Online Appendix

Medical Care Spending and Labor Market Outcomes: Evidence from Workers' Compensation Reforms

David Powell and Seth Seabury

A Linking WCIRB and Earnings Data

The WCIRB and earnings data are linked by Social Security Number (SSN). Earnings information was collected from the first quarter of 1998 to the second quarter of 2009. Data are not available for all workers in each quarter, and we cannot discern whether a worker did not work in that quarter, left the state, or was self-employed.

We observed multiple records for some individuals in the quarterly wage files. Multiple records may occur because of name changes, variations in how employers submit name (e.g., submitting "Jon" instead of "Jonathan"), typographical errors, and illegal uses of SSNs. To account for these concerns and capture all wages for an individual within a quarter, we applied the Soundex phonetic filing system to the first and last name and kept records that had only one last name across all employers. To keep individuals with legitimate name changes, we also kept records with multiple last names but only one first name. Due to these selection criteria, approximately 19% of injured workers were not matched to wages.

B Matching Injured to Uninjured Workers

For each injured worker, we selected up to five workers employed at the same firm at the time of injury who had earnings close to the injured worker's over the year prior to injury. 6.6% of our sample only has one match, 5.1% has two matches, 4.0% has three matches, 3.4% has four matches, and 81.0% has five matches. Our results are robust to using only workers with five matches. We define "close" as being within a band equal to the wage of the injured worker plus or minus 15 percent of the log standard deviation of the earnings of all injured workers. The comparison workers were also required to have similar tenure, where tenure is measured using three levels: less than or equal to one year on the job, one to two years, or more than two years. If more than five comparison workers met the matching criteria, we selected the five workers with the lowest absolute value of the difference in wages from the injured workers (ties were decided randomly). We sampled with replacement, meaning that the same comparison workers could be matched to more than one injured worker. If a worker were injured in a later year, however, that worker was not allowed to be a comparison worker. More information about the matching can be found in Seabury et al. (2011).

The selection of the uninjured "control" workers was completed in a secure data facility. We were only permitted to leave the data facility with information about the average earnings of the control workers (by quarter) and the labor force participation rates of the control workers (by quarter). More complicated matching procedures would have been difficult to implement given the available resources and would not have added much value to our analysis. We show in the paper that, on average, these control workers have similar earnings to the injured workers before the injury (see Figures A4 and A5), which was our primary goal for this part of the data collection.

C Sample Selection Adjustment Details

We model sample selection more explicitly by including a sample selection adjustment in our main specification. If selection is important, we should observe: (1) a differential change in the share of injuries which are back injuries; (2) outcome changes should be associated with these composition changes (i.e., selection is only potentially problematic if it is systematic). Our selection instrument is motivated by the testable hypothesis that industries with a higher fraction of severe injuries should experience a relative increase in the number of reported injuries post-reforms (because fewer injuries are reported in other industries). We find that our instrument significantly predicts the number of injuries in each period, ruling out alternative hypotheses about reporting behavior which would suggest that we should not observe this relationship. The selection instrument (h_{jkt}) is a measure of initial severity at the industry level interacted with the post indicator:[1]

$$h_{jkt} \equiv \left(\frac{\text{Number of injuries in 2000 that are in the top 75\% of all permanent injuries}_{jk}}{\text{Number of temporary and permanent injuries in 2000}_{jk}} \right) \times \text{Post}_t.$$

The industry-injury type fixed effects in our main specification account non-parametrically for the independent effects of the pre-reform injury severity measure. We should observe a differential change in the number of injuries reported post-reform based on the initial severity distribution. We model the log of the number of reported injuries ($\ln R_{jkqt}$) as a function of our exogenous variables and h_{jkt}, which is excluded from equation (1).[2]

[1] "Selection" may not occur simultaneously with the effect of the reforms. For example, workers may not change reporting behavior at first but learn through co-workers about changes to the system. Then, there could be a delay in the changes to reporting injuries. This is not problematic for our strategy since we are only concerned with the extent to which selection is correlated with our variable of interest. If selection occurs with a lag, this impacts the relationship between our selection adjustment and the outcomes, but we are interested exactly in how the selection adjustment term is correlated *on average* with outcomes after the reforms, regardless of whether the relationship changes over the post-reform period.

[2] We cannot distinguish between changes in the probability of reporting an incurred injury and changes in the probability of incurring an injury. For our purposes, however, this does not matter. Either of these factors could drive selection, but the selection correction should account for the effects of differential changes in the number of reported injuries for a given industry and injury type regardless of the source.

Intuitively, we are estimating the changes in the number of reported injuries for each industry-injury type cell. Then, we include the predicted number of injuries in the main specification to estimate the independent impact of changes in the number of reported injuries on the outcome variables. By separately identifying this term, we account for possible systematic biases resulting from selection and obtain consistent estimates of the relationship between our outcomes and $\text{Post}_t \times \mathbf{1}(\text{Back Injury}_k)$. More generally, our approach is to find groups/cells that should experience (predictably) smaller compositional changes and use this variation to separately account for sample selection. Given the possibility that any social insurance policy change may impact sample composition, this general approach is a straightforward way to address selection concerns in many public finance contexts.

In the first step of our approach, we estimate the relationship between our covariates, $\text{Post}_t \times \mathbf{1}(\text{Back Injury}_k)$, and h_{jkt} on the log of the number of reported injuries. Using notation similar to Newey (2009), we model selection as

$$\ln R_{jkqt} = W'_{jkqt}\delta + \epsilon_{jkqt},$$

where W includes all exogenous variables in equation (1) and the selection instrument, h_{jkt}. We test that our selection instrument predicts the number of reported injuries and find that it does. The results support the idea that industry-injury types with more severe injuries are less likely to "lose" observations in the post-reform period. Consequently, our selection equation is identified and we can include a prediction of the log of the number of reported injuries for each industry-injury type. Our selection adjustment will refer to this prediction. This term is allowed to have an independent effect on the outcomes, estimating the relationship between changes in the number of reported injuries and the outcomes.

In the second step, we estimate our main specification (equation (1)) while including the predicted log of the number of reported injuries ($W'_{jkqt}\widehat{\delta}$) as a control. This variable is allowed to have its own effect on the outcomes, separately accounting for changes (since we control for industry-injury type fixed effects) in the number of reported injuries over time. We report clustered bootstrap estimates of the 95% confidence intervals to account for the fact that the sample selection adjustment is estimated.

This approach is similar to a selection model which relates the probability of being in the sample to the outcome variable. Note that this approach assumes a constant treatment effect across all industries since the selection adjustment enters additively.

D Non-Medical Components of the Reforms

Our analysis assumes that the California reforms differentially affected low back injuries through medical care generosity changes only. The reforms made other changes to the workers' compensation program, motivating our approach to compare outcome changes for lower back injuries to other injury types to account for the other aspects of the reforms.

We test our assumption here and re-estimate equation (1) using other outcomes that may have been affected by the reforms. We start with replacement rates which were affected by changes in the formula for indemnity benefits. We calculate replacement rates for each worker in our data and then estimate equation (1) with the replacement rate as the outcome variable. Table A4 presents these results in Column (1). There is no evidence that lower back injuries were differentially affected. The point estimates suggest that workers with low back injuries received less generous benefits, implying that they would return to work earlier than workers with other types of injuries.[3]

We are also concerned that the reforms altered the incentives to contest judgments or make settlements. Many workers do not return to work until their dispute is formally resolved (Hyatt (2010)) so differential incentives to litigate claims could impact labor supply behavior. If disputes became more common among workers with low back injuries after the reforms, then we should observe a relative rise in defense costs for these injuries. We study the differential effect of the reforms on total defense costs associated with each claim. Again, we find no evidence that these factors can explain our results, shown in Column (2).

The reforms affected generosity of vocational rehabilitation vouchers.[4] In Column (3), we find little evidence of a relationship with voucher use. Overall, we conclude that workers with lower back injuries did not benefit more or less than workers with other types of injuries due to the reforms on dimensions other than medical care.

E Substitution to Private Insurance

To test for substitution between workers' compensation medical care coverage and private insurance claims in our context, we use administrative claims data from the Truven MarketScan Commercial Claims & Encounter Database for 2002-2006, testing for differential effects beginning in 2004. We select on occupational therapy, physical therapy, and spinal manipulation and adjustment.[5] We use the diagnoses code to categorize each claim by injury type: low back, shoulder, knee, and hand/wrist. MarketScan includes ICD-9 diagnosis codes which permits us to categorize claims into one of four categories: low back, knee, shoulder, and hand/wrist. We searched the literature for ICD-9 codes used by workers' compensation system to appropriately code injuries and medical care. We found several sources and categorized the injuries using the lists included in these papers (Wang et al. (2008); Yang and Fomenko (2012); Silverstein and Adams (2007)).

[3]Alternatively, we could separately identify the effect of changes in the replacement rate from the differential impact of the medical reforms using a simulated instrument strategy (predicting the replacement rate by industry, injury type, and time by applying each period's benefit schedule to a fixed sample) in the spirit of Currie and Gruber (1996). Our results are similar when we use this approach. Our point estimates are -0.072 and -0.098 for medical expenditures and post-injury earnings, respectively.

[4]There is evidence that these vouchers had little impact on returning to work (Seabury et al. (2011)).

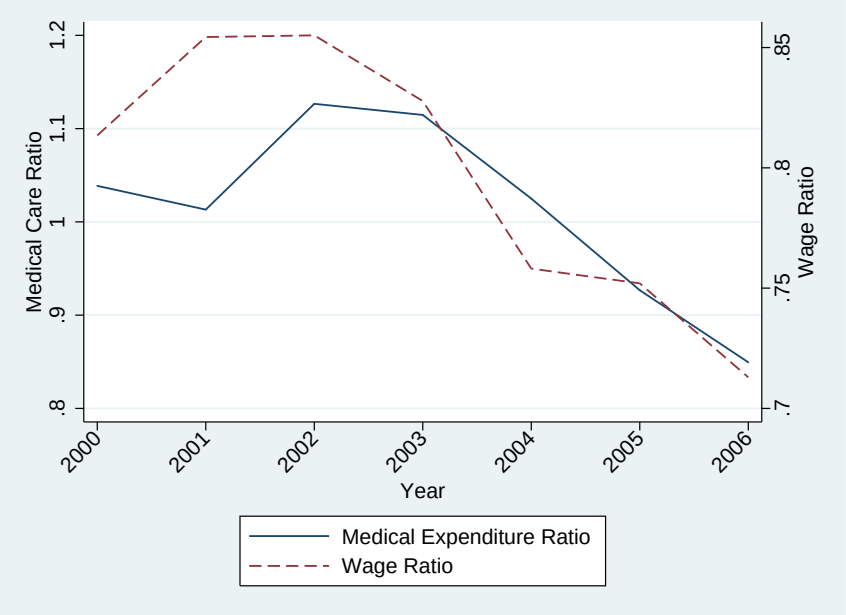
[5]The results of this analysis are not meaningfully changed by examining only one of these categories at a time or by using a broader utilization measure not limited by service types.

We select on individuals ages 18-60. In Figure A16, we graph the trends in number of claims for low back injuries as well as for all other injury types. We do this for the full sample (N=5,927,475) and for a balanced sample of people in the data for the entire time period (N=1,646,500). For the full sample, we observe a small relative decrease in the number of back claims in 2004 and 2005, though the trends for the two groups converge in 2006. When we study the balanced sample, the trends are relatively similar to each other. There are more back claims relative to other claims in 2003, which is unlikely to result from the reforms. While we consider injuries incurred in 2003 as partially-treated in our main analysis, this is because those injuries are later (potentially) affected by the reforms. Here, we are studying claims at time of care (not time of injury) so 2003 is an untreated year. Overall, we find little evidence that private claims are increasing in response to the reforms. Regression analysis supports this conclusion as all estimates are negative, small, and statistically insignificant. Results are similar if we use expenditures instead of number of claims.

Note that we only observe privately-insured claims so we miss utilization from the uninsured. However, the uninsured should be even less likely to pay for their own treatment since they must pay full price for medical services.

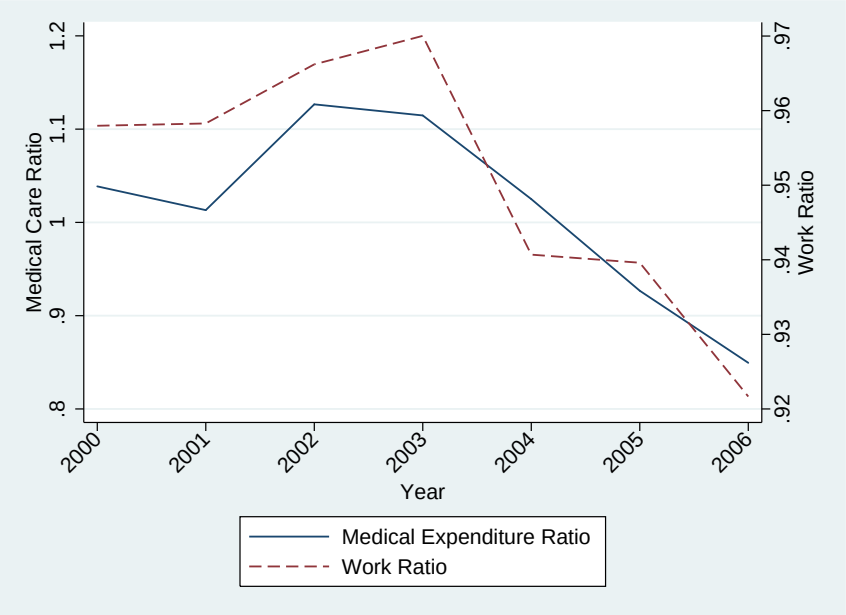
F Online Appendix Figures and Tables

Figure A1: Relative Trends in Medical Expenditures and Labor Earnings



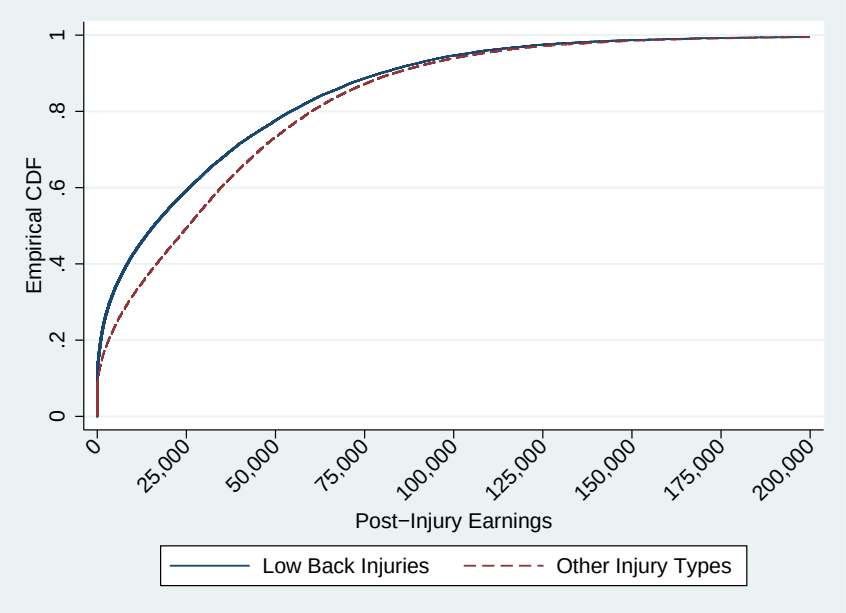
Notes: Calculations made using 2000-2006 WCIRB data (N=189,253). The ratios are defined as the mean for low back injuries relative to the mean for other injuries. Other injuries are shoulder, knee, hand/wrist injuries.

Figure A2: Relative Trends in Medical Expenditures and Working Status



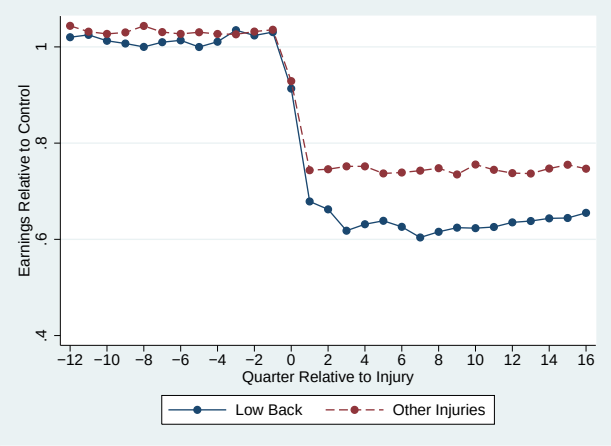
Notes: Calculations made using 2000-2006 WCIRB data (N=189,253). The ratios are defined as the mean for low back injuries relative to the mean for other injuries. Other injuries are shoulder, knee, hand/wrist injuries.

Figure A3: Empirical CDF by Injury Type: 2000-2002

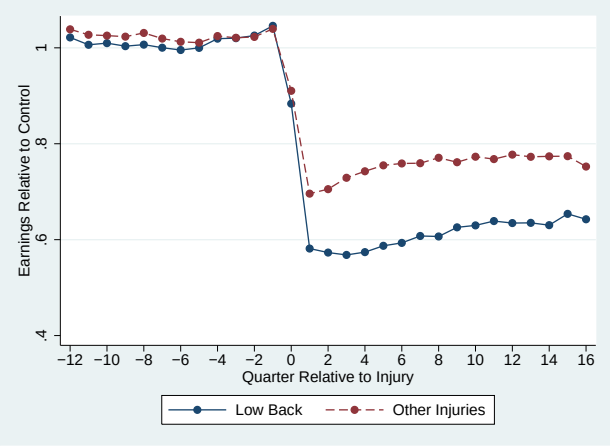


Notes: Calculations made using 2000-2002 WCIRB data. We construct the empirical cumulative distribution functions for low back injuries and other injury types up to $200,000 in post-injury earnings. Earnings are defined for the six quarters after injury.

Figure A4: Earnings Trajectory of Injured Workers



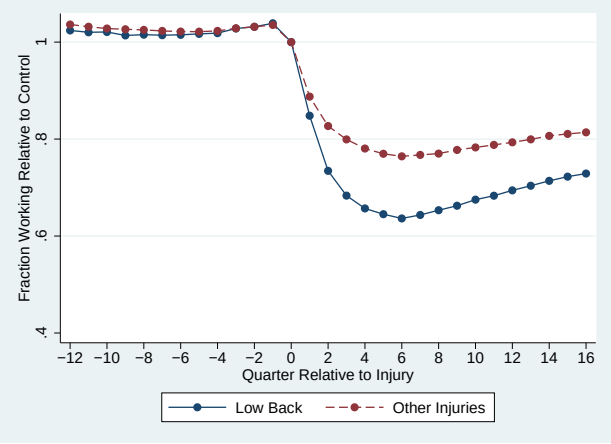
Pre-Reform



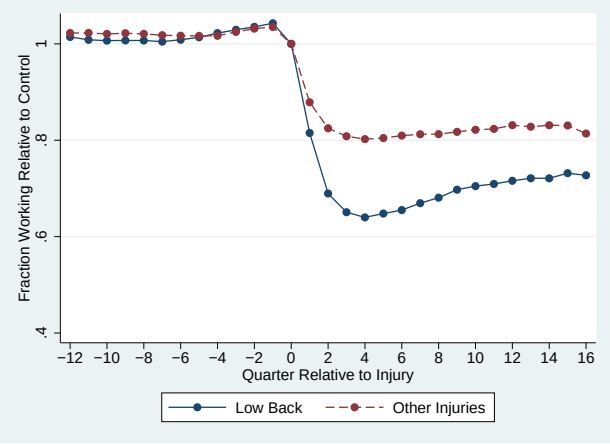
Post-Reform

Notes: Calculations made using 2000-2002 (Pre-Reform) and 2004-2006 (Post-Reform) WCIRB data (158,065 injured workers and 158,065 sets of matched control workers). Earnings expressed as earnings in quarter divided by earnings in quarter of matched control workers. A ratio of 1 means that the injured worker and control workers have equal post-injury earnings.

Figure A5: Employment Trajectory of Injured Workers



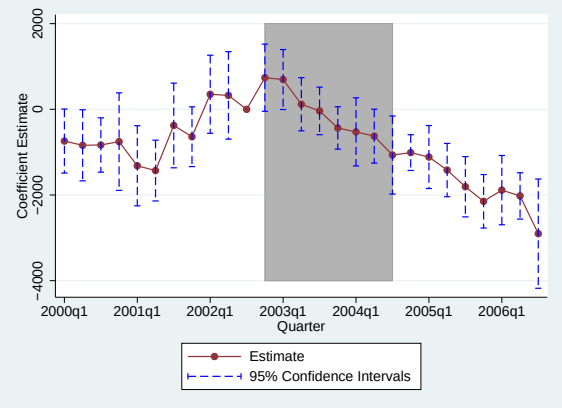
Pre-Reform



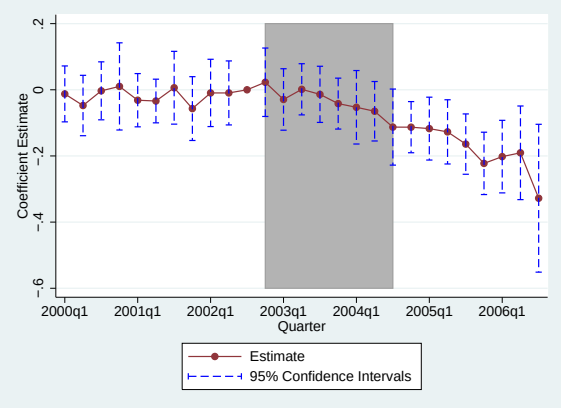
Post-Reform

Notes: Calculations made using 2000-2002 (Pre-Reform) and 2004-2006 (Post-Reform) WCIRB data (158,065 injured workers and 158,065 sets of matched control workers). Fraction of individuals with positive earnings in quarter divided by fraction of individuals with positive earnings of matched control workers.

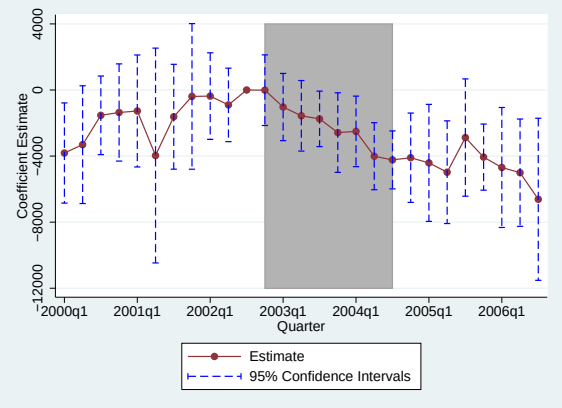
Figure A6: Event Studies: OLS Estimates



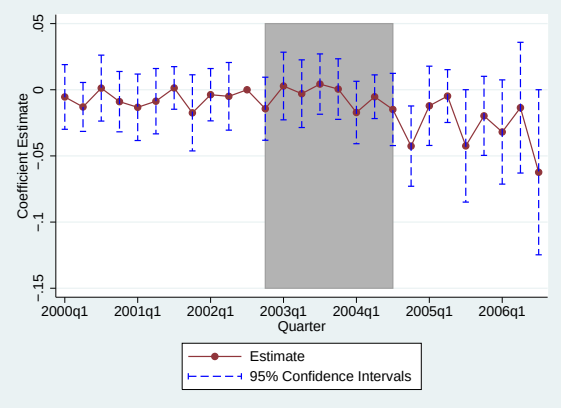
(a) Medical Expenditures



(b) ln(Medical Expenditures)



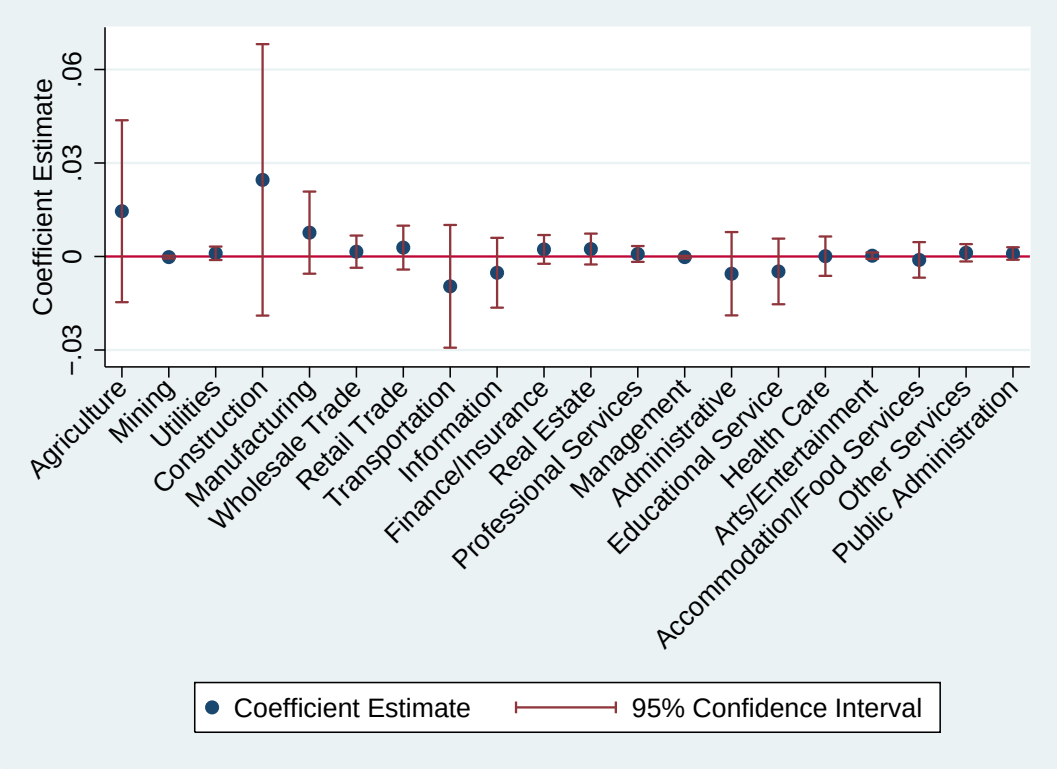
(c) Post-Injury Earnings



(d) 1(Work)

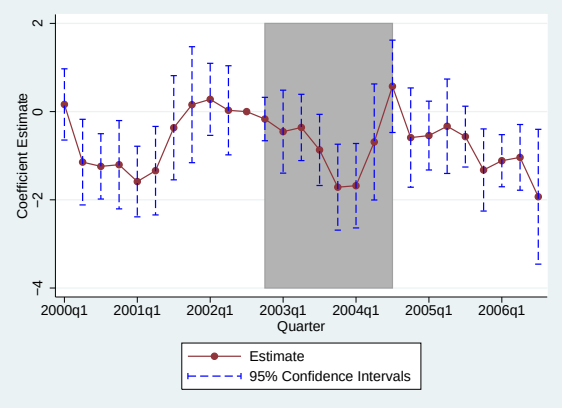
Notes: Each figure represents estimates generated from an event study specification using 2000-2006 WCIRB data (N=189,253). Medical expenditures and post-injury outcomes defined for six quarters post-injury. 1(Work) is equal to 1 for workers with positive post-injury earnings. All specifications include quarter fixed effects and industry-year and industry-injury type interactions, estimated using OLS. The estimates for quarter 3 of 2002 are normalized to zero. Each estimate represents the conditional relationship between low back injuries and the outcome in that quarter. The shaded region represents the "implementation region" in which injuries become increasingly exposed to the medical care reforms. 95% confidence intervals presented, adjusted for clustering at industry-level.

Figure A7: Industry Composition Changes

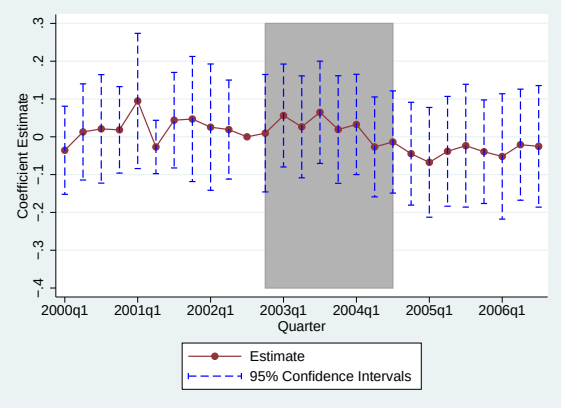


Notes: We present the estimate on Post × Back using 2000-2002 and 2004-2006 WCIRB data (N=158,065). Quarter and injury type fixed effects are included. The outcome is equal to one for the industry listed on the x-axis. None of the estimates are statistically significant from zero (at the 10% level). 95% confidence intervals presented are adjusted for clustering at the industry-level.

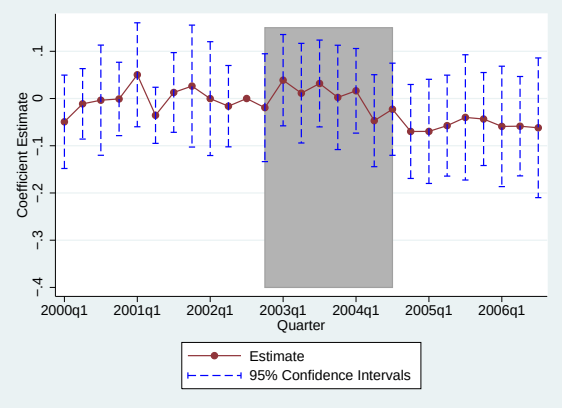
Figure A8: Event Studies: Balance Tests



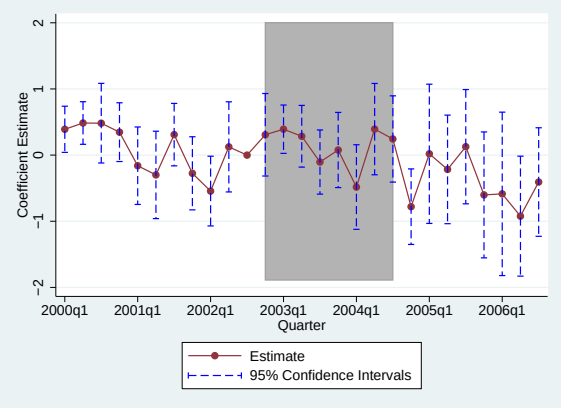
(a) Disability Rating



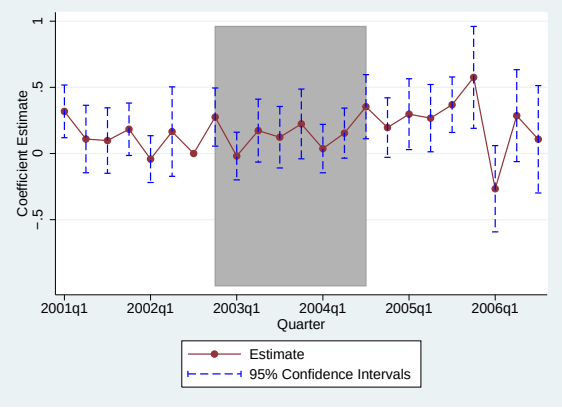
(b) Pre-Injury Earnings



(c) Control Wages



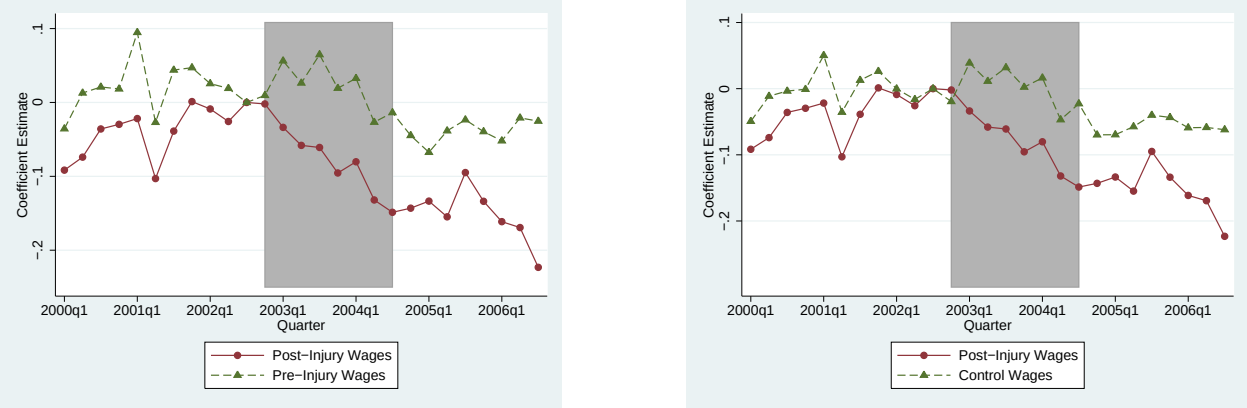
(d) Age



(e) Tenure

Notes: Each figure represents estimates generated from an event study specification. The first two rows use 2000-2006 WCIRB data (N=189,253). Disability Rating is the administrative impairment level between 0 and 100 as determined by a qualified medical evaluator. Pre-injury earnings are the total earnings in the six quarters prior to the injury. Control Wages are the average earnings of matched control workers in the six quarters after the injured worker's injury. Tenure is the total number of years worked at the firm in which injury occurred. The age event study uses DEU data for 2000-2006 (N=115,337); the tenure event study uses DEU data for 2001-2006 (N=93,243) since tenure is not observed before 2001 in the data. All specifications include quarter fixed effects and industry-year and industry-injury type interactions. Figures (a), (d), and (e) are estimated using OLS; Figures (b) and (c) are estimated using Poisson. 95% confidence intervals presented, adjusted for clustering at industry-level. The estimates for quarter 3 of 2002 are normalized to zero. Each estimate represents the conditional relationship between low back injuries and the outcome in that quarter. The shaded region represents the "implementation region" in which injuries become increasingly exposed to the medical care reforms.

Figure A9: Comparing Event Study Earnings Results



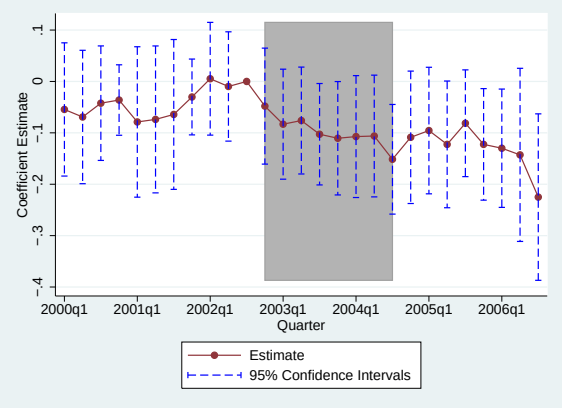
(a) Pre-Injury Earnings

(b) Control Earnings

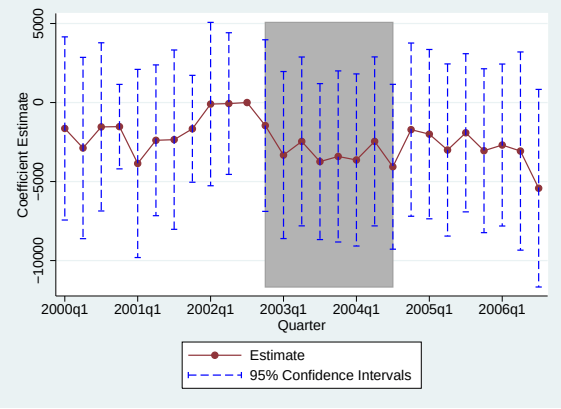
Notes: Both figures include the event study estimates for post-injury earnings already shown in Figure 3b. Post-injury earnings are the total earnings earned by the injured worker in the six quarters after the injury. Pre-injury earnings are the total earnings earned by the injured worker in the six quarters prior to the injury. Control Wages are the average earnings of matched control workers in the six quarters after the injured worker's injury. The left figure repeats Figure A8(b); the right figure repeats Figure A8(c). Each figure represents estimates generated from event study specifications using 2000-2006 WCIRB data (N=189,253). All specifications include quarter fixed effects and industry-year and industry-injury type interactions and are estimated using Poisson regression.

Figure A10: Triple Difference Event Studies (Injured and Control Workers)

Post-Injury Earnings

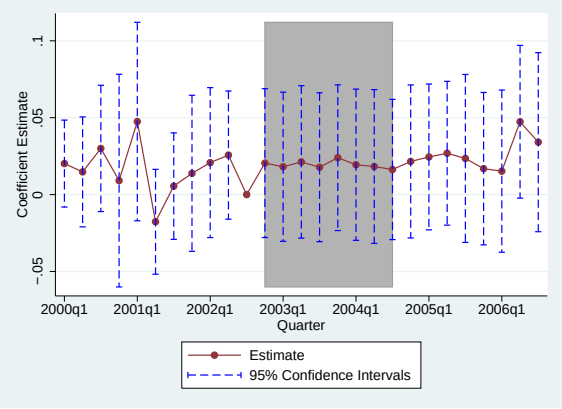


(a) Poisson

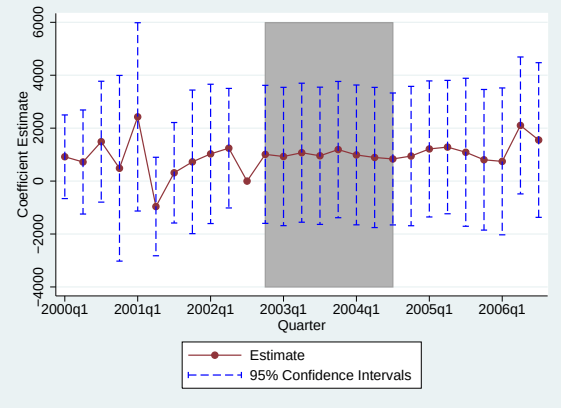


(b) OLS

Pre-Injury Earnings (Placebo)



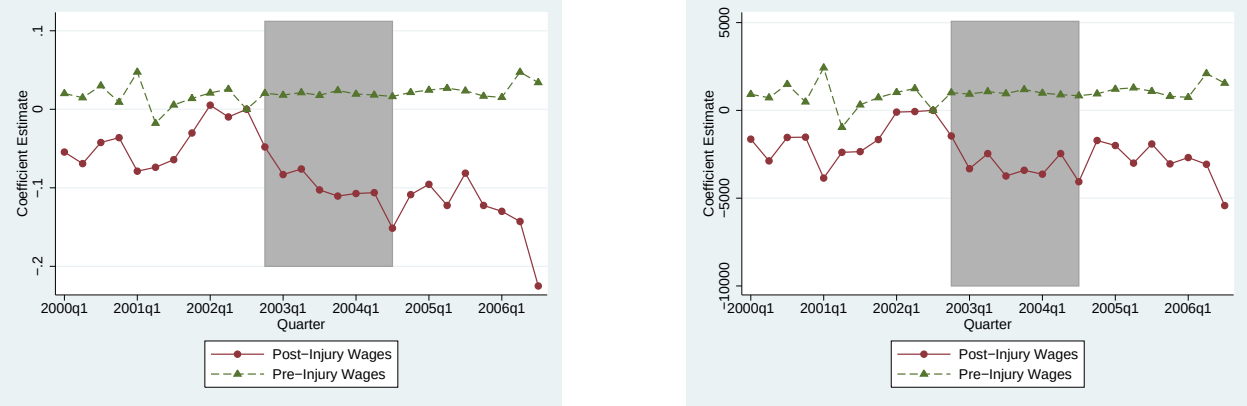
(c) Poisson



(d) OLS

Notes: Each figure represents estimates generated from a triple difference event study specification using 2000-2006 WCIRB data (N=378,506). Post-injury earnings are the total earnings earned by the injured worker (or the control workers) in the six quarters after the injury. Pre-injury earnings are the total earnings earned by the injured worker in the six quarters prior to the injury. All specifications include industry-quarter-group, injury type-group, and quarter-industry-injury type interactions where "group" is either injured or control workers. Estimates are normalized to 0 in 2002, quarter 3. Each estimate represents the conditional relationship between low back injuries for the injured workers and the outcome in that quarter. 95% confidence intervals presented, adjusted for clustering at industry-level.

Figure A11: Comparing Triple Difference Event Study Earnings Results

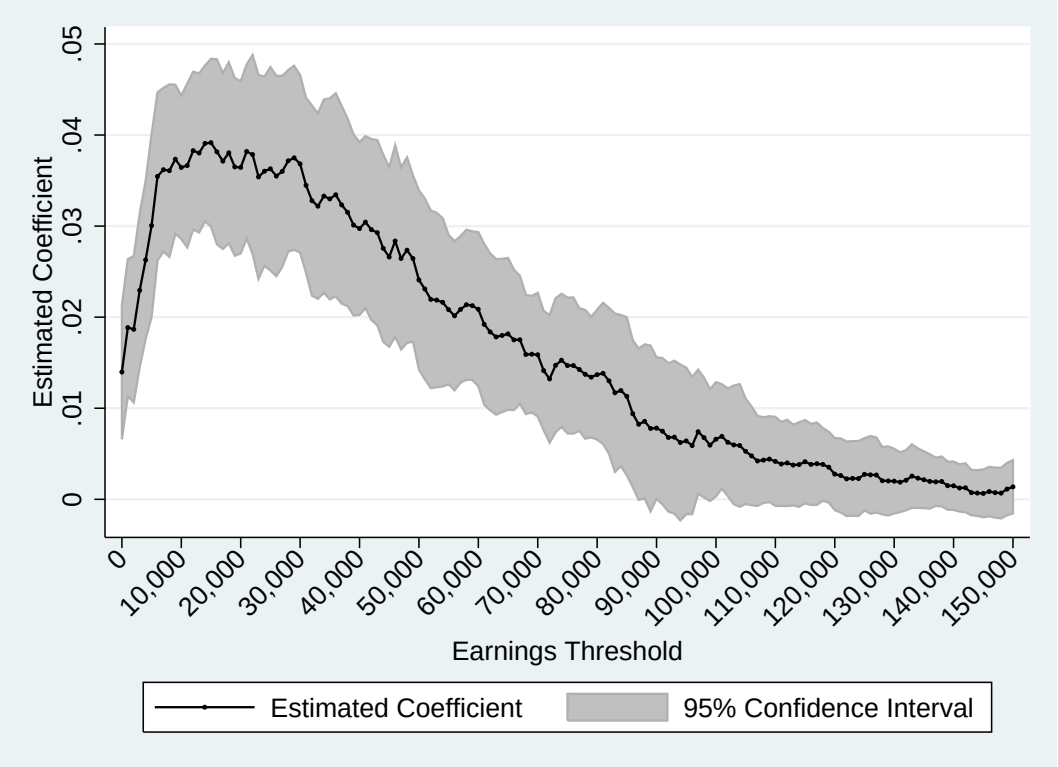


(a) Poisson

(b) OLS

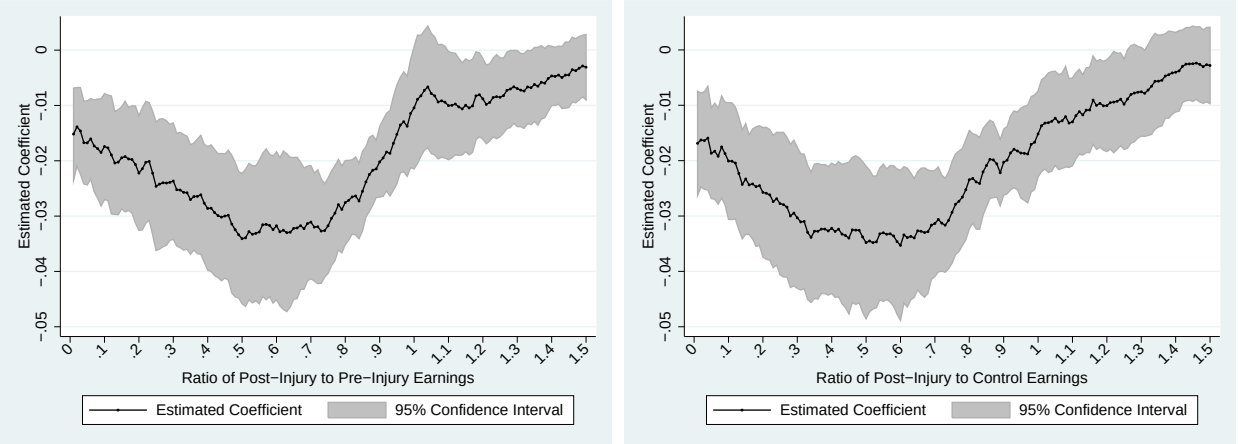
Notes: Each figure represents estimates generated from a triple difference event study specification using 2000-2006 WCIRB data (N=378,506). Post-injury earnings are the total earnings earned by the injured worker (or the matched control workers) in the six quarters after the injury. Pre-injury earnings are the total earnings in the six quarters prior to the injury. All specifications include industry-quarter-group, injury type-group, and quarter-industry-injury type interactions where "group" is either injured or control workers. The figure on the left includes estimates already shown in Figures A10(a) and (c). The figure on the right includes estimates shown in Figures A10(b) and (d). Confidence intervals suppressed.

Figure A12: Estimates of Effect on Cumulative Distribution Function



Notes: We present the estimate on Post × Back in a linear probability model using 2000-2002 and 2004-2006 WCIRB data (N=158,065). Industry-injury type interaction, quarter of injury fixed effects, and industry-year fixed effects are included the model. The outcome is $\mathbf{1}(\text{Earnings} < s)$ where s is the value on the x-axis. Positive estimates imply an increased likelihood of earning less than s. 95% confidence intervals are adjusted for clustering at the industry-level.

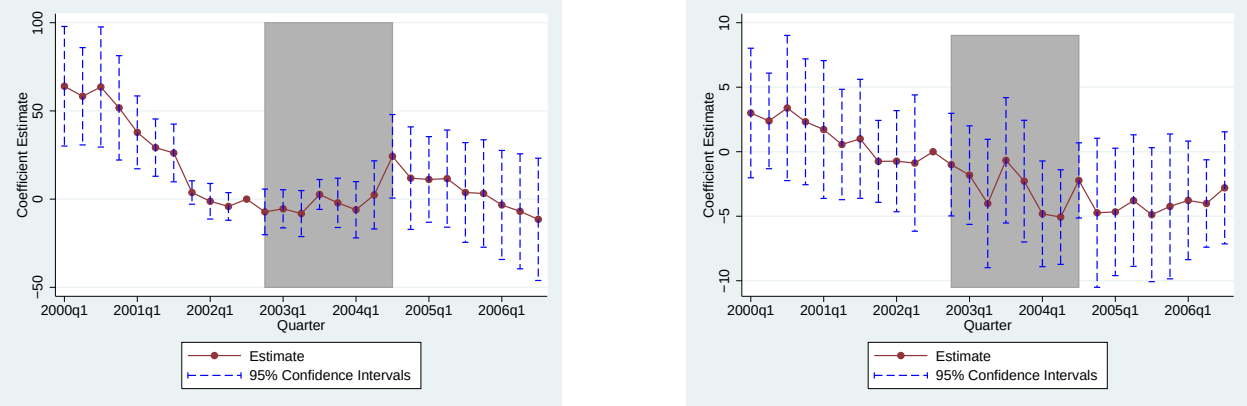
Figure A13: Differential Effect on Reaching Fixed Percentage of Prior Earnings or Control Workers' Earnings



Pre-Injury Earnings | Control Working Earnings

Notes: Each point represents the coefficient on Post × Back for outcome equal to $\mathbf{1}$(Post-Injury Labor Earnings $> s \times$ Pre-Injury Labor Earnings), where s is defined by the number on the x-axis, from a linear probability model using 2000-2002 and 2004-2006 WCIRB data (N=158,065). The right hand figure uses each individual's control workers' post-injury earnings. A negative coefficient implies that workers with low back injuries had a decreased chance of reaching that fraction of their prior earnings (or the earnings of their control workers). All regressions condition on industry-injury type indicators, quarter indicators, and industry-year interactions. Confidence intervals are adjusted for within-industry clustering.

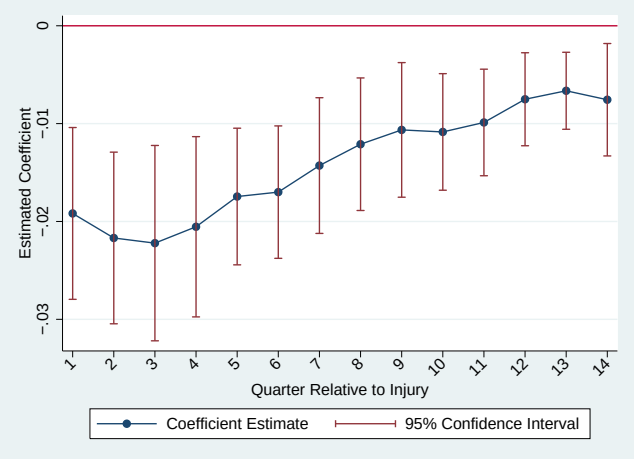
Figure A14: Event Studies: Number of Injuries



(a) California | (b) Oregon

Notes: The outcome is the number of claims for a cell defined by quarter of injury, industry, and injury type (Number of cells=2800). Each event study specification includes interactions for each quarter-industry and industry-injury type. We graph the estimates associated with 1(Back) interacted with each quarter of injury indicator. 95% confidence intervals are adjusted for clustering at the industry level. The left figure uses 2000-2006 WCIRB data; the right figure uses 2000-2006 administrative workers' compensation claims from the Oregon Department of Consumer and Business Services, Workers' Compensation Division. Estimates are normalized to 0 in 2002, quarter 3. Each estimate represents the conditional relationship between low back injuries and the number of injuries in that quarter.

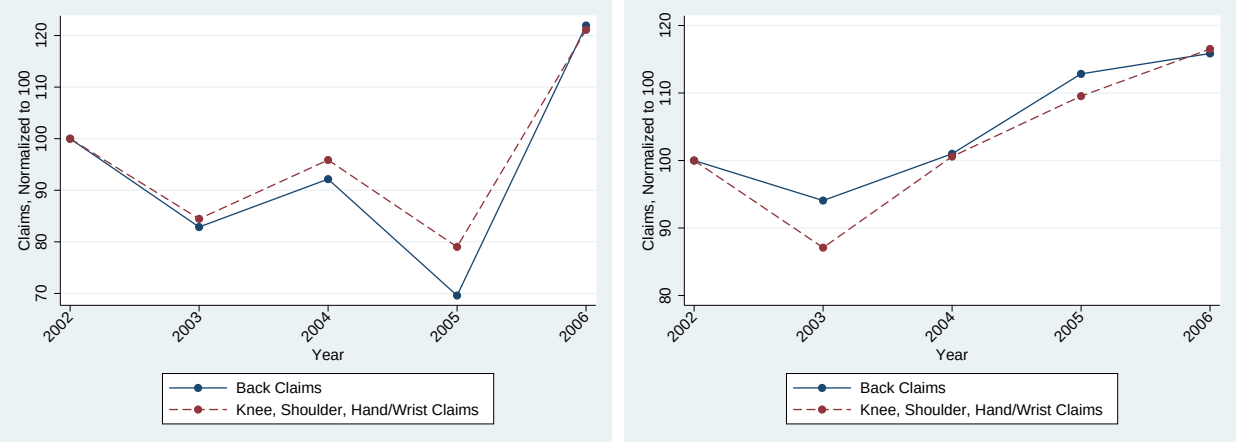
Figure A15: Differential Effects on Injury Duration



Notes: Using 2000-2002 and 2004-2004 WCIRB data, a linear probability model is estimated in which the outcome is equal to 1 if the worker has positive earnings up to that point in time since the injury. The model includes quarter of injury fixed effects, industry-injury type interactions, and industry-year interactions. We only have data for the full sample for 6 quarters post-injury (N=158,065). For the subsequent quarters, we have longer post-injury periods in the earlier years. Thus, the sample composition is changing after 6 quarters. Confidence intervals are adjusted for clustering at the industry level.

Figure A16: Private Medical Claims

Low Back Injuries Relative to All Other Injuries:



Full Sample Balanced Sample

Notes: Using Truven MarketScan Commercial Claims & Encounter Database for 2002-2006, we categorize claims using diagnosis codes by body part and by type of service, limiting claims to occupational therapy, physical therapy, and chiropractic care. The sample composition is the same for the two categories. Each time series is normalized to 100 in 2002. On the left, we use the full sample (N=5,927,475). On the right, we perform the same analysis but only use individuals in each year of the sample (N=1,646,500).

Table A1: Summary Statistics

	Low Back Injuries		Other Injuries	
	Mean	Standard Dev.	Mean	Standard Dev.
Medical Expenditures	$9,544.73	$14,434.37	$9,298.15	$10,984.29
Pre-Injury Earnings (6 quarters)	$46,023.22	$53,131.57	$47,967.25	$89,068.98
Post-Injury Earnings (6 quarters)	$29,345.27	$99,658.95	$35,871.86	$86,623.27
Fraction Working within First 6 Quarters	0.87	0.34	0.91	0.28
Fraction with Post-Injury Earnings $\geq$ Pre-Injury Earnings	0.24	0.43	0.30	0.46
Fraction with Post-Injury Earnings $\geq 0.75 \times$ Pre-Injury Earnings	0.39	0.49	0.50	0.50
Fraction with Post-Injury Earnings $\geq 0.5 \times$ Pre-Injury Earnings	0.50	0.50	0.63	0.48
Fraction with Post-Injury Earnings $\geq 0.25 \times$ Pre-Injury Earnings	0.61	0.49	0.74	0.44
Fraction with Post-Injury Earnings $\geq$ Control Earnings	0.23	0.42	0.30	0.46
Fraction with Post-Injury Earnings $\geq 0.75 \times$ Control Earnings	0.37	0.48	0.49	0.50
Fraction with Post-Injury Earnings $\geq 0.5 \times$ Control Earnings	0.48	0.50	0.49	0.49
Fraction with Post-Injury Earnings $\geq 0.25 \times$ Control Earnings	0.60	0.49	0.44	0.44
Fraction of Injuries that are Permanent	0.62	0.48	0.65	0.48
Severity Rating	19.9	14.5	16.3	13.0
N	50,342		107,723	

Notes: WCIRB data for 2000-2002, 2004-2006 injuries. "Other Injuries" are shoulder, knee, and hand/wrist injuries. All dollar values reported in 2006 dollars. "Control Earnings" refer to the earnings of the control workers. Severity ratings are conditional on being a permanent injury.

Table A2: Relationship Between Medical Expenditures and Post-Injury Earnings

	(1)	(2)	(3)	(4)
Outcome:	**Post-Injury Earnings** (Mean=$33,793)			
ln(Medical Expenditures)	-0.030***	-0.029***	-0.029***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)
Fixed Effects:	Year Injury Type	Quarter Injury Type	Quarter Industry x Injury Type Industry x Year	Quarter Industry x Injury Type Industry x Year Severity Rating x Year

Notes: WCIRB data for 2000-2002, 2004-2006 injuries: N=158,065. ***Significance 1%, ** Significance 5%, * Significance 10%. Standard errors in parentheses adjusted for clustering at industry level. Post-injury earnings are defined as total earnings in the six quarters post-injury; medical expenditures are total medical care costs in six quarters post-injury. The "Fixed Effects" row lists all the fixed effects included in the column's model. "Severity Rating" refers to the official measure of impairment assigned to injured workers.

Table A3: Balance Tests

	(1)	(2)	(3)
Outcome:	Disability Rating	Disability Rating (2000-2004)	Pre-Injury Wages
Post x Back Injury	-0.085	0.065	-0.029
	(0.266)	(0.355)	(0.026)
Mean	11.037	11.949	47,256.44
	(4)	(5)	(6)
Outcome:	Control Wages	Age	Tenure
Post x Back Injury	-0.029	-0.249	0.055
	(0.025)	(0.170)	(0.096)
Mean	47,886.75	43.62	8.36

Notes: WCIRB data for 2000-2002, 2004-2006 injuries: N=158,065. ***Significance 1%, ** Significance 5%, * Significance 10%. Standard errors in parentheses adjusted for clustering at industry level. Disability Rating is the administrative impairment level between 0 and 100 as determined by a qualified medical evaluator. We assign temporary injuries a disability rating of 0 (see footnote 36). Pre-injury earnings are the total earnings in the six quarters prior to the injury. Control Wages are the average earnings of matched control workers in the six quarters after the injured worker's injury. Tenure is the total number of years worked at the firm in which injury occurred. Other variables included in each model: industry-injury type interaction, industry-year interactions, quarter fixed effects. Columns (1), (2), (5), and (6) are estimated using OLS; Columns (3) and (4) estimated using Poisson regression. Column (2) limits analysis sample to years 2000, 2001, 2002, and 2004. Columns (5) and (6) use 2000-2002, 2004-2006 DEU data (N=97,611). The tenure variable is only available beginning in 2001 (N=76,196).

Table A4: Other Workers' Compensation Benefits

	(1)	(2)	(3)
Dependent Variable:	**Replacement Rate**	**Defense Costs**	**1(Vocational Rehabilitation)**
Post x Back Injury	-0.036	-0.005	-0.001
	(0.075)	(0.042)	(0.007)
Mean	1.198	969.145	0.262

Estimates generated using 2000-2002 and 2004-2006 WCIRB data (N=158,065). ***Significance 1%, ** Significance 5%, * Significance 10%. Standard errors in parentheses adjusted for clustering at industry level. The replacement rate is the ratio of weekly indemnity benefits to average pre-injury weekly earnings. Defense costs are the total legal costs associated with the claim. 1(Vocational Rehabilitation) is equal to 1 for injured workers who received a job training voucher. Other variables included but not shown: quarter fixed effects, industry-year interactions, industry-injury type interactions. Poisson used for replacement rate and defense costs. OLS used for vocational rehabilitation. Note that the replacement rate is highly-skewed because of workers with low earnings subject to the minimum level of benefits. The median replacement rate is 0.461.

Table A5: Triple Difference Estimates

	(1)	(2)	(3)
	A. Post-Injury Wages and Control Wages (Mean=$40,904)		
Post-Reform x Back x Injured	-0.088***	-0.088***	-0.081***
	(0.021)	(0.022)	(0.019)
Effect in Dollars:	-2377.32	-2391.41	-2198.86
Fixed Effects:	Quarter x Group	Quarter x Group	Quarter x Industry x Group
	Injury Type x Group	Injury Type x Group	Injury Type x Group
	Quarter x Injury Type	Year x Industry x Injury Type	Quarter x Industry x Injury Type
	B. Post-Injury Wages and Pre-Injury Wages (Mean=$40,570)		
Post-Reform x Back x Post-Injury	-0.083***	-0.084***	-0.072***
	(0.023)	(0.023)	(0.020)
Effect in Dollars:	-2259.49	-2272.66	-1944.92
Fixed Effects:	Quarter x Group	Quarter x Group	Quarter x Industry x Group
	Injury Type x Group	Injury Type x Group	Injury Type x Group
	Quarter x Injury Type	Year x Industry x Injury Type	Quarter x Industry x Injury Type
	C. Placebo Test: Pre-Injury Wages and Pre-Injury Control Wages (Mean=$46,775)		
Post-Reform x Back x Injured	0.006	0.006	-0.001
	(0.008)	(0.008)	(0.003)
Effect in Dollars:	239.62	244.89	-32.37
Fixed Effects:	Quarter x Group	Quarter x Group	Quarter x Industry x Group
	Injury Type x Group	Injury Type x Group	Injury Type x Group
	Quarter x Injury Type	Year x Industry x Injury Type	Quarter x Industry x Injury Type

Notes: 2000-2002 and 2004-2006 WCIRB data (N=316,130). ***Significance 1%, ** Significance 5%, * Significance 10%. Standard errors in parentheses adjusted for clustering at industry level. Post-injury Wages and Control Wages are total earnings in the first six quarters post-injury. Pre-Injury Wages are total earnings in the six quarters immediately prior to injury. We include results using Pre-Injury Wages for both the injured and control workers as a placebo test. "Group" refers to injured or control in Panels A and C. "Group" refers to pre-injury or post-injury in Panel B. Poisson used for all regressions.

Table A6: OLS Triple Difference Estimates

	(1)	(2)	(3)
	Post-Injury Wages and Control Wages (Mean=$40,904)		
Post x Back x Injured	-1550.69**	-1550.69**	-1556.19**
	(663.77)	(664.21)	(706.86)
Fixed Effects:	Quarter x Group	Quarter x Group	Quarter x Industry x Group
	Injury Type x Group	Injury Type x Group	Injury Type x Group
	Quarter x Injury Type	Year x Industry x Injury Type	Quarter x Industry x Injury Type
	Placebo Test: Pre-Injury Wages and Pre-Injury Control Wages (Mean=$46,775)		
Post x Back x Injured	246.94	246.94	73.82
	(405.22)	(405.48)	(285.94)
Fixed Effects:	Quarter x Group	Quarter x Group	Quarter x Industry x Group
	Injury Type x Group	Injury Type x Group	Injury Type x Group
	Quarter x Injury Type	Year x Industry x Injury Type	Quarter x Industry x Injury Type

Notes: 2000-2002 and 2004-2006 WCIRB data (N=316,130). ***Significance 1%, ** Significance 5%, * Significance 10%. Standard errors in parentheses adjusted for clustering at industry level. Outcomes are defined as earnings within 6 quarters of injury. We include results using Pre-Injury Wages (defined as earnings in the six quarters prior to injury) as a placebo test. "Group" refers to injured or control. OLS used for all regressions.

Table A7: Placebo Tests using Oregon

	Oregon	California
Dependent Variable:	**Medical Expenditures**	
Post x Back	0.018	-0.075***
	(0.016)	(0.013)
Mean	7,118	9,377
Dependent Variable:	**Post-Injury Earnings**	
Post-Reform x Back	-0.026	-0.104***
	(0.021)	(0.018)
Mean	35,773	33,793
Dependent Variable:	**1(Work)**	
Post x Back	-0.002	-0.014***
	(0.004)	(0.004)
Mean	0.96	0.90
	Triple Difference Estimates	
Dependent Variable:	**Post-Injury & Pre-Injury Earnings**	
Post-Reform x Back x Post-Injury	-0.002	-0.072***
	(0.013)	(0.020)

Notes: Oregon column uses 2000-2002 and 2004-2006 administrative Oregon WC data (N=67,464; 134,928 for triple differences). California column uses 2000-2002 and 2004-2006 WCIRB data (N=158,065; 316,130 for triple differences). The California results have been reported previously above. ***Significance 1%, ** Significance 5%, * Significance 10%. Standard errors in parentheses adjusted for clustering at industry level. Medical expenditures are total medical costs in six quarters post-injury for California claims and total medical costs overall for Oregon claims. Earnings defined as total earnings in six quarters post-injury (for both California and Oregon). 1(Work) is equal to 1 if post-injury earnings are positive. Pre-injury earnings are used in the triple difference specification and equal total earnings in the six quarters prior to injury. Other variables included in each model: industry-injury type interaction, industry-year interactions, quarter-of-injury fixed effects. Triple Differences Estimates include quarter-industry-group, industry-group, and quarter-industry-injury type interactions and use post-injury and pre-injury earnings of injured workers. "Groups" are defined by pre-injury and post-injury.