

# Experience Rating Workers' Compensation Insurance: Measuring the Safety Impact

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Frank Neuhauser, UC Berkeley;  
John Mendeloff, U of Pitt/RAND  
Seth Seabury, RAND

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# Motivating Policy Questions-Small Employers

- Does experience reduce reported injuries and illnesses?
- Is any observed accident reduction just claim suppression or a real safety impact?
- In the absence of statutory and regulatory intervention, would insurers act any differently?

# Experience Rating—US States

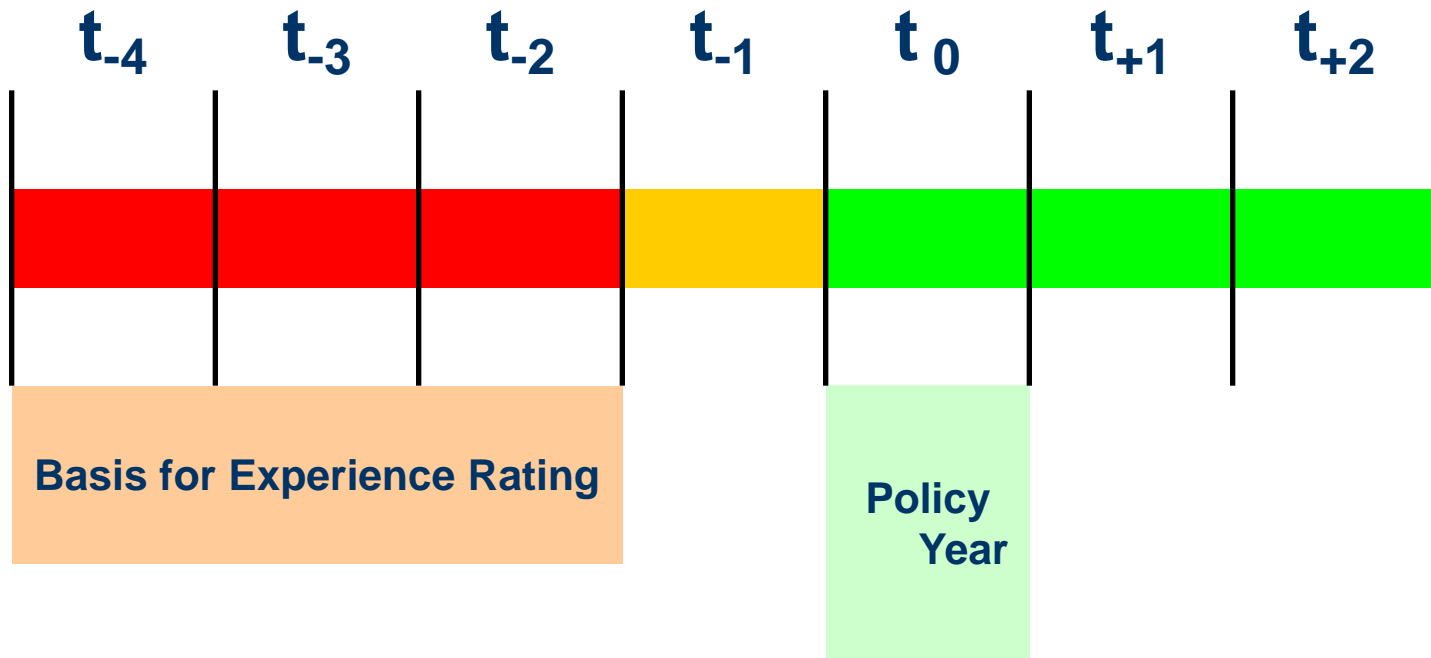
Single approach for all jurisdictions

Designed and managed by insurers through  
NCCI (38 states) and several independent  
state rating bureaus

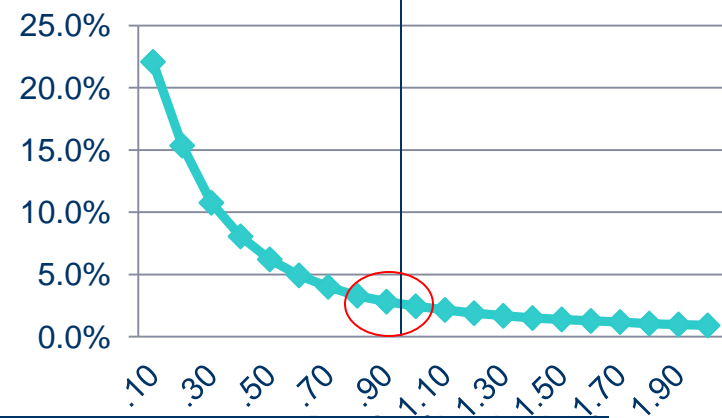
Social motivation---Safety incentives

Practical application—Strictly an underwriting  
tool for insurers

# Experience rating



# Methods



- Large number of employers just below the threshold (about \$8,000 premium/year)
- Unaffected by experience
- Each year, some employers x-rated for 1<sup>st</sup> time
- Impact can be large:
  - X-mod, for small employers, 0.89 to 1.21

# Treatments & Controls

- Payroll reported in all 5 years  $t_{-2}$  to  $t_{+2}$
- Manual premium +/- 30% of threshold ( $t_0$ )
- Manual premium +/- 30% across  $t_{-2}$  to  $t_0$
- Not X-rated in either  $t_{-2}$  or  $t_{-1}$
- Treatment : X-rate 1<sup>st</sup> time in  $t_0$ , also  $t_{+1}$  &  $t_{+2}$
- Controls : not X-rated in  $t_0$ ,  $t_{+1}$  &  $t_{+2}$

# Methods

$$z_i^* = \beta_0 + \beta_1 \textit{After}_i + \beta_2 \textit{Treat}_i + \beta_3 \textit{Treat}_i * \textit{After}_i + \delta X_i + \epsilon_i$$

# Tobit: Dep. Var.= Number of claims

	1 <sup>st</sup> year X-rated	2 <sup>nd</sup> year X-rated	3 <sup>rd</sup> year X-rated
Constant	-3.615*** (0.110)	-3.424*** (0.095)	-3.476*** (0.094)
<b>Experience rated * After</b>	<b>-0.081** (0.033)</b>	<b>-0.123*** (0.035)</b>	<b>-0.120*** (0.035)</b>
Experience rated	0.054* (0.026)	0.055* (0.027)	0.049 (0.027)
After	0.033*** (0.006)	0.053*** (0.008)	0.042*** (0.010)
\$1000_Premium	0.293*** (0.014)	0.232*** (0.007)	0.236*** (0.006)
\$1000_Premium_sq	-0.009*** (0.001)	-0.005*** (0.0003)	-0.004*** (0.0002)
Multi_class	0.218*** (0.016)	0.215*** (0.016)	0.198*** (0.016)
Primary_manual_rate	0.085*** (0.006)	0.088*** (0.006)	0.089*** (0.006)
Primary_manual_rate_sq	-0.005*** (0.0003)	-0.005*** (0.0003)	-0.005*** (0.0003)
Pseudo R <sup>2</sup>	0.010	0.015	0.020
sigma	2.2595	2.2723	2.2855
n =	380,246	380,284	380,246



# Comparison of 3<sup>rd</sup> year results

	Tobit +OLS	Two-stage (Logit/ OLS) + OLS	1-stage (OLS)
P(any claims)	-7.2%***	-6.0%***	
Number of claims, conditional on any	-1.3%***	-5.4%***	
<i>ln</i> (cost/claim)	0.0%	0.0%	
<i>ln</i> (incurred cost)			-15.7%***
Total impact	-8.4%	-10.8%	-15.7%

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# Claim Suppression

- Fewer claims
- Suppression = Higher average cost/claim
  - Smaller claims easier to hide
  - Financial incentives are to report expensive claims, hide inexpensive claims
    - For smaller employers it is always economical to report large claims,
    - Frequently disadvantageous to report small claims

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## How would insurers act in the absence of the statutory requirement?

- Do insurers adjust premium to reflect experience of small employers, even when not experience rated?
- Use ratio of (Actual Premium)/(Pure Premium) to measure the charged premium to underlying expected premium
  - Debits/credits
  - Different companies under umbrella
  - Switching between companies

## Do insurers apply *de facto* X-mods in the absence of regulatory requirements

- Impact of one moderate claim (\$10K) in one of the three years prior to the policy year:
  - Not experience rated: X-mod  $\approx 1.005$
  - Experience rated: X-mod  $\approx 1.156$

# Policy implications

- Reducing the threshold for experience rating small employers would reduce injuries and costs by 8% - 16% among employers who would not otherwise be experience rated
- This is a safety effect, not a reporting effect
- Insurers are unlikely to de facto experience rate absent statutory requirement

# Experimental Design

Employer size as a measure of the degree of experience rating

- Premium not employment
- But does this capture what employers actually experience?
  - Small employer at threshold
  - One \$3,700 claim in rating period vs. no claims
  - Premium increase over 3 years = \$12,000



# Discussion—Other issues

- Variance introduced to employer cost
- Appropriateness of current X-mod calculation
- Should employers under-report

[Frankn@berkeley.edu](mailto:Frankn@berkeley.edu)

Director

Center for the Study of Social Insurance

University of California, Berkeley