to the California workers' compensation system. These reforms may have led to changes in the administrative cost structure, changes that may be temporary or permanent. The second measure will cover the 13 years since open rating (1995-2007). The average administrative cost over the longer period is very near with the national average for all state workers' compensation programs in the U.S.

Table 6.1 Administrative Cost in California Workers' Compensation (Insured Employers)

	2004-2007	1995-2007
Written premium (Gross of deductibles)	$73.7	$163.6
WCIRB "reported" ultimate losses	$27.3	$110.4
"Actual" ultimate losses	$24.1	$101.7
Discounted actual ultimate losses	$21.5	$ 90.8
Estimated administrative cost	$52.2	$ 72.8
Estimated cost of delivering $1 of direct benefits (Fully insured employers)	$2.42	$ 0.80

The basic data is laid out in table 6.1. The full analysis of administrative costs is discussed in a working paper (Neuhauser, et al., 2008(b)). We will only present a summary here. Written premium (calendar year) is reported by the Workers' Compensation Insurance Rating Bureau (WCIRB, 2008). The WCIRB also estimates the "ultimate losses" on accidents occurring during the calendar year (referred to as "accident year" losses) over the life of the claim, even if paid years in the future. The WCIRB includes several types of administrative costs in the category of benefits paid to workers. Excluding these administrative costs, "actual ultimate losses" is the estimate of actual benefits paid to workers. Finally, premiums are paid prior to incurring liability, often months or years before losses are actually paid. Consequently we discount the losses to reflect the period over which insurers retain the earnings on investment. Alternatively, we could include investment earnings (foregone by employers and earned by insurers) in the total cost. For temporary disability, the discounting has a small effect on estimated administrative costs because temporary disability is paid out relatively early in a claim relative to other benefits such as medical treatment and permanent disability.

The final row of Table 6.1 gives the estimate of administrative costs in workers compensation for delivering a dollar of actual disability payments to workers. The post-reform estimate is $2.42 in administrative costs to deliver a dollar of direct, temporary wage loss benefits. The extended year estimate is $0.80 in administrative costs to deliver a dollar of benefits. The true cost may lie somewhere in between these two estimates. The extended year estimate is likely low, reflecting a period when intense price competition led to premium rates so low that numerous insurers, representing a majority of premium, became insolvent. Administrative costs during the post-reform period may be temporarily inflated by the need to absorb numerous changes to administration dictated by reform. However, even using the lower estimate, workers' compensation administrative costs for delivering a dollar of temporary disability benefits are 16 times as high as SDI. We will use these two estimates, $0.80 and $2.42, as the basis for the high and low end estimates below.

Hence, if workers' compensation temporary disability was merged into the State Disability Insurance system, the cross-subsidy by workers eliminated, and the administrative cost of the integrated system matched the current SDI system, based on 2006 injuries and illnesses:

- Workers would pay $400 million less in payroll taxes (0.08% of payroll)

- Employers would pay $2,050 million into SDI

  o $400 million for current occupational injuries supported by workers through SDI

  o $1,550 million current TD payments under workers' compensation

  o 5% administrative cost under SDI

    ▪ ($400 million + $1,550 million) * 1.05 = $2,050 million

- Employers would pay $2,800 million to $5,300 million less in workers' compensation costs

  o $1,550 million TD payments

  o 80.5% administrative cost under workers' compensation

    ▪ $1,550 million * 1.805 = $2,800 million

  o 242% administrative cost

    ▪ $1,550 million * 3.42 = $5,300 million

- Net savings for employers, $750 million (0.13% of payroll) to $3,250 million (0.52% of payroll).

Employers could fund the current portion of SDI that workers are subsidizing and still save at least $750 million, and possibly several times that, annually by integrating all temporary disability under the SDI program instead of retaining separate temporary disability programs under SDI and workers' compensation.

6.2 Challenges with Integration

Integration, while conceptually simple, is more difficult in practice because SDI and workers' compensation eligibility rules and benefits are not identical.

Table 6.2 Comparison of Benefits: SDI vs. Workers' Compensation

	State Disability Insurance	Workers Compensation
Duration of benefits	52 weeks	104 weeks
Benefits/weekly wage	60%	66.7%
Eligibility	Minimum of $300 wages in base period	Full benefits from first day of work
Benefit exhaustion	Can occur if wages in base period are too low	Not applicable

The differences between the systems affect a surprisingly small fraction of claims. Based on the analysis in Neuhauser (2008(c)) :

- Only 6.6 % of workers' compensation claims exceed 52 weeks of temporary disability.

- Just 3.9% of workers run out of SDI benefits because of insufficient earnings in the base period.

- Weekly payments under SDI are lower by 6.7 percentage points, but not for all workers, some are subject to minimum and maximum. High wage and very low wage workers receive the same benefit payments under both systems.

The most important difference here is probably the limitation to 52 weeks of benefits under SDI. Two solutions come immediately to mind: increase the duration of benefits in SDI or improve the coordination of benefits between SDI and Social Security Disability Insurance which pays benefits if disabilities last longer than 52 weeks.

In any case, the differences between the systems are not large and the savings are substantial. This should allow employers and labor to work out a compromise that improves benefits while reducing costs to both parties.

6.3 Caveats on the Findings and Data

Two main objections have been raised to merging occupational disability under SDI. First, observers have claimed that the extra administrative costs in workers' compensation are necessary to control the length, and hence the cost, of disability. If this is so, we would expect disability durations to be substantially shorter in workers' compensation than in SDI for the same condition. We examine this issue in a separate paper for CHSWC (Neuhauser, 2008(c)) and only summarize the main finding here. After controlling for the different maximum duration of benefits and the possibility of benefit exhaustion in SDI, average disability duration in workers' compensation (107.4 days) is 5.9% shorter than SDI (114.1 days). This is a significant difference, statistically, but would not have a substantial affect on our measures of savings.

A second concern is that if occupational disability is merged into SDI, employers will have less of an incentive to improve workplace safety. However, there is very little research showing a strong relationship between changes in workers' compensation costs and safety efforts by employers. In addition, temporary disability is only about a fifth of workers' compensation costs, leaving the majority of employers' incentive in place. Finally, SDI could be experience rated for employers, like Unemployment Insurance.

The most important caveat about the data used in this study is that we are unsure that the SDI data accurately reflects final disposition of the issue of causation for SDI claims. The SDI system is the default payor if there is a dispute about whether a claim is work related. If the decision on causation is delayed for a sufficiently long period, the SDI system will pay benefits until the dispute is resolved. Subsequently, SDI attempts to recover payments for cases that are determined occupational. These recoveries are supposed to be reflected in the Single Client File (SCF) because they potentially affect the workers subsequent ability to receive payments for a future non-occupational disability.

However, legal determination of causation can be difficult, long-delayed, and ultimately only partially resolved. For example, a particularly difficult case might involve litigation at the Workers' Compensation Appeals Board that lasts for more than a year. If the parties ultimately agree on a compromise settlement, that settlement may not involve a determination of compensability. SDI is then left with the option of submitting a lien claim and attempting to resolve the compensability of the case-in-chief, de novo, or settling with the insurer/employer for something less than 100 cents on the dollar.

We have been assured by SDI that they accurately adjust the Single Client File (SCF) data to reflect the final resolution of disputed cases. And they have an important incentive to be accurate because a worker's subsequent eligibility for and duration of SDI benefits could be negatively affected if the accounting in their file was inaccurate. However, since this is a complex issue and the resolution of causation disputes could exceed the time frame where the SCF has to be adjusted, we still have reservations. This issue can be resolved simply. We propose linking the SCF to the Division of Workers' Compensation's Information System (WCIS). The WCIS tracks all workers' compensation claims, even those that were originally disputed and even those eventually denied.

A second important caveat involves the definition of occupational causation. According to California law, which reflects the law in most other jurisdictions, workers' compensation is responsible for all costs related to a claim if work was a "contributing" cause. In California, for all but a handful of conditions, contributing cause is interpreted as a very low standard, probably 1% or less. So, while many occupational injuries and illnesses may be misreported as non-occupational, at least a portion of claims paid by workers' compensation might have a majority of their causation appropriately attributed to non-occupational causes. This is a form of subsidization that goes in the opposite direction of that reported in this paper. The importance of this effect should be the subject of future research.

Third, our estimate of fraction of SDI costs absorbed by administration is probably overstated for an integrated system. Because SDI is the default payor when causation is disputed, SDI spends a significant fraction of its administrative resources tracking disputed cases and recovering benefit payments from insurers and employers. In an important fraction of disputed cases, EDD has to file a lien in the workers' compensation system. If the dispute between the employer and worker is settled without a decision on causation, EDD has to either proceed with a case against the insurer or employer, de novo, or separately negotiate a settlement of its claim.

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