The California Commission on Health and Safety and Workers' Compensation

Fraud in Workers' Compensation Payroll Reporting:
How Much Employer Fraud Exists?
What is the Impact on Honest Employers?

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Fraud in Workers' Compensation Payroll Reporting:
How Much Employer Fraud Exists and What is the Impact on Honest Employers?
Executive Summary

Background

It has long been suspected that a fraction of employers fraudulently under-report and misreport payroll for calculation of workers' compensation premium or illegally forgo purchasing workers' compensation insurance altogether. Previously, the Commission on Health and Safety and Workers' Compensation (CHSWC) contracted with the University of California, Berkeley to develop a pilot project and analyze the degree to which employers fail to secure coverage (Neuhauser, 1998). The present study extends that prior study to include the impact of fraudulent under-reporting and misreporting of payroll used by insurers to calculate premiums. During the period studied for this report, 1997-2002, rates were initially low (for California) and increased rapidly. Subsequent to the study period rates continued to increase through 2004 and then dropped to near earlier levels. This study examines the extent of fraudulent reporting and the impact of the rapid increase in premium rates on employer fraudulent behavior.

Findings

Extent of Under-reporting

- *Table S1* shows that during the study period, the level of under-reporting increased from between 6%-10% of private industry payroll when premium levels were low ($2.47/$100 payroll) to 19%-23% when premium levels were high ($4.28/$100 payroll).
- This translates to a change from $19.5-$31.3 billion in 1997 to as much as $100 billion in under-reported payroll in 2002.

Table S1: **Under-reported Payroll ($ billions)**
Percent of Under-reported Private Industry Payroll in Parentheses*

Year	Average Premium Rate (as of 1/1/YY) $/$100 payroll	Assuming 0.92 as baseline	Assuming 0.957 as baseline
1997	$2.47	19.5 (6%)	31.3 (10%)
1998	$2.35	23.4 (7%)	37.0 (11%)
1999	$2.30	18.1 (5%)	32.6 (9%)
2000	$2.68	34.2 (8%)	50.4 (12%)
2001	$3.49	68.4 (15%)	85.7 (19%)
2002	$4.28	88.3 (19%)	106.0 (23%)

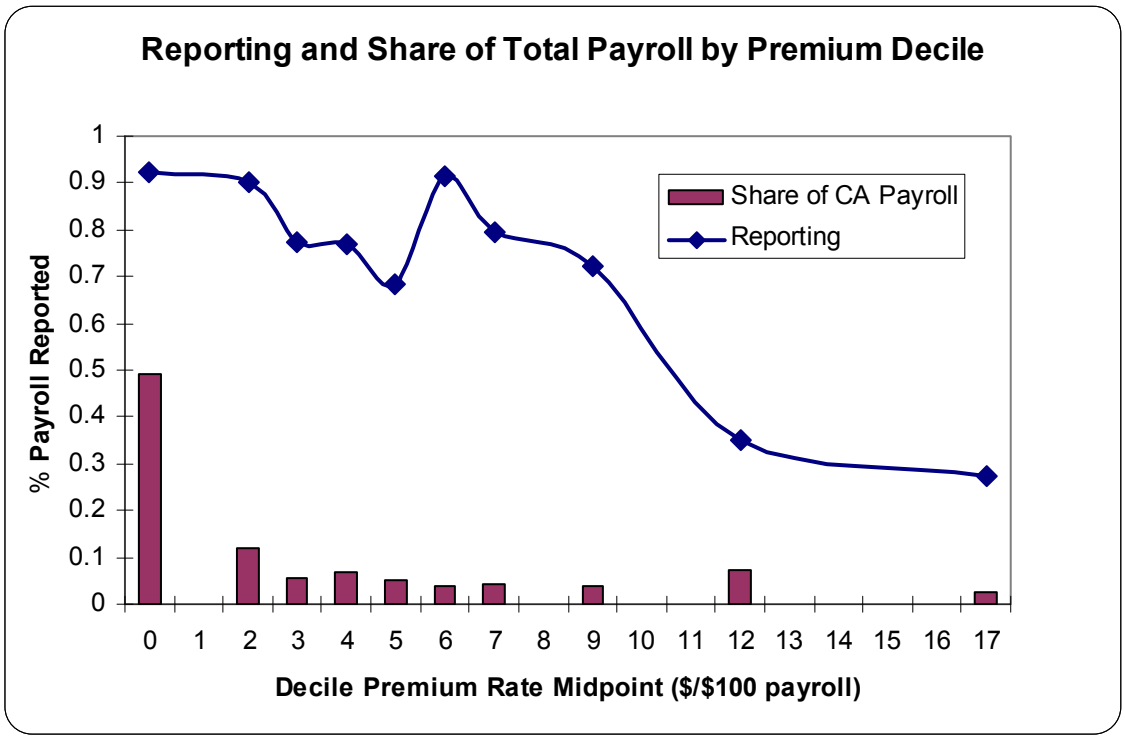
*Total wage estimates based on Current Population Survey

Under-reporting and Misreporting by Class Code and Premium Level

Besides under-reporting payroll, employers can fraudulently misreport, reporting workers in high-risk, high-premium classes as earning wages in lower risk occupations.

- *Figure S1* shows that under-reporting and misreporting increases dramatically as the premium rate for a class of workers increases.
- For very low risk classes of workers, for example clerical and professional employees, misreporting of payroll might even lead to over-reporting of payroll for some premium classes as employers fraudulent shift payroll from higher premium rate classes.
- On the other hand, for very high risk classes, as much as 65% to 75% of payroll is being under or misreported.

Figure S1



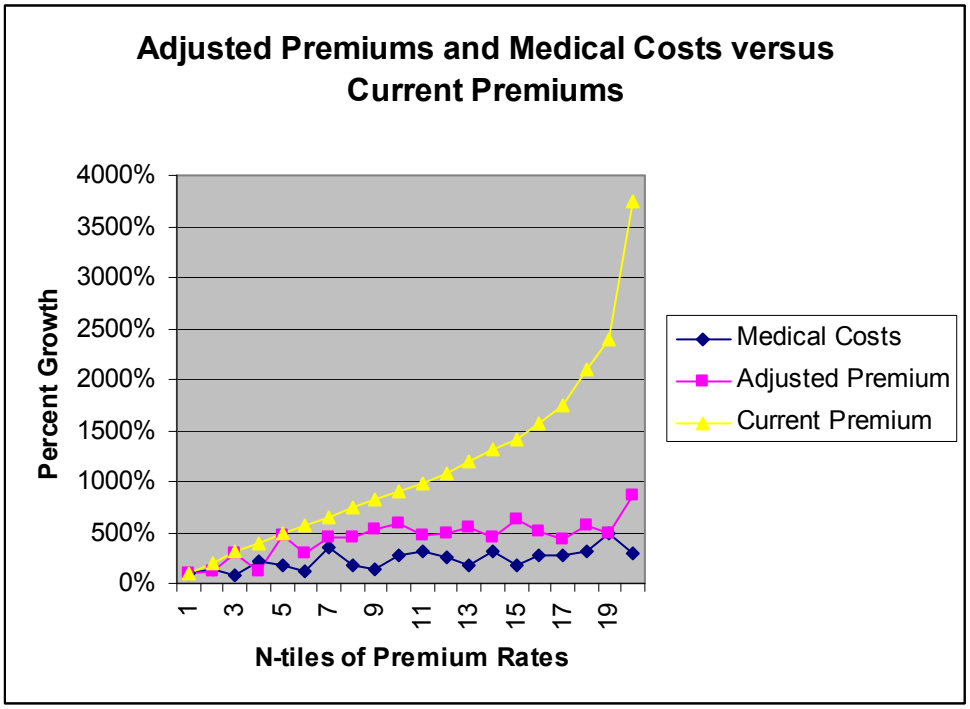
Impact on Honest Employers' Premium Rates

If employers misreport payroll to reduce premiums but report injuries accurately when they occur, premiums for high-risk class codes will be inappropriately high. As shown in *Figure S2*, we found:

- Above the median premium level for all classes, honest employers were consistently facing premium levels that were inappropriately high as a result of fraudulent reporting by dishonest employers.
- Employers in the highest class codes were paying rates up to 8 times the rate we would expect to see under full reporting.

- These multiples to the appropriate premium levels are surprising, but they were confirmed by other data sources that showed actual occupational medical costs rose much less steeply than employers' premium rates when comparing low and high risk classes of workers.
- The use of Experience Modification (X-mod) factors to adjust employers premium rates based on past experience does reduce the impact of fraud on honest employers. However, the impact is limited and only a fraction of employers have premiums adjusted by an X-mod.

Figure S2



Recommendations to CHSWC for Improving Payroll Reporting

1. The Legislature, California Department of Insurance, Department of Industrial Relations/Division of Labor Standards and Enforcement could push for more aggressive enforcement against misreporting and under-reporting. This could include:
    a. Focusing more Fraud Assessment Commission funding on premium fraud,
    b. Raising the civil penalties for premium fraud, and/or
    c. Raising the criminal penalties for premium fraud.
2. The Test Audit Program which monitors insurer audits of policyholders is currently operated by the Workers' Compensation Insurance Rating Bureau, an insurance industry association. The California Department of Insurance might consider the suggestion of some observers and have this process conducted by a separate, private contractor.
3. The results of the Test Audit Program are not public record. The Bureau's Governing Committee discusses the audit program results and takes actions against individual insurers. However, these discussions are not public and the public members of the

Governing Committee are not allowed to be present for these discussions. Insurer compliance might be improved if these discussions and results were open for public scrutiny.

4. Employers report payroll data to the Employment Development Department (EDD) for tax withholding and unemployment and disability insurance. These records could be matched to employers' reporting to insurers for premium purposes. Currently this avenue is limited by restrictions on insurer access to EDD data. Legislation could simplify this basic audit procedure.
5. The Franchise Tax Board receives large amounts of information that could be used to identify fraudulent under-reporting. These data include income information from both employers and workers that could be used to identify fraudulent use of independent contractor status. Again, access to these data is heavily restricted and legislation might be needed to facilitate access for investigators.
6. Professional employment organizations (PEOs) have been cited as a frequently method for employers to avoid the consequences of high experience modifiers or to disguise the risky nature of workers' occupations. However, to date there has been no systematic study of the size or scope of the PEO market or the claims experience of PEOs. At a minimum, the state should undertake a study to gauge the impact of PEOs in the workers' compensation market.
7. Recently, at least one very large national insurer was fined for systematically under-reporting premium in several states (Bloomberg News, 5/26/07). It is unclear whether the under reporting extended to payroll and occurred in California. If this extended to California, then the estimates of under-reporting could include fraudulent behavior by at least one insurer, not just employers. This should be a high priority for study by CHSWC and CDI.
8. Even more critical, if one or more insurers under-reported payroll and premium, there is a strong possibility that this action could have affected individual employers experience modification. In the aggregate, insurer under-reporting could also have elevated pure premium rates set by the WCIRB and CDI. Again, this should be a high priority area for CHSWC and CDI to study.

Methods and Comments

Traditionally it has been difficult to establish the extent of under-reporting and misreporting because there have not been accurate estimates of total wages that are legally subject to workers' compensation premium calculations. In particular, the "grey economy" where employers pay cash and avoid all reporting has been outside the scope of previous studies.

For the CHSWC study, the authors made use of several unique data resources. First, we used the Current Population Survey (CPS) conducted by the U. S. Bureau of the Census to estimate total wage income, including the cash economy. Second, we used the National Compensation Survey (NCS), also by the U.S. Bureau of the Census, to estimate wages legally excluded from payroll used to compute premiums. Third, we used data from the Medical Expenditure Panel Survey (MEPS) conducted by the Federal Agency for Healthcare Research and Quality (AHRQ) to confirm our estimates of appropriate premium rates under full reporting.

The most unique aspect of our research design was linking data from these surveys to payroll reported to the Workers' Compensation Insurance Rating Bureau of California (WCIRB) at the individual class code level. For this, the authors developed a unique cross-walk between the industry and occupation coding used by the U. S. Bureau of the Census and the workers' compensation specific classification of occupation and industry (class codes) used by the WCIRB.

This methodology is unique, and uniquely suited to identifying the extent and impact of fraudulent reporting. It does however have limitations and is subject to some concerns. The most important concern is the accuracy of self-reported earnings and employment status in the CPS data. A number of studies, comparing CPS to Social Security Administration data have found CPS does a reasonably good job of identifying cash economy income but reported employment status, employed or self-employment (including independent contractor status) was inconsistent between the two data sources. Which source is more accurate is not clear or is any bias that is introduced.

Finally, the cross-walk between Census codes and WCIRB class codes developed for this study was challenging to create. It is also unique and, like most cross-walks, is not perfect. Bias is always a possible result of such linking process. However, we used separate analytic techniques that are not subject to the most obvious sources of bias that could be introduced and found results that were consistent with our basic approach. We are confident that our results are accurate, but look forward to suggestions on how to improve the cross-walk if necessary.

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"A San Diego Superior Court judge orders the owner of a San Diego-area construction company to pay more than $475,000 in restitution to the California State Compensation Insurance Fund as part of his sentence for workers' comp insurance premium fraud….State Fund says it discovered the fraud after [the contractor] filed a workers' comp claim related to an employee for which [the contractor] had never reported wages." Providence Publications, August 30, 2006.

"If you ain't cheatin', you ain't tryin'." (Old NASCAR saying)

1.0 Introduction

Employers in California, as in all states except Texas, are required secure coverage for workers' compensation.[1] Coverage can be secured from a workers' compensation insurer or through a certificate of self-insurance from the California Department of Industrial Relations (DIR). The state can enforce substantial penalties against employers for failure to secure coverage, as illustrated by the news clipping introducing this section. A previous study by the University of California, Berkeley for the Commission on Health and Safety and Workers' Compensation examined the extent to which employers were failing to secure compensation (Neuhauser, 1998). However, this report did not examine the extent to which employer fraud involves under-reporting or misreporting of premium. This study makes the first estimates of the extent of premium fraud and the impact of premium fraud on the insurance rates faced by honest employers.

The study finds substantial under-reporting of payroll in jobs where the employer pays high workers' compensation premium rates. The under-reporting becomes increasingly more severe as the cost of workers' compensation increases. The level of under-reporting results in much higher premiums for firms employing workers in high-risk jobs. Honest employers consequently face inappropriately high premium costs that are not adequately mitigated by experience modification, especially for small employers.

The end result is pressure on honest employers to under-report in order to stay competitive. This in turn raises premium rates, increasing the incentive for dishonest employers to under-report or misreport payroll in high risk classes. This process can lead to a vicious cycle, driving the very high premium rates and under-reporting we observe for high-risk classes of workers.

1.1 Under-reporting/Misreporting Defined

Absent effective auditing or accountability mechanisms, an employer seeking to minimize insurance costs has an incentive to under-report or misreport the payroll for different types of employees.

[1] California Labor Code Section 3700. Note: the Labor Code allows the State of California to be legally uninsured for workers' compensation.

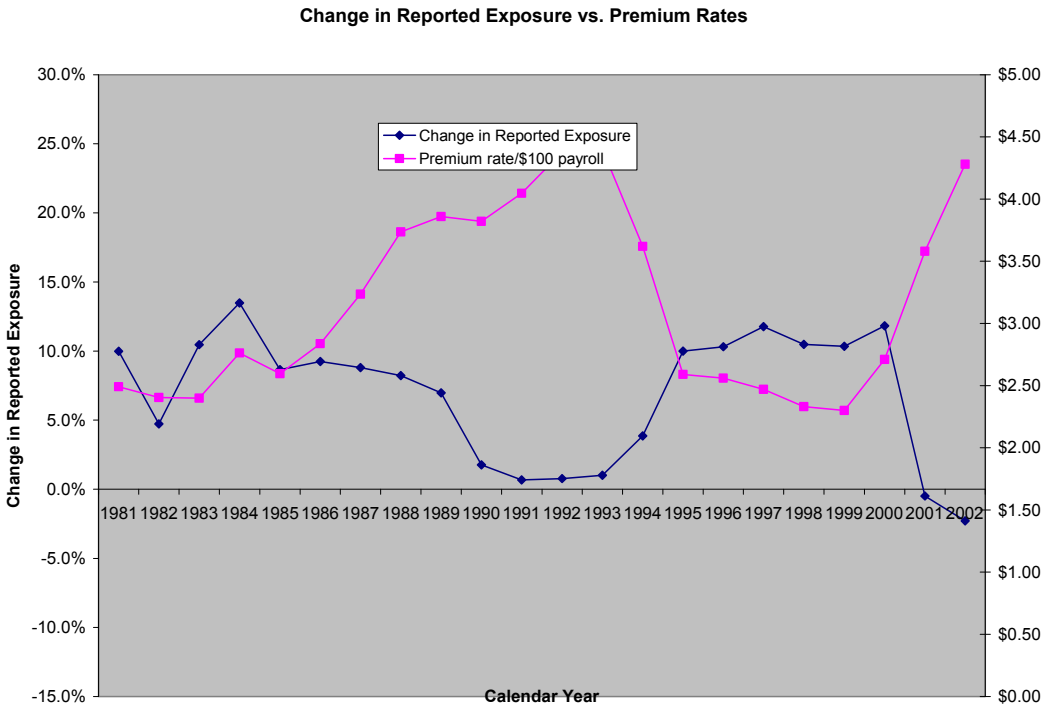
For example, a construction firm owner might under-report the payroll for his roofers in order to avoid paying premiums. He might mis-report those payroll dollars as paid to other classes of workers with lower premium rates (e.g. secretaries). Alternatively, the employer might not report this portion payroll at all (e.g., defining the worker as an independent contractor) thereby avoiding payroll insurance costs altogether.

If employers avoid premium payments, we would expect avoidance to increase as workers' compensation insurance rates increase.[2] On the other hand, insurers presumably seek to limit fraudulent behavior by monitoring employer compliance. Again, insurer monitoring should increase as premiums rates increase. These effects work in opposite directions and which dominates is a question we will answer in this paper. Next we examine aggregate data to get a first indication of the relation between premium rates and under-reporting.

1.2 Misreporting Seems to Occur

"Exposure" is the term used in workers' compensation for employers' payroll subject to insurance premium. Exposure is reported to the WCIRB by all workers' compensation insurance companies writing policies in California. In *Figure 1,* changes in total reported exposure for the state of California against the average premium level are plotted. An inverse relationship is observed between premium and reported payroll, consistent with increasing employer incentive to avoid premium payments when premium rates are higher. As premium levels rise, growth in reported exposure falls and as premium levels fall, growth in reported exposure rises.

Figure 1 **Insured**



[2] Employers may also reduce their payrolls by cutting hours and/or employment. However, there is little evidence that premium rates have a significant effect on employment in the short-term.

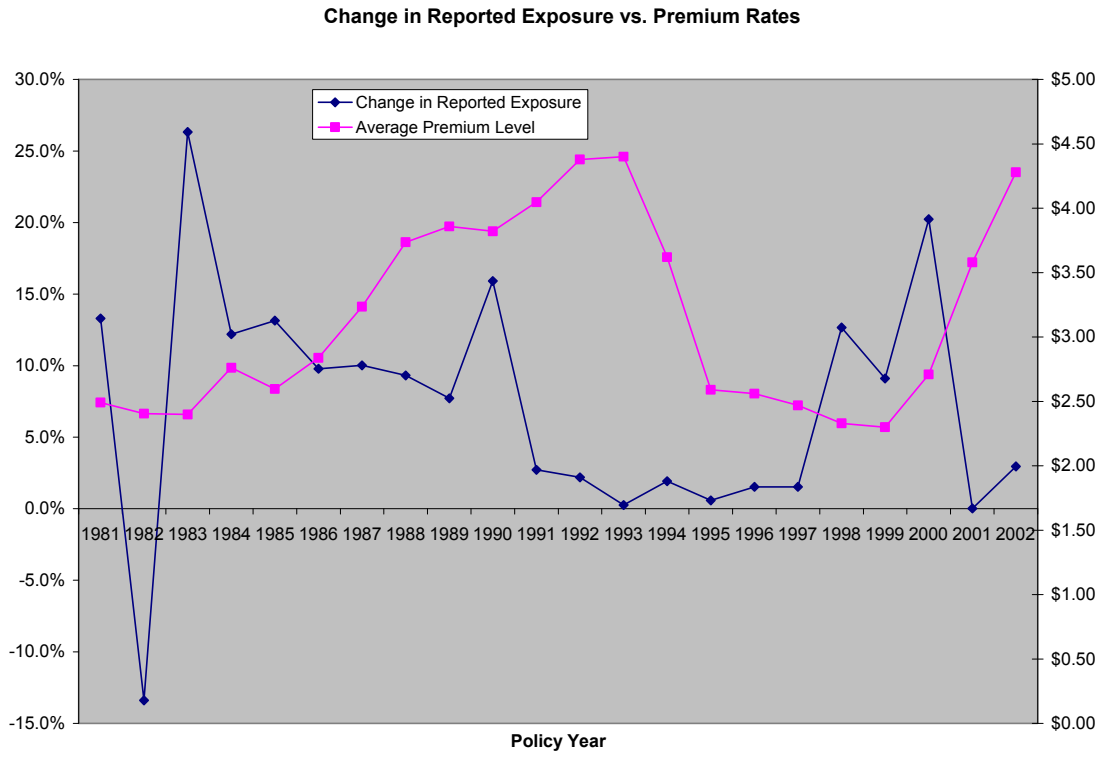
Some other issues intervene that may affect the strength of the relationship observed in *Figure 1*. First, it is likely that as premium levels increase, employers increasingly switch to self-insurance and as premium rates fall, more employers migrate to insurance. Self-insuring is one way to avoid paying premiums set by insurers based on California Department of Insurance recommended rates for state-mandated workers' compensation. Self-insuring requires independently paying employee medical and indemnity costs for injuries or illnesses incurred on the job. When rates are high, more employers might believe this option to be cheaper and worth the additional risk.

It is also possible that honest employers are more likely to choose self-insurance, indirectly selecting into the insured pool employers more likely to cheat. As premiums increase, adverse selection in the insured sector could become increasingly problematic.

Premium increases may coincide or be causally related to changes in economic activity and employment. During the period observed in *Figure 1*, there were several business cycles affecting employment. Recessions will slow the increase in payrolls or cause a decrease. Conversely, economic upswings will increase the rate of change in payrolls and reported exposure.

In *Figure 2*, we add self-insured payrolls to total state exposure and factor in changes in employment related to cyclical variation in economic activity. We also adjust for differences in calendar-year, policy-year report timing.

Figure 2[3] **Insured and Self-Insured**



[3] Adjusted for self-insured payroll, calendar year differences, and economic conditions.

The impact of controlling for self-insurance coverage and economic conditions is visible in *Figure 2*. Economic conditions and shifts between insurance and self-insurance affect the strength of the relationship between premiums and reported exposure. But, the adjustments do not eliminate the relationship. A strong, inverse relationship persists between premium rates and changes in reported exposure. Such a relationship suggests a systematic increase in under-reporting of payroll when premium rates are relatively high.

1.2.2 More Suggestive Evidence of Misreporting

As indicated above, incentives to cheat are greater when the potential savings from doing so are greater. The potential for savings from fraudulent reporting is the greatest in the highest risk insurance classes. Workers' compensation premiums vary by a factor of 100 over the risk categories defined by the Workers' Compensation Insurance Rating Bureau of California (WCIRB) and the California Department of Insurance (CDI).[4] Therefore, we expect to see greater cheating 1) in high risk, higher premium classes and 2) when the overall rate level is higher.

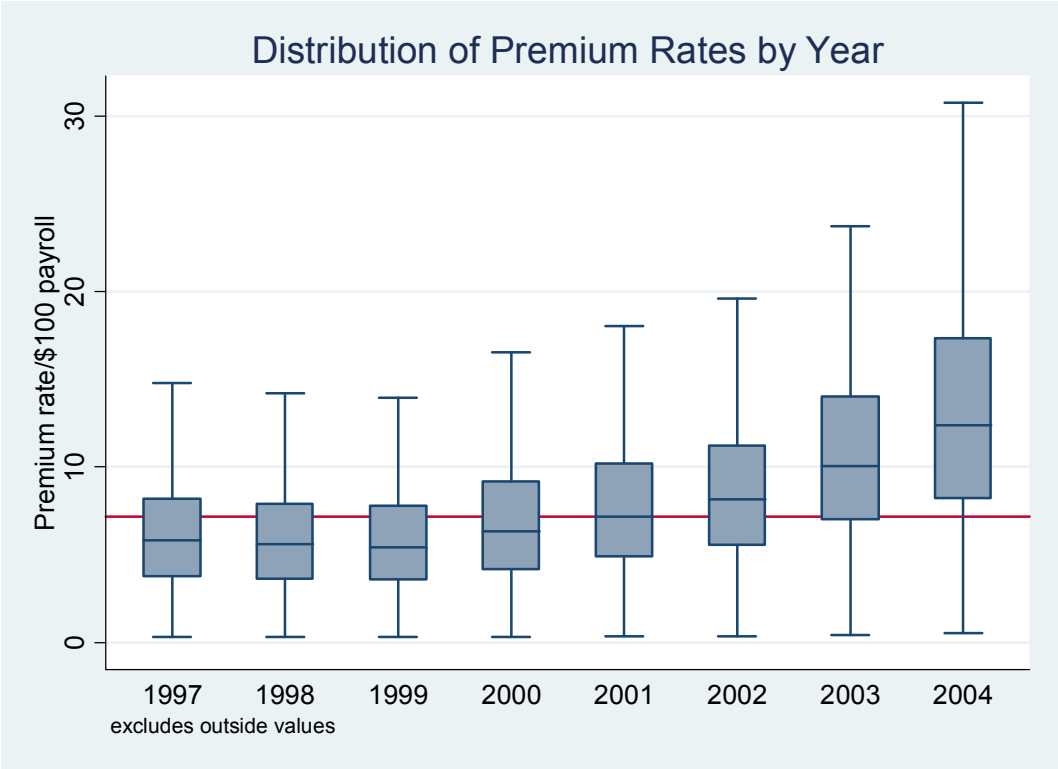
In the long-term, premium rates are endogenous to reported payroll. If cheating behavior has been occurring for many years, then a divergence in premium rates should also be seen; cheating leads to higher premiums and higher premiums thus encourage more cheating. In the short-term, we might expect to observe changes in employer cheating, but at a lower level than the long-term accommodation.

Figure 3 is a box and whisker plot of premium rates for each year. The shaded regions represent the range for the premium rates for half of the risk classes, centered at the median. The top and bottom ends of the "whiskers" represent the highest and lowest premium values respectively, in a given year (excluding outliers). The horizontal line inside the box is the premium rate for the median risk class for the given year. In 1997, for example, 50% of premium rates fell somewhere between about $4 and $8. The spread was only $4. In 2004, however, the half of premium rates centered at the median ranged from about $8 to nearly $18; a spread of $10.

Indeed, we see a greater range as premiums increased over this period. The red line is the overall median premium rate for all class codes in all years ($7.17). The lower quartiles (bottom of the box, below which one-quarter of the values lie) and medians shift up over time, but the increases in premium rates are most exaggerated in the upper quartiles (the distance between the top edge of a box and the upper whisker) suggesting that the higher premium rates are being driven up. This effect might be explained by rising medical costs over the given years. The spread between the high and low risk codes will increase with the level of premiums. However, the increase in spread here exceeds what we expect to observe based on trends in costs and shifts in absolute premium rates.

[4] For 2003, WCIRB premium rates varied from $0.43/$100 for real estate agencies to $52.16/$100 or roofers. Pure premium rates include only the direct cost of benefits. Actual premiums, including administrative costs, brokerage fees, profits and taxes are typically a higher than pure premium rates, typically, 20% to 40% higher. See the WCIRB rate filing for 1/1/2003 pure premium rates.

Figure 3



At a very aggregate level, these data suggest that premium levels affect employer reporting of payroll. In the remainder of this report we will examine in more detail the evidence for under-reporting and the implications for honest employers.

1.3 Premium Fraud and Competitive Advantage

Summarizing the discussion above, employers, seeking to minimize total costs, have incentives to avoid paying insurance premiums, especially if the workers' compensation system provides a relatively easy and risk-free mechanism for doing so. Indeed, by misreporting payroll costs, employers are able to avoid the higher premiums they would incur with full reporting of payroll. Employer savings come from under-reporting or misreporting payroll and potential savings are greatest for the highest-risk (i.e. highest-cost) employees.

The WCIRB recommends premium rates by evaluating historic experience within a risk class of workers (referred to as a Class Code). Experience is composed of reported payroll for a previous period and the estimated ultimate medical and indemnity costs for claims occurring during the period. If employers under-report payroll in a class but accurately report the class code of injured workers, the premium rate estimated by the WCIRB for that class code will be artificially high.

Employers, who report truthfully for these classes are faced with artificially high premiums and incur higher costs than their cheating competitors. This effect is amplified if the higher premiums in turn encourage more employers to under-report or dishonest employers to under-report to a greater extent.

1.4 Insurer Incentive to Audit Reporting

Insurers are required to audit policy holders if the premium exceeds a threshold, currently $10,000. However the aggressiveness of the auditing process is subject to question At a recent meeting of California's Fraud Assessment Commission, Chairman William Zachary opined that insurers lacked sufficient incentive to track and report fraudulent behavior by employers.

Even if premium avoidance becomes endemic, workers' compensation insurers may have limited incentive to seek out and punish cheaters as long as premiums rates are artificially high enough to create sufficient total premium to cover costs and profit. For example, imagine that a large fraction of employers cheat at least a little. If one insurer decides to unilaterally enforce auditing in an aggressive manner, dishonest employers would "wisely" choose not to insure with that company. On the other hand, honest employers have no additional incentive to insure with the aggressive insurer because premium rates are set for the entire insurance industry. An aggressive insurer risks losing a significant fraction of business that, while subject to a relatively high rate of fraudulent behavior, is still profitable because of artificially high premium rates. In addition, insurers incur higher costs if they audit more aggressively.

Most workers' compensation policies are sold through brokers to employers, rather than directly from insurers. Brokers may have interests that are not perfectly aligned with insurers. Larger brokers may have enough experience with insurers and auditing to guide their clients to insurers that less aggressive auditors or ones that are not subject to test audits by the Rating Bureau during a particular policy period.

The WCIRB does have an aggressive program of evaluating insurer audits, trying to ensure both employer and insurer compliance. Called the Test Audit Program (WCIRB, 2003), it involves re-auditing approximately 3,000 of the 600,000 policies issued by insurers in California each year. The WCRIB results are compared to those reported by insurers and discrepancies can result in fines, increased audits, and other penalties. Insurers meeting high standards are given a pass on audits for eight quarters.

While concerns have been raised that there are certain gaps in the Test Audit Program (e.g., larger employers domiciled out of state often avoid audits), the program is probably the most aggressive effort in the country aimed at ensuring effective auditing by insurers. However, our estimates of premium avoidance may challenge observers' perceptions of both the insurer methods and the WCIRB's efforts to measure of the effectiveness of insurer audits.

Among the issues raised by observers are problems with auditing "non-standard" policies, particularly large-deductible policies and policies written for non-standard class codes. Also considerable concern has been raised about the impact of Professional Employer Organizations (PEOs) that assume the payroll requirements, including payroll taxes and insurance, and contract employees to employers. This arms-length relationship complicates the process of auditing the risk of the underlying employment. This is frequently raised as a growing concern but we are unaware of any analysis quantifying the extent or change over time in PEO penetration among high-risk occupations.

A contention of this paper is that if responsibility for monitoring is primarily located in an agent (insurer) that has less than perfect incentive to monitor, monitoring will be less than perfect, and, will be increasingly imperfect as the incentive to monitor closely decreases. Limited incentives might also explain why there has been little research into the extent of fraudulent activity.

Further, systematic efforts to improve monitoring will be limited if the most powerful voices in the employer community are silent on the issue. Influence on policies surrounding employer issues is often concentrated among large employers who can self-insure or purchase very large deductible policies that allow them to avoid the impact of fraudulent reporting on premium rates.[5] Smaller employers may have less "voice" in the debates over tightening controls on reporting payroll for insurance premiums.

1.5 Recent Studies of Payroll Reporting in Other Jurisdictions

Recently, two reports have been published attempting to estimate the extent of under-reporting and misreporting in other states. A study by the Fiscal Policy Institute (FPI) (2007) covering New York state estimated that between $25 billion and $50 billion in payroll (20% of total payroll) was inappropriately unreported for workers' compensation. FPI compared payroll reported to the state for unemployment insurance (UI) with payroll reported to insurers for calculating workers' compensation premiums. The authors considered the estimate conservative because it did not account for payroll that was not reported to either source. On the other hand, the estimate may be too high if, like California, New York excludes certain wages, reported for UI, from premium calculations such as overtime wage differentials.

A University of Maine study (Murphy, 2007) examined the extent to which employers in the construction industry misreported employees as independent contractors, avoiding both workers' compensation and tax withholding. That study, based on an earlier survey by Harvard University, estimated 11% of Maine's construction workers were misclassified as independent contractors.

While these recent reports are insightful, they rely on reported wages, aggregated across classes as the base measure, even while acknowledging that the reported wages are misreported. In any case, accurate data on actual earnings within workers' compensation classes has been non-existent. This report fills that void, making the first estimates of under-reporting, how it is distributed by the risk and premium related to occupation, and the extent to which it has an impact on honest employers.

1.6 Anecdotal Stories from the Press of Employer Fraud

Recent press reports highlight examples of the potential for employer premium fraud:

> A contractor "doing business in Monterey County for approximately 26 years…allegedly hired and employed staff, for many years without providing workers' compensation insurance." *Silicon Valley/San Jose Business Journal, January 17, 2007.*

> "The owners of an Escondido roofing company were ordered yesterday to pay $3 million in restitution for underpaying workers' compensation premiums from 2001 to 2003." *The San Diego Union-Tribune, December 15, 2006.*

[5] According to the Workers' Compensation Insurance Rating Bureau of California (WCIRB 2006) approximately 30% of written premium is on large deductible policies that essentially mirror self-insurance. Full reporting is done on estimated premium, payroll, and claims, but the employer retains the majority of liability.

> "The president and vice president of a Chatsworth-based flooring company were arrested Wednesday on charges of bilking the state's workers' compensation fund out of nearly $11 million in premiums…[They] are accused of conspiring to under-report the true amount of the company's payroll by more than $31.8 million…between September 2001 and April 2006." *CBS.com, October 18, 2006.*
>
> "A San Diego Superior Court judge orders the owner of a San Diego-area construction company to pay more than $475,000 in restitution to the California State Compensation Insurance Fund as part of his sentence for workers' comp insurance premium fraud….State Fund says it discovered the fraud after [the contractor] filed a workers' comp claim related to an employee for which [the contractor] had never reported wages." *Providence Publications, August 30, 2006.*
>
> "A Riverside judge sentenced a Norco couple and their business partner to state prison Tuesday for their roles in what authorities called Riverside Country's largest and most sophisticated payroll fraud scheme…[They] cheated California out of almost $5 million… Authorities said [the tree company] used unskilled workers, paid many of them in cash, …did not report appropriate payroll to [the workers' compensation insurer] and falsified documents if a worker was injured….'You walked into the mess,' [the judge said] 'Month by month. Year by year. You didn't plan to be a multimillion-dollar swindler, you just ended up that way'" *Press Enterprise, August 29, 2006.*

Although anecdotal, these accounts highlight the opportunity for employers to not only under-report risk and underpay premiums, but to do so for extended periods without being identified.

In most of these examples, employers purchased workers' compensation insurance. However, they conducted high-risk business while avoiding substantial premiums through under-reporting or misreporting. The employers engaged in fraudulent activities despite being subject to regular auditing, thus raising the question: How much deterrence does the current audit process generate?

2.0 Estimation of Misreporting/Under-reporting

2.1 Risk Variable

In order to determine whether or not fraudulent behavior is driving the observed relationships between exposure and premium rates in the proceeding figures, we compare premium rates and payroll reporting behavior. We define a measure of the accuracy of reporting for each class code: the ratio of total employer reported payroll to an estimate of "true" payroll. The estimate of "true" payroll is derived from the Current Population Survey as described below and in more detail in *Appendix 2*.

The CPS is a household survey conducted by the Census Bureau for the Bureau of Labor Statistics. Survey samples are constructed to give representative statistics for most states and nationally. The survey is the primary source for labor force information in the United States and is used extensively by researchers, legislators, and policymakers. It includes a wide range of demographic and employment information. Each month, the Census Bureau interviews 50,000

households across the United States and interviews each household for a total of 8 months over a span of 16 months. I n a given month earnings data are only available on the 25% of members of surveyed households that comprise the "outgoing rotations," households in months 4 and 8 of sampling. In our sample, we have approximately 1,000 California working households for each month of years 1997 to 2002.

We estimate "true" payroll using reported wages from the CPS from years 1997 to 2002. Using 3-digit industry and occupation code pairs from the CPS we assign each worker to a specific class code.[6] We then group people based on the class code that we assigned and multiply their monthly earnings by the CPS earnings weight variable. (This variable equals the number of people in the state that the person represents, based on CPS estimates.) Aggregating weighted earnings for each class gives a monthly exposure measure for the given class. Summing 12 months of calculated exposure for each class in a given year gives a yearly value of "true" payroll that we can compare to the actual employer-reported payroll.

There are two possible sources of error in our estimate of "true" payroll. The first is random sampling error that occurs with all survey sampling. In particular, our measurement of "REPORTING" for an individual class code is:

[exposure reported to WCIRB]/[Earnings reported by respondents to CPS]

There is no sampling error in the reporting of WCIRB exposure because it is a census of payroll. But, the samples for any individual class code may be small, meaning that the error in our estimates for any individual class in any single year may be substantial. However, our analytic approach is appropriate for this type of error. In addition, it is not believed these errors will systematically bias the study estimates.

A second potential source of error could arise from our assignment individuals to class codes. The assignment method is discussed in more detail in *Appendix 2.* We do not believe that our classification is biased in one direction or another, as we use detailed descriptions of class codes, industries, and occupations, to ensure the most accurate matching between two coding schemes that have no direct crosswalk.

To address concerns that our classification scheme is systematically biased and driving the direction and significance of our results, we define a second classification scheme whereby we allow for matches of an industry-occupation pair to more than one class code that could be a second or third best match to our original specification. Our results are robust to this classification and we present some of these results below. We also specify a class-fixed effects model that examines the impact of changes in premium rates within individual class codes. This avoids any problems with systematic bias across classes. As shown below, the results within class are consistent with the findings across classes.

2.2 Adjustments

2.2.1 Self-Insured/Self-Employed

Many employers do not buy workers' compensation insurance coverage but rather self-insure. These employers do not report payroll or injury experience to the WCIRB. However, when workers at these firms are respondents to the CPS, their earnings are included in our estimates.

[6] See appendix for a more detailed account of matching methodology.

To correct for this discrepancy between our estimated class code payroll and employer reported payroll, we obtained self-insured data for each industry (3-digit SIC code) for each year through a special request to the California Self-Insured Plans, a division of the California Department of Industrial Relations. We distributed the self-insured payroll across class codes using the distribution of exposure by industry as observed in the CPS.

We also exclude from our payroll estimates earnings of self-employed persons, as these individuals are not mandated to purchase workers' compensation coverage. This poses some concerns that will be discussed later. Notably, self-employment status is self-reported. As such, it will reflect the workers' perception of their employment status. This perception is not necessarily perfectly coincidental with legal definitions of self-employment that would release an "employer" from the requirement to report earnings for premium calculation. It also is not necessarily coincidental with the status an employer claims for the worker when reporting payroll for premium and payroll tax purposes. The Murphy study (2007) highlighted the extent to which employers misclassify employees as self-employed, independent contractors in Maine's construction industry.

There will be discussions at several points in the paper why the workers' perception may be more consistent with employers' interpretation than with the very broad interpretation of employment status defined by state statute for workers' compensation liability.

2.2.2 WCIRB Exposure vs. Payroll

Exposure is the term used by the WCIRB to describe payroll against which workers' compensation premiums are calculated. Exposure closely tracks payroll but is always less than actual payroll. The most important difference is that exposure does not include any wage premiums beyond the base hourly wage. For example, if a worker is paid time-and-a-half for overtime, only the regular hourly wage is included in exposure for premium calculations. Similarly, if the night shift pays a premium over the day shift, only the day shift wage is used in the calculation of premium. There are other exclusions like certain bonus payments and portions of very highly paid executives.

The total impact of the exclusions from payroll is unknown. It is also not known how the level of exclusion might vary across class codes. We have some indication of the extent of excluded payroll. The NCS conducted by the Census Bureau for the U. S. Bureau of Labor Statistics estimates the contribution to payroll cost of various components of compensation. Using a very strict definition of payroll exclusions, the NCS gives an estimate that 4.3% of payroll is excluded from premium calculation. A very broad definition of excluded payroll would suggest that 8% of payroll is appropriately excluded from premium calculation. In the discussion of *Table 3*, the impact of both these exclusions levels on under-reporting is examined..

Research has not yielded any other estimates of the percentage of payroll excluded from premium calculations, nor variation in this percentage across class codes. The WCIRB has investigated this issue, but the calculations are against total compensation costs reported by employers, including health insurance, pension benefits, etc (WCIRB, 2003 Wage Level Study). The WCIRB did find variation across class codes, suggesting that exclusions were generally higher for lower-risk industries.

The NCS, based on highly aggregated industry level data, that variation in the portion of payroll excluded is negatively correlated with occupational risk. Like the WCIRB study, the NCS data

indicate that value for REPORTING, when there is complete reporting, should be lower in the lower risk class codes, that is, more payroll would be excluded from reporting for lower risk occupations.

2.3 Comparison of Actual to Reported Exposure

We compare our estimate of "true" or actual exposure, aggregated yearly earnings as reported in the CPS for each class of workers, to the employer-reported exposure, as reported by insurers to the WCIRB and supplied by the WCIRB for this project. The following ratio is a measure of the completeness of reporting for a given class.

$$\text{REPORTING} = \frac{employer\_reported\_payroll}{actual\_payroll} = \frac{(WCIRB + Self\_Insured)}{CPS\_reported\_earnings}$$

A higher value of "REPORTING" indicates that employers in a class code are reporting a larger fraction of what we estimate to be the correct payroll. As the value of REPORTING falls, employers are reporting a smaller percentage of payroll. If the value of REPORTING is negatively correlated with premiums, this indicates systematic and problematic behavior consistent with patterns of fraud.

It is expected that exposure (payroll reported to insurers for premium calculations) is systematically lower than payroll for the reason of exposure omissions discussed above. Considering this, it is not believed that a value of REPORTING equal to one is a measure of perfectly honest reporting. Rather, a value somewhat less than one is what we would expect to observe for a truly honest employer.

A value indicating greater than full reporting for some classes of employment (or greater than the uncertain benchmark approximately 0.957) may be observed if employers are actually over-reporting payroll in certain classes. An employer might choose to do this for a low-risk class to somewhat compensate for under-reporting in a high-risk class; as this would decrease insurance costs while more truthfully reporting the dollar amount of payroll. Some employers might find this to be a more acceptable form of insurance fraud than simply under-reporting. This is especially true if the employer is unwilling to avoid payroll taxes and related requirements by not reporting payroll at all.

The next section explores how the percentage of payroll reported by employers varies with the premium rates for the class of workers. In the analysis, natural logarithm of REPORTING as the dependent variable is used. Using the natural logarithm ensures a normally distributed random variable, as required by the regression analysis.

2.3.1 Suggestive Results and Graphs

A smaller value of REPORTING indicates that employers are cheating more (i.e. reporting a smaller percentage of payroll in the appropriate risk category). As discussed above, employers have greater incentives to cheat at higher premium rates. Evidence that employers are responding to these incentives is shown in *Figure 4*. *Figure 4* plots the average value of REPORTING for ten deciles of premium rates.[7] Indeed, it is observed that values of REPORTING decline as

[7] Note that these deciles are based on the pure distribution of premium rates, not on the joint sample distribution, which would capture relative frequencies in our sample.

premium rates increase, i.e. these employers appear to be cheating more when workers' compensation costs are higher.

Figure 4

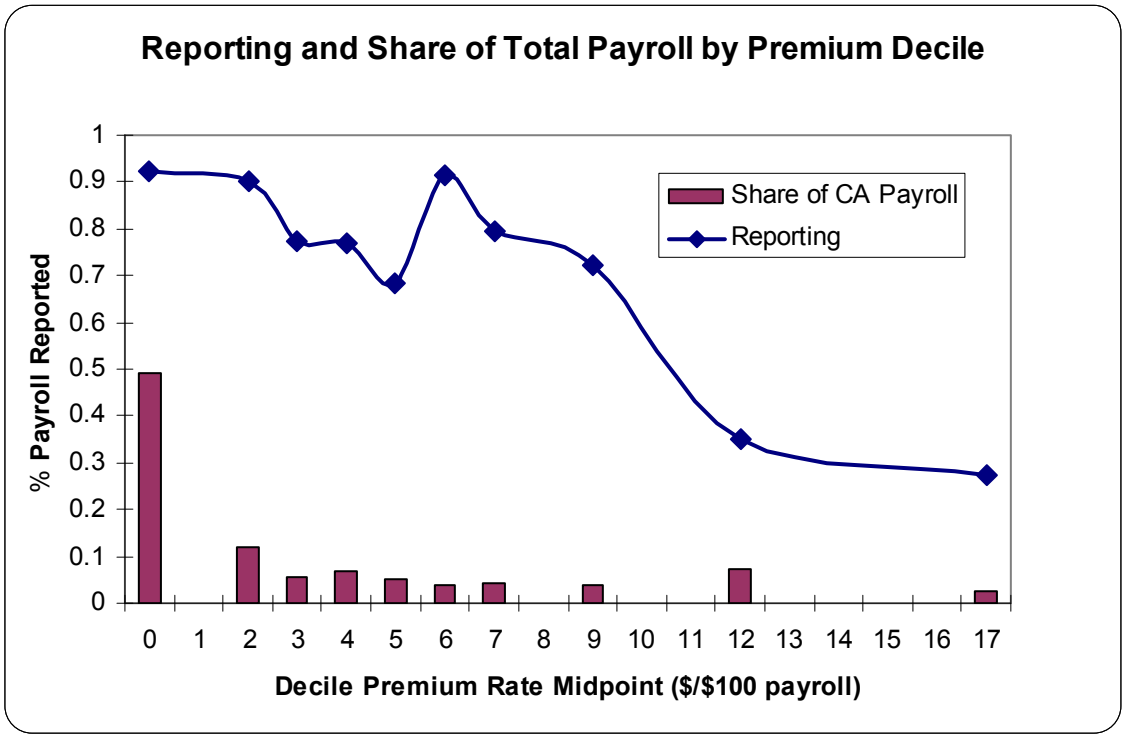


Figure 4 suggests extensive problems with payroll reporting, particularly in the highest premium rate class codes. For the lowest premium rate classes, payroll reporting is close to actual payroll. Payroll might even be over reported for these classes, likely shifted from higher rate classes.

Figure 4 also graphs the level of employment in each of the deciles. Employment is highly skewed towards the lowest premium rate class codes, with almost 40% of employment in the lowest decile of class codes measured by premium rates. This is consistent with the very large concentration of employment and payroll in class codes covering clerical and professional occupations with low risk (e.g., 8810, 8808). [8] Beyond the lowest risk decile of classes, payroll is more evenly distributed, representing 5-12% of total employment.

Examples of the highest and lowest risk classes are given in *Table 1* on the following page. Also note that while premium rate levels changed substantially, the highest and lowest rated classes and their ordering changed very little over the period.

[8] The employment numbers are generated from the CPS data, not from exposure reported to the WCIRB. Hence it is not subject to under-reporting bias that the data suggest would characterize estimates based on WCIRB data.

***Table 1*--Low and High Premium Class Codes**

Class Code	Description	Premium Rate
	1997	
8859	Computer Programming or Software Development	$0.33
8803	Auditors or Accountants	0.37
8741	Real Estate Agencies	0.42
8743	Mortgage Brokers	0.46
4512	Biomedical Research Laboratories	0.54
8810	Clerical Office Employees	0.62
…	…	…
5632	Steel Framing–light gauge–commercial– less than $23.00	23.50
5059	Iron or Steel Erection–structural–buildings under 3 stories	24.99
106	Tree Pruning, Repairing or Trimming	26.60
7601	Telephone, Telegraph or Fire Alarm Line Construction	29.81
5552	Roofing–less than $20.00	35.08
9185	Carnivals or Circuses	49.97
	2002	
8859	Computer Programming or Software Development	$0.36
8741	Real Estate Agencies	0.36
8803	Auditors or Accountants	0.54
8743	Mortgage Brokers	0.56
4512	Biomedical Research Laboratories	0.92
8810	Clerical Office Employees	0.94
…	…	…
5645	Carpentry–less than $23.00	28.74
8293	Furniture Moving	29.45
106	Tree Pruning, Repairing or Trimming	31.27
2702	Logging or Lumbering, Wood Chopping, Clearing Land	37.08
5552	Roofing–less than $20.00	41.04
9185	Carnivals or Circuses	42.07

Payroll reporting rapidly declines from near full reporting to around 20% of total payroll in the classes included in the highest decile. The level of reporting and the clear trend are strong evidence of under-reporting, and the increasing incentive to under-report as premium rates increase.

How employers choose to mis-report has important implications for how honest employers are affected. At one extreme, employers could avoid premiums by excluding both employees and their injuries from reporting. This would have implications for the workers who might be deprived of full benefits, but it would have limited impact on the premiums honest employers paid and limited impact on insurers. At the other extreme, employers could under-report payroll but accurately report claims, which would have significant impact on premium rates for honest employers, or employers could report payroll accurately but fraudulently report high-risk payroll in a low-risk class.

Class assignment for claims and their related costs are based, to an important extent, on reporting by the initial treating physicians. Consequently, we expect the claim reporting by class code to be fairly accurate.[9] Assignment of class code for reported claims is also subject to a separate audit process under the WCRIB Test Audit Program.

In the next section, the evidence of the impact of payroll misreporting on premiums faced by honest employers (and avoided by dishonest employers) is examined.

2.4 Welfare Analysis

In order to analyze the distortions caused by these premiums, a "true" premium rate, the premium rate that would arise if all employers reported payroll truthfully, equal to the current premium times the level of reporting observed, is estimated.[10] This is an illustrative measure and assumes that reported injury costs are allocated to the correct class. This true premium rate for each class code of worker is calculated. *Figure 5* on the following page compares the average current premium rate for 20 quantiles of premium rates and the average adjusted or "true" premium rate for the same quantiles. To standardize the different data sets, the premium rate for the lowest risk quantile is set at 100% and the actual and "true" premium for each subsequent quantile as a fraction or multiple of the lowest-risk class is estimated.

The "true" premium, calculated in this manner, rises with the risk of the classes included in each quantile. But the "true" premium rate rises more slowly than the actual premium rate. For high-risk classes, the "true" premium rate is substantially below the actual premium rates. The gap between "true" and actual premium is quite substantial for higher risk classes. For the highest risk quantile, actual premium rates average 40 times the rate for the lowest quantile. Estimated "true" premium rates for the highest quantile are only between 5 and 10 times as high as those for the lowest risk quantile.

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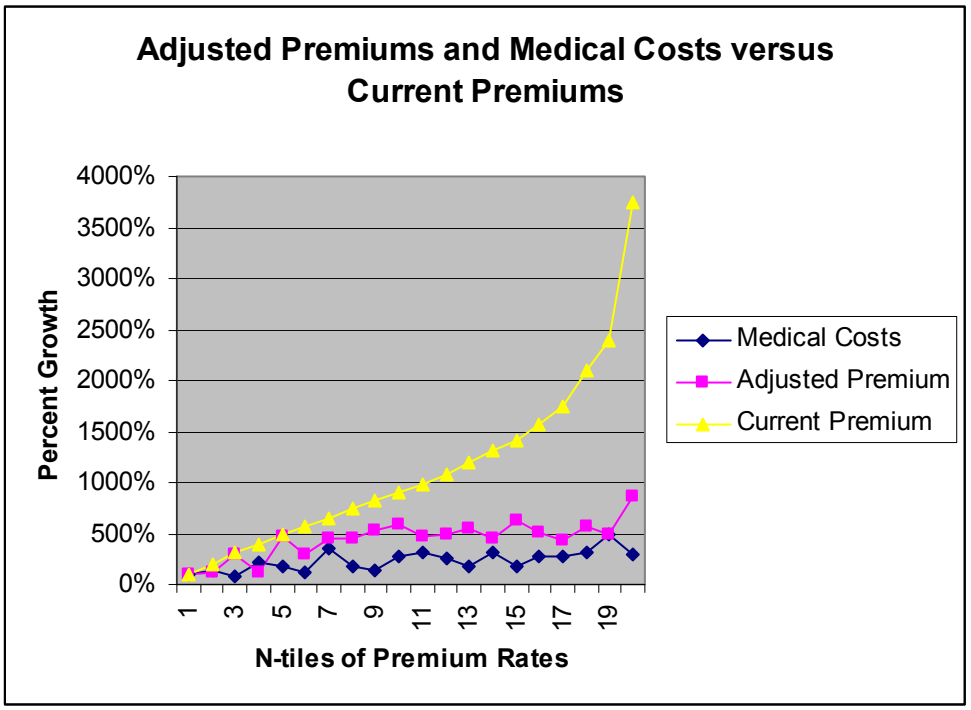
[9] An initial treating physician is required by law to file a Doctor's First Report of Injury which includes a description of the injured workers job at injury. This report is filed with the employer, insurer, and the California Division of Workers' Compensation.

[10] $true = \frac{injury\_cost}{CPS\_estimated\_exposure}$; $current = \frac{injury\_cost}{Employer\_reported\_exposure}$. Combining terms using the common injury cost gives:

$$true = \frac{Employer\_reported\_exposure}{CPS\_estimated\_exposure} \times Current = FRAUD \times Current$$

Figure 5



It can be argued that this is a lower bound on the true premium rate, given that it assumes all claims are correctly reported even when substantial payroll is under-reported or misreported. On the other hand, it is clear that the current premium rates represent an unrealistic upper bound given the substantial observed under-reporting.

2.4.1 Alternative Estimate of "True" Premium Rates

Using a separate data source, an alternate measure of relative claim costs across risk categories was calculated to examine which of these boundary measures more accurately reflects the real underlying premium rates under honest reporting. The MEPS, conducted by the Agency for Healthcare Research and Quality (AHRQ) (part of the Centers for Medicare and Medicaid Services), is a panel survey that follows a large, representative sample of the U.S. households. A new sample is drawn each year and followed for two years. All medical expenditures for each person in the sample are collected along with information on the payer, including workers' compensation, private insurance, and public programs. Detailed demographic data are collected on each person, including occupation and industry for a person's main job, if working.[11]

Using MEPS, each respondent was assigned to a specific insurance class code using occupation and industry, identical to the assignment using CPS data. Then all occupational medical payments during the two years the respondents are in the survey were aggregated and these were averaged across all respondents in each of 20 quantiles (based on main occupation in the first year of the survey) used in constructing the CPS data for *Figure 5*. This gives an estimate of how average occupational medical expenditures vary by risk category. Medical costs are the largest

[11] MEPS made available confidential data on occupation and industry at the 3-digit level. These data were made available at the Secure Data Center at AHRQ headquarters in Rockville, Maryland. The linking dataset is available at AHRQ for future researchers.

component of direct benefit costs (approximately 60% in California), and medical costs are highly correlated with indemnity costs.

The "Medical Cost" line in *Figure 5* represents average occupational medical costs in each premium rate quantile stardardized on the average for the first, least risky quantile. Average premium rates are expected to closely follow average medical costs. That is, the trend in medical costs should represent a good predictor of the "accurate" rate of increase in premium costs, under full reporting, across the 20 quantiles.

The results are striking. The trend in medical costs follows quite closely the "true" premium costs predicted by the adjustments made to premium rates that reflect under-reporting of payroll. Occupational medical costs increase by about 400% across the 20 quantiles of risk. This is close to the estimate trend in "true" premium which increases something more than 500% over the span of risk. Actual premium rates increase much more rapidly, about 7-10 times more rapidly over the span of 20 occupational-risk quantiles.

Both the adjusted measure of true premium rates and medical costs have similar slopes. Current premium rates have a much steeper slope in the higher-risk class codes. This is consistent with the argument that there is extensive under-reporting which becomes increasingly severe as risk (and premium rates) increases. The "true" premium rates and the MEPS-calculated rates are similar, and both differ substantially from the "actual" premium rate. This difference is attributed to fraudulent reporting of payrolls that are causing premiums to be artificially high for honest employers.

The estimate of the trend in premium rates across risk categories, based on changes in occupational medical costs across risk categories, may be too conservative. The main concern is that in MEPS, respondents are only observed for 2 years. If injuries are randomly distributed across months, then in MEPS, only occupational medical cost for an average of one year after injury is observed. This is a short observation period for occupational injuries which can have medical treatment over many years. The estimates would be biased if claims in higher-risk classes have a greater percentage of their costs in longer-term claims, i.e., a greater fraction of total expenditures occur outside the observed period (1-24 months after injury). It is also possible that the direction of the effect is in the opposite direction if, for example, lower-risk class codes are more dominated by cumulative injuries that typically have longer durations. The bias in either direction is not expected to be large, certainly not large enough to explain the discrepancy between observed premium rates and expected premium rates.

2.4.2 Regression Results

Linear regression analysis provides detailed insight into the relationships depicted in the graphs above. *Table 2* on the following page presents the study's regression results. A basic linear model and a class fixed effects model is presented. Results are presented for the original class to industry-occupation pair matching, as well as the second specification done at a higher level of aggregation.

Table 2 **- Regression results for ln(REPORTING) on Premium Rates**[12]

	(1)	(2)	(3)	(4)
pprate	-0.240***	-0.071***	-0.103**	-0.144***
	(0.000)	(0.023)	(0.03)	(0.003)
pprate^2	0.009**	-0.004	0.006***	0.008***
	(0.002)	(0.235)	(0.036)	(0.003)
year	0.027	0.010	0.004	0.003
constant	-0.127*	-0.267***	-0.573***	-0.276***
R^2	0.193	0.12	0.913	0.923
Fixed effects	No	No	Yes	Yes
Weighted	Yes	Yes	Yes	Yes
Specification	1	2	1	2

† Standard errors adjusted for premium rate sampling bias
º *** denotes significance at the 1% rejection level; ** at 5%; * at 10%.

The regression results support the relationships that observed in Figures 1-4. The Models (1) and (2) display results from OLS regressions for the original (1) and more aggregated (2) specification. In both specifications, the coefficient on Premium Rate (PPRATE) is negative. The interpretation of this is that higher insurance premiums are associated with a decrease in the level of REPORTING, i.e., increased under-reporting. The second- and third-order terms are slightly positive, although only the second-order term is statistically significant in the first specification. Regardless, the net effect is negative since the slightly positive coefficient is small.

The main concern about the findings from models (1) and (2) is that there may be some unobserved characteristic that is correlated with premium rates and explains the trend in under-reporting. This could be the case if matching of class to occupation and industry were systematically biased or wage exclusions for premium estimation are systematically related to risk. However, if the unobserved characteristic is also associated with fraudulent reporting, the results on under-reporting would stand, but not the explanation of premium rates as a causal factor. For example, if high-risk classes are associated with smaller employers and smaller employers cheat more, the trend we attributed to premium would be observed. This concern is explored by specifying a second set of models.

[12] In our regressions, we are unable to control for firm-level characteristics that might also explain the level of fraudulent reporting (firm size, location, etc.) as we only have aggregated state-level data. Thus, the strong significance of our results might be overstated for models (1) and (2). However, since the "fixed-effects" model calculates within class-code coefficients, the estimates are not subject to this potential limitation.

Models (3) and (4) display regression results for a class fixed-effects OLS specification. Fixed effects allows for differing intercepts for each class code. This specification tests whether changing the premium rate within class codes changes the reporting within class codes, that is, whether changes in the premium rates in the short-term (1997-2002) result in within-class code changes in the level of reporting. It is expected that the effects observed will be smaller than those observed across classes. Across-class differences reflect long-term accommodation to differences in premium rates. The fixed-effects-model requirement limits these accommodations to those employers can make in the short-term. Most important, systematic bias across classes will not be a factor in the results observed with the fixed-effects models. The fixed-effects specification requires that observed response be a product of within-class response by employers to higher premium rates.

The fixed-effects model gives surprisingly strong results given the short-term nature of the premium changes. In the first specification, the coefficients on the premium variable are about half as large as they are for the model comparing all classes in a single pool. In the more highly aggregated specification, the second-order term is significant and positive which makes the net effect less negative.

Setting the model at the median value of the pure premium rate over all years ($7.17/$100 payroll):

1. Both specifications, less inclusive and more inclusive, give similar estimates; a 10% increase in pure premium rates results in a 7% to 9% reduction in reported exposure. This is for the model grouping all class codes and years.
2. When the specification includes fixed effects, the responsiveness of employers to premium rate changes is smaller. A 10% increase in premium rates results in a 1% to 2% decrease in reporting. Since increases/decreases are year-to-year, this means employers can respond to annual changes, but at about 10% of the long-term responsiveness.
3. Both the less inclusive and more inclusive specifications give similar levels of responsiveness to premium changes. The more inclusive specification gives slightly higher estimates of the elasticity or reported payroll to premium rates.

Point estimates in this analysis are highly significant and negative in all specifications, further supporting the conclusion that increases in premium rates lead to increases in fraudulent employer reporting.

The most important conclusion to draw from the regression analyses is that the findings are robust to many concerns. A challenge to the model would be that the study's assignment of occupation and industry pairs to class codes is biased in a way that consistently results in lower estimates of reporting as premiums increase. For example, if higher-risk classes were increasingly more narrowly defined in the occupation-industry coding relative to the true definition of class codes, then lower reporting would be observed as premium rates increased. However, this would not affect the fixed-effects models that evaluate the responsiveness of reporting only within class codes.

That short-term (fixed-effects) results are smaller than long-term effects is consistent with how we think employers respond to incentives. Over the long-term, industries structure employment relationships to reflect payroll costs, for example, attempting to define employment contracts as independent contractors or more aggressively hiring employees that are willing to work under

alternative employment contracts. An example would be an industry that becomes increasingly dominated by migrant labor willing to work for cash, forgoing employer contributions to Social Security, Medicare, unemployment insurance, etc., in exchange for higher immediate wages or an increased opportunity for reasonably steady employment.

The positive second-order coefficient on the premium rate is interesting. The effect is to make the short-term accommodation for year-to-year changes in the high premium classes much smaller or near zero. It is quite possible that the long-term accommodation by employers to consistently high premium rates has accomplished most of the possible accommodation. For example, once employers have reduced reported payroll to 20-30% of actual payroll, there may be little room for additional accommodation.

The finding of a significant degree of short-term accommodation to premium rates by employers is important for explaining the results initially presented in Figure 1 and Figure 2. Those figures show year-to-year payroll reporting, aggregated across all classes, that is responsive to premium rate changes. If short-term accommodation in the fixed-effects models were not observed, it would be difficult to explain these year-to-year trends in aggregate data.

Finally, the results, particularly for the fixed-effects models, suggest that the main impact of the run-up in rates during the study period was on the mid-range to mid-high range of risky class codes. That is, the short-term response of employers was larger in the middle to middle-high range than at either extreme. The most likely explanation is that employers with low premium rates still had only limited incentive to mis-report. In addition, high employers with very high premium rates may have already made virtually all of the accommodation possible to the extraordinarily high rates they have faced over the long-term.

3.0 Insurance Pricing Modification

Insurance pricing includes modifications for employer experience, referred to as "experience modification" or Ex-mod. The Ex-mod is a factor, centered around 1.0, which adjusts an employer's actual premium up or down based on an employer's historic payroll and estimated ultimate losses relative to the average experience of all other employers in the same classes. A portion of an employer's past experience is used to calculate the Ex-mod with the aim of forcing employers to internalize their injury costs.

The actual method used to calculate Ex-mods is quite arcane. Each policy year, the WCRIB sets a minimum premium threshold for an employer to be experience-modified. Only about 20% of employers have sufficient experience to achieve the threshold required to have an Ex-mod calculated; the other 80% receive a modification of 1.0. Above the modification threshold, the larger an employer's premium the greater the weight given to past experience.[13] When given a modification, the contribution of experience rises slowly with the level of an employer's premium. Almost no employers are fully experience-rated. It is also very unusual to have an Ex-mod below or above 0.80-1.20.

An important issue in estimating the impact of fraudulent misreporting is the extent to which experience modification corrects an honest employer's premium rate for misreporting by

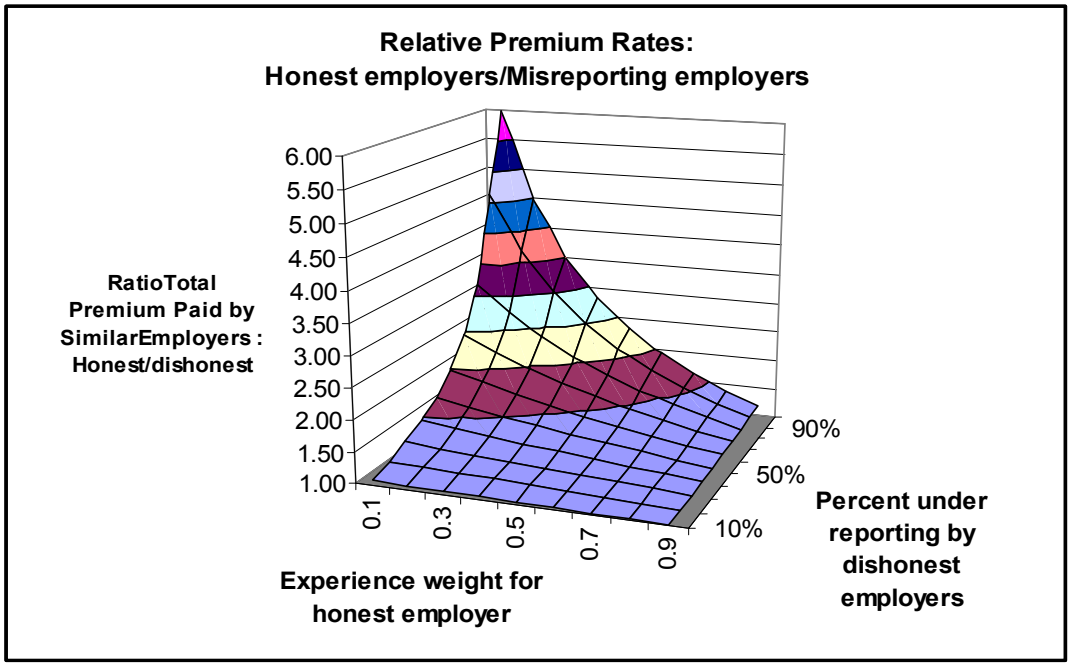
[13] For a detailed discussion of how California calculates experience modifications, see "California Workers' Compensation Experience Rating Plan—1995, Revised July 1, 2006, available at: https://wcirbonline.org/root/pdf/erp_ic_regs_only.pdf

dishonest employers. At one extreme, for those few employers who are fully experience-rated, the purchase of very large-deductible policies or self-insured misreporting by dishonest employers does not affect workers' compensation costs. The honest employer's cost is entirely based on its own experience.[14] At the other extreme, the 80% of employers who are not experience-rated face the full impact of misreporting by dishonest employers.

Figure 6 below suggests the importance of experience rating in mitigating the impact of misreporting. The graph compares the premiums of honest and dishonest employers assuming that ½ the employers report honestly and the other half misreport a portion of their high-risk class of workers as being workers in the low-risk class. In this simple example, there are only two class codes, high-risk (premium rate = $10/$100 payroll) and low-risk (premium rate = $1/$100 payroll), and two types of employers, honest and dishonest. In this example, dishonest employers correctly report payroll, but misreport a varying portion of high-risk payroll in the low-risk class.

Experience rating does reduce the impact on honest employers of under-reporting by dishonest employers. However, it does not eliminate the impact, especially for small employers. In this example, if dishonest employers misreport half of their high-risk payroll in a low-risk class and honest and dishonest employers are among the 80% of employers too small to be experience-rated, the honest employer will face approximately twice the premium paid by the dishonest employer. If employers are large enough to have experience rating account for 25% of the Ex-mod, 50% mis-reporting by dishonest employers results in honest employers paying about 1.5 times the rate of the dishonest employers.

Figure 6



[14] Being large enough for full experience rating and self-insurance are no longer the only ways to avoid the impact of fraudulent reporting by dishonest employers. The workers' compensation insurance market in California changed dramatically in the mid-1990s with the introduction of very large-deductible policies. By the mid-2000s, large-deductible policies accounted for approximately 1/3rd of total written premium (premium before adjustment for deductible policies).

There is a very important "take away" conclusion from this analysis. A small fraction of employers, but a large fraction of employment is concentrated in employers that are self-insured, insure under large deductible policies, or are nearly fully experience rated. These employers are virtually outside the insurance premium process and, consequently, unaffected by reporting by dishonest employers. However, for the majority of employers who are too small to self-insure and are partially, or not at all experience rated, experience rating only partially controls for the fraudulent behavior of dishonest employers.

In addition, assuming that honest employers have a large incentive and dishonest employers have little incentive to self-insure, the exclusion of a large fraction of injury experience and payroll through self-insurance (and possibly large deductible policies) means that the calculation of appropriate premium rates is more heavily reliant on the experience of dishonest employers. The 80% of employers that are too small to be experience rated at all will be very adversely affected by fraudulent behavior.

4.0 Discussion and Conclusions

These analyses find that despite auditing by insurers and the WCIRB and penalties for fraudulent reporting imposed by statute and regulation, dishonest employers are significantly and substantially under-reporting or misreporting payroll to insurers. In so doing, dishonest employers are gaining unfair advantage relative to honest employers in two ways. First, dishonest employers shift part premium payment onto honest employers. Second, by avoiding premiums, they can price their products or services unfairly relative to honest employers.

Table 3 gives estimates for the extent to which payroll is under-reported for employers in California.

***Table 3* - Under-reported Payroll ($ billions)**
Percent of Under-reported Private Industry Payroll in Parentheses*

Year	Average Premium Rate (as of 1/1/YY) $/$100 payroll	Assuming 0.92 as baseline	Assuming 0.957 as baseline
1997	$2.47	19.5 (6%)	31.3 (10%)
1998	$2.35	23.4 (7%)	37.0 (11%)
1999	$2.30	18.1 (5%)	32.6 (9%)
2000	$2.68	34.2 (8%)	50.4 (12%)
2001	$3.49	68.4 (15%)	85.7 (19%)
2002	$4.28	88.3 (19%)	106.0 (23%)

*Total wage estimates based on Current Population Survey

Two estimates of "full reporting" are presented. In the first column, it is estimated that between $19 billion and $106 billion in payroll, depending upon the year and definition of full reporting, is under-reported for premium calculations. This accounts for 6% to 23% of total payroll for employers required to purchase insurance. It should be noted that these estimates are based on calculating payroll from the CPS. The CPS is thought to do a good job of accurately including the "grey economy" in employment and earnings estimates (Roemer, 2002). That is, jobs, where the work is paid cash "under the table" that is unreported for tax withholding, unemployment insurance and other payroll-related programs, are included in the total payroll calculations. These earnings are, by definition, excluded from standard wage and salary estimates, such as those based on payroll reporting to the California Employment Development Department Base Wage File.

It is also noted that whether a worker is employed or self-employed is based on the survey respondents' answers to a series of questions. The self-reported employment status may include error for a number of reasons (Roemer, 2002). The most important reason is that being paid as an independent contractor, which would not require an employer to supply workers' compensation insurance, is based on a legal definition, not always clear to parties, particularly workers. However, since California's statute defines legal independent contracting in a very narrow way, it is not likely that workers are systematically over-reporting status as "employed" rather than "self-employed." On the other hand, there is evidence that employers in risky industries, for example construction, erroneously or fraudulently assign independent contractor status to a significant fraction of workers.

Including the grey economy wages and possibly a substantial portion of illegally defined independent contractor payments in the total wage calculation will increase the percent of wages that this study calculates as unreported for workers' compensation. However, those inclusions are appropriate and hence give more accurate estimates of payroll that is unreported for premium calculations.

The most important aspect of these findings is that under-reporting and misreporting of payroll result in premium rates in the highest-risk class codes that are several times the rate the employers would experience under full reporting. In these classes, honest employers are paying substantially more, up to eight times more, for workers' compensation than actual experience would imply is accurate. This is a substantial transfer of income and profits from honest employer to dishonest employers. This transfer compounds the competitive disadvantage faced by honest employers. It is important for the state to improve reporting in order to level the playing field for employers who try to play by the rules.

It should be noted that nothing in this analysis suggests that insurers are facing losses because employers are under-reporting or misreporting payroll. These actions do not affect insurer profits, at least in the aggregate across insurers, as long as the premium rates that are charged by insurers reflect the impact of fraudulent reporting. For example, w a surprisingly large degree of under-reporting in the high-risk class codes is observed. However, premium rates that appear to be high enough to compensate insurers for the observed under-reporting are also observed. Consequently, on net, insurers are unaffected.

Similarly, the small percentage of firms that are able to self-insure, purchase large-deductible policies, or are large enough to be completely experience-rated are unaffected by the fraudulent under-reporting. These employers essentially face costs that are independent of the pure

premium rate recommendation of the WCIRB and CDI. In addition, they are also outside the actual premium rate setting of the insurance companies. However, they are not immune from the competitive disadvantage they face when competing with employers who fraudulently report.

Because the problems with reporting are so large, create significant costs and disadvantages for honest employers, and have only limited impact on insurers and large employers, there is an important role to be played by CHSWC and the CDI in ensuring that employers report accurately.

5.0 Recommendations

Suggested recommendations include:

1. The Legislature, California Department of Insurance, Department of Industrial Relations/Division of Labor Standards and Enforcement could push for more aggressive enforcement against under-reporting and misreporting. This could include:
    a. Focusing more Fraud Assessment Commission funding on premium fraud,
    b. Raising the civil penalties for premium fraud, and/or
    c. Raising the criminal penalties for premium fraud.
2. The Test Audit Program that monitors insurer audits of policyholders is currently operated by the Workers' Compensation Insurance Rating Bureau, an insurance industry association. The California Department of Insurance might consider the suggestion of some observers and have this process conducted by a separate, private contractor.
3. The results of the Test Audit Program are not public record. The Bureau's Governing Committee discusses the audit program results and takes actions against individual insurers. However, these discussions are not public and the public members of the Governing Committee are not allowed to be present for these discussions. Insurer compliance might be improved if these discussions and results were open for public scrutiny.
4. Employers report payroll data to the Employment Development Department (EDD) for tax withholding and unemployment and disability insurance. These records could be matched to employers' reporting to insurers for premium purposes. Currently this avenue is limited by restrictions on insurer access to EDD data. Legislation could simplify this basic audit procedure.
5. The Franchise Tax Board receives large amounts of information that could be used to identify fraudulent under-reporting. These data include income information from both employers and workers that could be used to identify fraudulent use of independent contractor status. Again, access to these data is heavily restricted and legislation might be needed to facilitate access for investigators.
6. Professional employment organizations (PEOs) have been cited as a frequently method for employers to avoid the consequences of high experience modifiers or to disguise the risky nature of workers' occupations. However, to date there has been no systematic study of the size or scope of the PEO market or the claims experience of PEOs. At a minimum, the state should undertake a study to gauge the impact of PEOs in the workers' compensation market.

7. Recently, at least one insurer very large national insurer was fined for systematically under-reporting premium in several states (Bloomberg News, 5/26/07). It is unclear whether the under reporting extended to payroll and occurred in California. If this extended to California, then the estimates of under-reporting could include fraudulent behavior by at least one insurer, not just employers. This should be a high priority for study by CHSWC and CDI.
8. Even more critical, if one or more insurers under-reported payroll and premium, there is a strong possibility that this action could have affected individual employers experience modification. In the aggregate, insurer under-reporting could also have elevated pure premium rates set by the WCIRB and CDI. Again, this should be a high priority area for CHSWC and CDI study.

6.0 Caveats and Concerns

There are several caveats that should be considered when evaluating the report's conclusions. First, some observers may challenge whether the results are driven by premium rates or some other, unobserved or omitted variable that is also correlated with REPORTING. For example, legitimate payroll exclusions, such as overtime, shift pay, or very high salary income, may be positively correlated with premium rate. However, we do not have any a priori reason to think there is a positive correlation. And, the correlation would have to be unrealistically strong. The results imply exclusion of a significant fraction, even a majority of wage income in high premium classes.

Even if there are omitted variables, the study has shown a strong relationship between fraudulent reporting and higher premiums. We believe that high premiums give incentives to misreport and that misreporting leads to higher premiums. Regardless if it is actually the premiums that employers are avoiding, or if it is simply risk-taking behavior, it is clear that higher premium classes induce more cheating and honest employers are hurt.

As noted above, employers are only one source of fraudulent under-reporting. Recently one very large, national insurer was fined in excess of $300 million for systematically under-reporting premium for states' assessments. At present, it is unclear if this systematic under-reporting extended to California and whether it affected reported exposure, or just the premium calculation. If one or more insurers systematically under-reported payroll and premium to avoid paying state assessments, an unknown portion of fraudulent under-reporting would not arise from employer actions, but rather the parties (insurers and brokers) with whom they interact when purchasing insurance.

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Appendix 1

Workers' Compensation Law Pertaining to Employers

LABOR CODE SECTION 3700-3709.5

3700. Every employer except the state shall secure the payment of compensation in one or more of the following ways:

(a) By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state.

(b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer, or as one employer in a group of employers, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees.

(c) For any county, city, city and county, municipal corporation, public district, public agency, or any political subdivision of the state, including each member of a pooling arrangement under a joint exercise of powers agreement (but not the state itself), by securing from the Director of Industrial Relations a certificate of consent to self-insure against workers' compensation claims, which certificate may be given upon furnishing proof satisfactory to the director of ability to administer workers' compensation claims properly, and to pay workers' compensation claims that may become due to its employees. On or before March 31, 1979, a political subdivision of the state which, on December 31, 1978, was uninsured for its liability to pay compensation, shall file a properly completed and executed application for a certificate of consent to self-insure against workers' compensation claims. The certificate shall be issued and be subject to the provisions of Section 3702.

For purposes of this section, "state" shall include the superior courts of California.

3700.1. As used in this article:

(a) "Director" means the Director of Industrial Relations.

(b) "Private self-insurer" means a private employer which has secured the payment of compensation pursuant to Section 3701.

(c) "Insolvent self-insurer" means a private self-insurer who has failed to pay compensation and whose security deposit has been called by the director pursuant to Section 3701.5.

(d) "Fund" means the Self-Insurers' Security Fund established pursuant to Section 3742.

(e) "Trustees" means the Board of Trustees of the Self-Insurers' Security Fund.

(f) "Member" means a private self-insurer which participates in the Self-Insurers' Security Fund.

(g) "Incurred liabilities for the payment of compensation" means the sum of an estimate of future compensation, as compensation is defined by Section 3207, plus an estimate of the amount necessary to provide for the administration of claims, including legal costs.

3700.5. (a) The failure to secure the payment of compensation as required by this article by one who knew, or because of his or her knowledge or experience should be reasonably expected to have known, of the obligation to secure the payment of compensation, is a misdemeanor punishable by imprisonment in the county jail for up to one year, or by a fine of up to double the amount of premium, as determined by the court, that would otherwise have been due to secure

the payment of compensation during the time compensation was not secured, but not less than ten thousand dollars ($10,000), or by both that imprisonment and fine.

(b) A second or subsequent conviction shall be punished by imprisonment in the county jail for a period not to exceed one year, by a fine of triple the amount of premium, or by both that imprisonment and fine, as determined by the court, that would otherwise have been due to secure the payment of compensation during the time payment was not secured, but not less than fifty thousand dollars ($50,000).

(c) Upon a first conviction of a person under this section, the person may be charged the costs of investigation at the discretion of the court. Upon a subsequent conviction, the person shall be charged the costs of investigation in addition to any other penalties pursuant to subdivision (b). The costs of investigation shall be paid only after the payment of any benefits that may be owed to injured workers, any reimbursement that may be owed to the director for benefits provided to the injured worker pursuant to Section 3717, and any other penalty assessments that may be owed.

INSURANCE CODE SECTION 11880-11881

11880. (a) It is unlawful to make or cause to be made any knowingly false or fraudulent statement, whether made orally or in writing, of any fact material to the determination of the premium, rate, or cost of any policy of workers' compensation insurance issued or administered by the State Compensation Insurance Fund for the purpose of reducing the premium, rate, or cost of the insurance. Any person convicted of violating this subdivision shall be punished by imprisonment in the county jail for one year, or in the state prison for two, three, or five years, or by a fine not exceeding fifty thousand dollars ($50,000), or double the value of the fraud, whichever is greater, or by both imprisonment and fine.

(b) Any person who violates subdivision (a) and who has a prior felony conviction of the offense set forth in that subdivision shall receive a two-year enhancement for each prior conviction in addition to the sentence provided in subdivision (a). The existence of any fact that would subject a person to a penalty enhancement shall be alleged in the information or indictment and either admitted by the defendant in open court, or found to be true by the jury trying the issue of guilt or by the court where guilt is established by plea of guilty or nolo contendere or by trial by the court sitting without a jury.

11881. Whenever in Chapter 4, Part 3, Division 2 of the Insurance Code the term "State Industrial Accident Commission" or "Industrial Accident Commission" or "commission" or "director" or similar designation occurs, it means the Board of Directors of the State Compensation Insurance Fund except when such meaning is inconsistent with the intent and context of said chapter.

INSURANCE CODE SECTION 11760

11760. (a) It is unlawful to make or cause to be made any knowingly false or fraudulent statement, whether made orally or in writing, of any fact material to the determination of the premium, rate, or cost of any policy of workers' compensation insurance, for the purpose of reducing the premium, rate, or cost of the insurance. Any person convicted of violating this

subdivision shall be punished by imprisonment in the county jail for one year, or in the state prison for two, three, or five years, or by a fine not exceeding fifty thousand dollars ($50,000), or double the value of the fraud, whichever is greater, or by both imprisonment and fine.

(b) Any person who violates subdivision (a) and who has a prior felony conviction of the offense set forth in that subdivision shall receive a two-year enhancement for each prior conviction in addition to the sentence provided in subdivision (a). The existence of any fact that would subject a person to a penalty enhancement shall be alleged in the information or indictment and either admitted by the defendant in open court, or found to be true by the jury trying the issue of guilt or by the court where guilt is established by plea of guilty or nolo contendere or by trial by the court sitting without a jury.

Appendix 2

The Methodology

Motivation for Class Code Assignment Methodology

The CPS contains detailed employment information for a large, random, representative sample of the US population. The survey assigns both an industry and occupation code to each person in the sample. However, these data are not easily used in research that requires occupational risk as a variable because, prior to this research, there has been no link established between the two dimensions of industry and occupation and the third dimension of relative occupational risk. Supplementing CPS occupation/industry data with a relative risk level has widespread applications for research related to insurance, short and long-term disability, workers' compensation, medical economics and other public health and public policy concerns.

A person's industry code is determined by her response to the census question: "What kind of business or industry is this? What do they make or do where (you/he/she) (work/works?/worked?)" A person's occupation code is determined by her response to the census question: "What kind of work (do/does/did) (name/you) do, that is, what (is/was) (your/his/her) occupation? (For example: plumber, typist, farmer.)" The two dimensional classification allows for such occupation-industry pairs as first line supervisor-construction works or first line supervisor-retail grocery.

The differing industries, in the example above, provide further insight into what kinds of hazards a supervisor might face. In other cases, the industry might not add much insight into occupational risks, e.g. typist-banking versus typist-real estate.

In many cases, occupations within different industries face unique occupational hazards, as in the supervisor example. Inasmuch, we seek to assign appropriate risk level indicators to each CPS occupation within each CPS industry.

The California Department of Workers' Compensation (DWC) uses a unique "class code" system to assign relative risk levels to all workers in the state. Every worker is assigned a class code and each class code is associated with a WC insurance premium based on the occupational risks faced by the worker and is calculated as a percentage of payroll reported by the employer. The DWC calculates the premium value, relative to all other classes, based on risk variable values for each class code. The variables are medical expenditures, indemnity costs, number of total injuries, and number of severe injuries. Relative premium levels tend to be constant across years, whereas nominal values change according to inflation, wage growth, and overall indemnity and medical costs.

In order to assign a relative risk variable to all workers in the CPS database, we utilize a matching algorithm that assigns a WC class code to each industry-occupation pair in the CPS.

The novelty of our system lies in our bridging the disparity between the CPS industry-occupation pairs and DWC relative risk codes. In the 1997-2002[15] CPS data, there are 236 industry classifications and 503 occupation classifications which yield a possible 118,708 pairs. 21,576 unique pairs are actually observed in the CPS data. The DWC defines 501 unique class codes. Our methodology attaches one of 501 class codes to each of the 21,576 CPS pairs but it is capable of assigning codes to any of the possible 118,708 pairs.

Description of the Methodology

In order to best match a WC class code to a given CPS industry-occupation pair, some subjective analysis is required. First, the occupational environments and hazards must be well understood. Most of this occupation research was conducted utilizing the BLS Occupational Handbook's comprehensive occupational descriptions.

The Bureau of Census and the Bureau of Labor Statistics use the same definitions of occupations in their respective analyses. The BLS Occupational Handbook is a comprehensive guide to these occupational definitions and describes five aspects of each occupation: the training and education needed, earnings, expected job prospects, what workers do on the job, and working conditions. These descriptions often include the hazards faced across industries, and the primary industries for occupations. The last two categories proved most helpful in understanding the occupational hazards faced by employees in different industries.

Guided by the BLS definitions, we made an informed judgment as to whether or not occupational risk exposures varied depending on which industry the occupation was paired with. A secretary, for example, is determined to face the same occupational hazards regardless whether he works in retail or in construction. Thus, a secretary is always classified under the WC classification of "Clerical Office Employees." However, an operating engineer presumably faces different hazards if she works in a saw mill versus crop production. In the former case she is assigned the WC classification of "Sawmills or Shingle Mills," and in the latter case she is assigned "Farm Machinery Operation."

In order to make these 49,532 (21,576 pairs from 1997-2002 and 27,956 from 2003-2004) class code assignments based on occupation/industry hazards as described in the Handbook, we employed a matching algorithm. The algorithm assumes as a default, that occupation represents the primary risk and industry represents a secondary risk. The algorithm further involves assigning each occupation in the CPS to one or more primary industry groups.

For each occupation, we assume that either:

[15] Between 2002 and 2003, the Bureau of Census changed industry and occupation coding schemes. All of the industry and occupation codes were changed to four digit numbers; some categories became broader, some narrower, some eliminated, and some were created. Consequently, there is no direct crosswalk from the 1997-2002 CPS coding to the 2003 and beyond codes, we had to develop a specific CPS-DWC cross-walk for each period (although the methodology is symmetric).

a) The occupational risk exposure is the same regardless of which industry it is assigned (e.g. a filing clerk is a filing clerk is a filing clerk). Or,

b) The occupational risk exposure differs between industries

When hazards vary by industry, they vary most markedly within one or more primary industry groups. Medical technicians in different types of health settings, for example, perform different tasks depending on if they are working in a hospital versus a veterinary office, say. It thus makes sense to give their risk exposure a more precise estimate in the health sector, whereas outside of health, it is not obvious which type of tasks they may be performing and they are best categorized generically as lab technicians. In this case "Health" is the primary industry group assigned to this occupation. The CPS industries that fall under our "Health" industry group is comprised of Hospitals, Physician's Offices, Nursing Homes, Dentist Offices, Veterinary Services, etc.

Industries (N=236 in CPS 97-02 and N=271 in CPS 03-04) are divided into 21 primary industry groups based on working environments that affect risk exposure levels for occupations that would be exposed to unique risks within each industry. Occupations (N=503 in both CPS 97-02 and CPS 03-04[*]) are assigned to one or more primary industry groups, within which hazards significantly vary.

We assign a "default" class code to each occupation and to most industries (216 of 236 from CPS 97-02 and 239 of 271 from CPS 03-04). Some industries are not assigned default class codes because either there is not an appropriate classification in the WC system for the unique risks that might be faced for workers within the industry or because all occupations in the industry perform tasks that are most appropriately categorized by the default occupation class code.

The occupation default class code identifies the risk exposure for an occupation whenever it is paired with an industry outside of its primary industry group(s). The industry default class code identifies the unique hazards associated with the working "in the field" of an industry. Whenever an occupation is paired with an industry within its primary industry group, the default *industry* class code is assigned as the output class code. Whenever an occupation is paired with an industry outside of its primary industry group(s), the default *occupation* class code is the output.

Whenever a medical technician works in a "Health" industry, for example, the industry-occupation pair is assigned the default *industry* class code. A medical technician who works in the hospital industry, as described in the CPS data, is assigned the WC class code for "Hospitals" and a medical technician who works in veterinary services is assigned the MEPS class code for "Veterinary Hospitals." A medical technician working in Real Estate–an industry that is not categorized under the primary industry group–would be assigned the default *occupation* class code which we determined to be "Biomedical Research Laboratories."

[*] We did not include military in our assignment since these occupations are very high risk and are insured much differently than civilians.