



NCCI Holdings, Inc.

# Worker Health in a Changing World of Work

Canadian Association for Research on Work and Health (CARWH)

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## Workplace Injuries and Job Flows

This presentation provides a summary of the major findings established in Frank Schmid (2009) *Workplace Injuries and Job Flows*, <http://www.ncci.com/Documents/WorkplaceInjuries-0709.pdf>

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# Summary

**Q: What is the most important driver of deviations from trend of frequency growth in workers' compensation?**

A: Deviations from trend in the growth rate of frequency are primarily driven by job flows (*job creation* and *job destruction*)

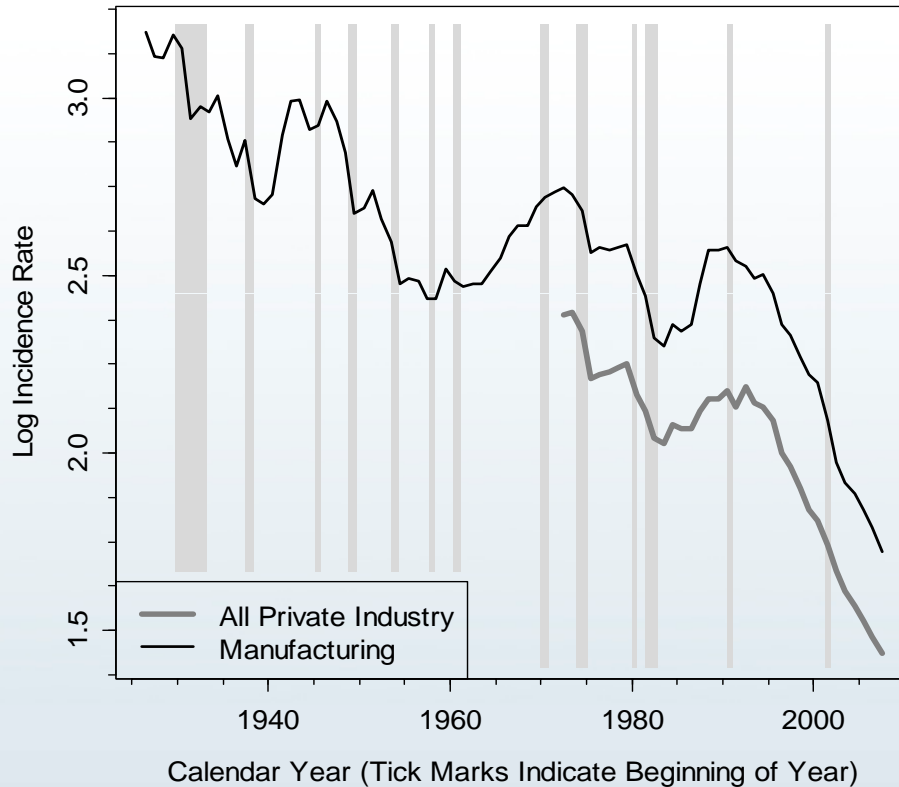
**Q: Does frequency drop during recessions even more than it would drop otherwise?**

A: Yes, frequency accelerates its decline during recessions due to the decline in the rate of job creation

**Q: Is there indication that layoffs give rise to workers' compensation claims that would not be observed otherwise?**

A: Yes, there is statistical evidence that elevated job destruction during recessions slows the decline in frequency, but the magnitude of this effect is smaller than the opposing effect of depressed job creation

# BLS Frequency



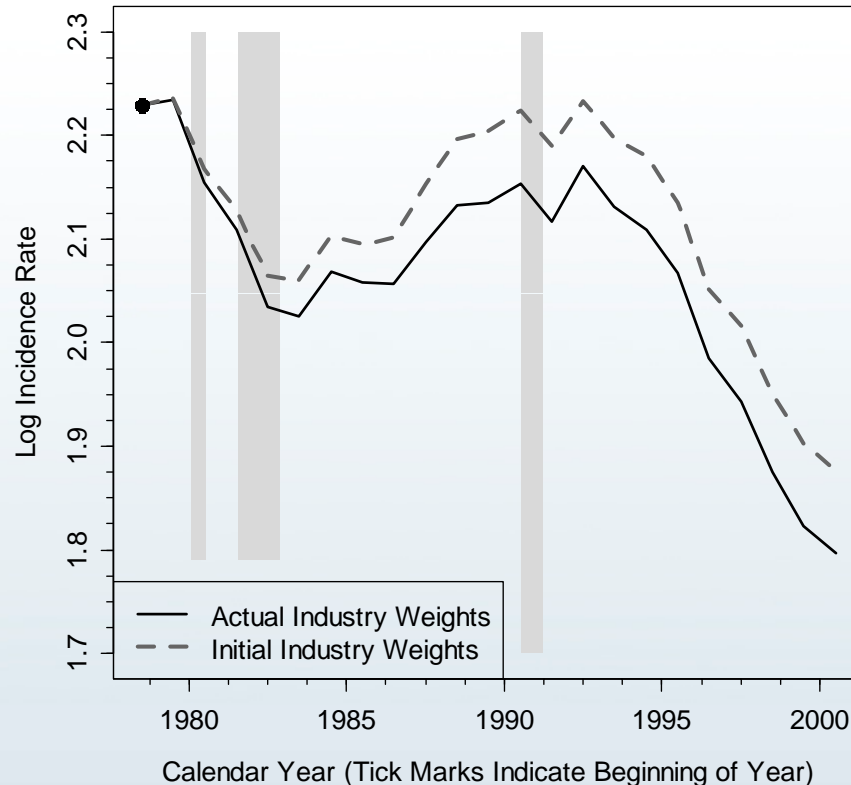
- Frequency is defined as number of cases per 100 full-time equivalent employees
- Frequency exhibits a long-term decline, both in All Private Industry and in Manufacturing
- There are highly persistent deviations from trend, during which the decline slows or temporarily reverses
- The gray bars indicate economic recessions, as defined by the NBER Recession Dating Committee

All Private Industry: 1972-2007; Manufacturing: 1926-2007

Data source: BLS (Bureau of Labor Statistics), [www.bls.gov](http://www.bls.gov); recession information: NBER (National Bureau of Economic Research), [www.nber.org](http://www.nber.org)

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# BLS Frequency and Structural Change

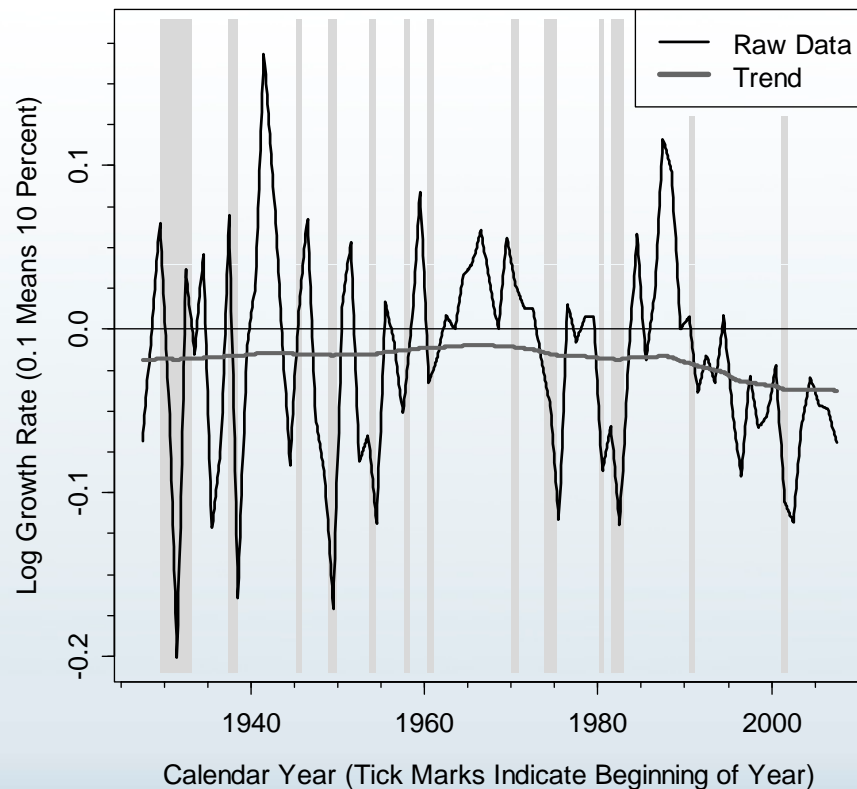


- Actual frequency (“actual industry weights”) is plotted alongside the level of frequency that would have been observed had the structure of the economy not changed over time (“initial industry weights”)
- Only about 15 percent of the frequency decline is due to structural change in the economy

All Private Industry: 1977-2000; Frequency is calculated as employment-weighted average across industries: Agriculture, Forestry and Fishing, Mining, Construction, Manufacturing, Transport and Public Utilities, Wholesale Trade, Retail Trade, Finance, Insurance and Real Estate, and Services; these industries add up to the private sector. The industry classification rests on SIC (Standard Industrial Classification), which confines the data set to the pre-2002 time window

Data source: BLS (Bureau of Labor Statistics), [www.bls.gov](http://www.bls.gov); recession information: NBER (National Bureau of Economic Research), [www.nber.org](http://www.nber.org)

# Trend Rate of Frequency Growth

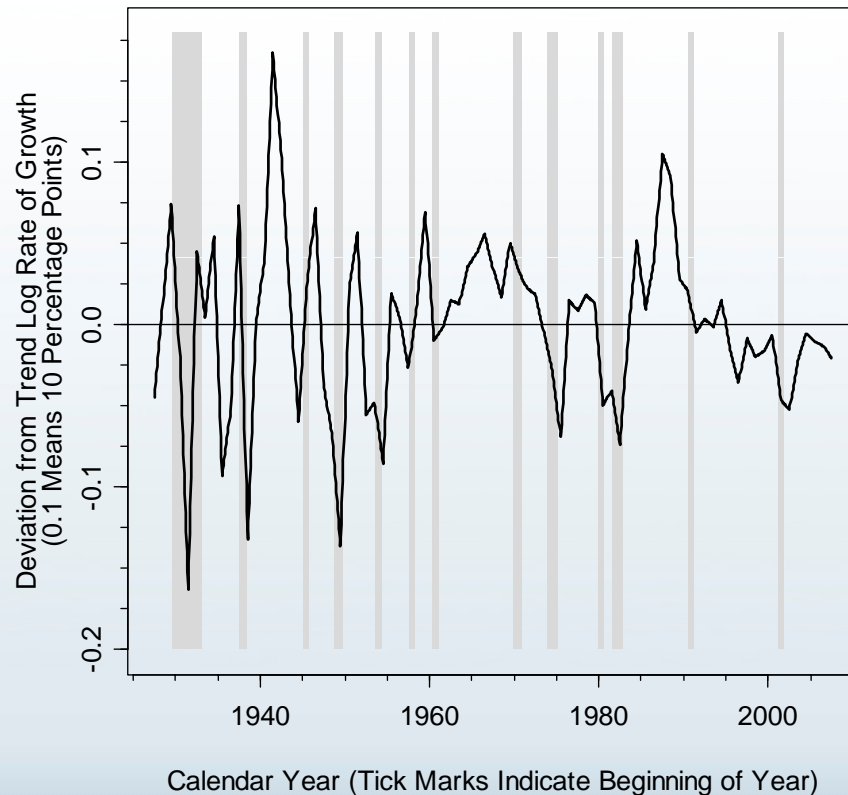


- The trend rate of growth has been negative since the 1920s
- During the 1990s, this (negative) trend rate of growth has drifted down, but has since stabilized at a new level
- L.I. Boden and J.W. Ruser (2003, "Workers' Compensation 'Reforms,' Choice of Medical Care Provider, and Reported Workplace Injuries," *Review of Economics and Statistics* **85**, 923-929) attribute this decline to cost containment reforms in the early 1990s

Manufacturing: 1927-2007

Data source: BLS (Bureau of Labor Statistics), [www.bls.gov](http://www.bls.gov); recession information: NBER (National Bureau of Economic Research), [www.nber.org](http://www.nber.org)

# Autoregressive Process

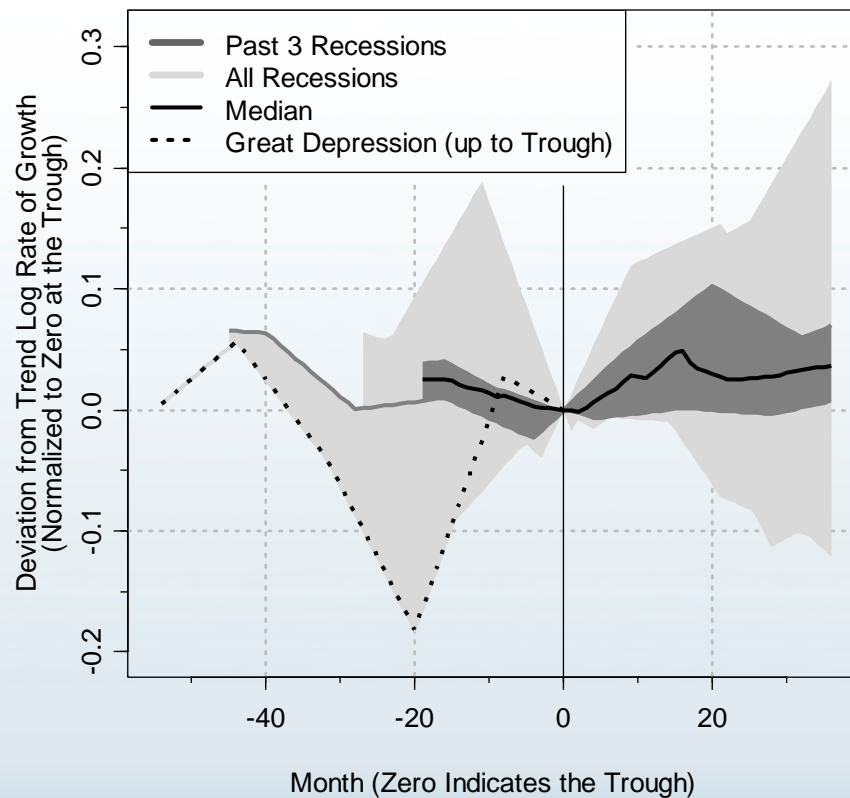


- The business cycle (i.e., fluctuations in economic activity) manifests itself in an autoregressive process
- The autoregressive process is net of trend and (white) noise in measurement
- By definition, the autoregressive process is centered on zero

Manufacturing: 1927-2007

Data source: BLS (Bureau of Labor Statistics), [www.bls.gov](http://www.bls.gov); recession information: NBER (National Bureau of Economic Research), [www.nber.org](http://www.nber.org)

# Frequency Growth Rate over the Business Cycle



- The chart summarizes all recessions since (and inclusive of) the Great Depression
- During the course of a recession, the frequency growth rate tends to drop by 2.5 percentage points
- During the economic recovery, this growth rate rises sharply; it overshoots its pre-recession level by about 2.5 percentage points, before settling back down—this process ends 24 months into the recovery

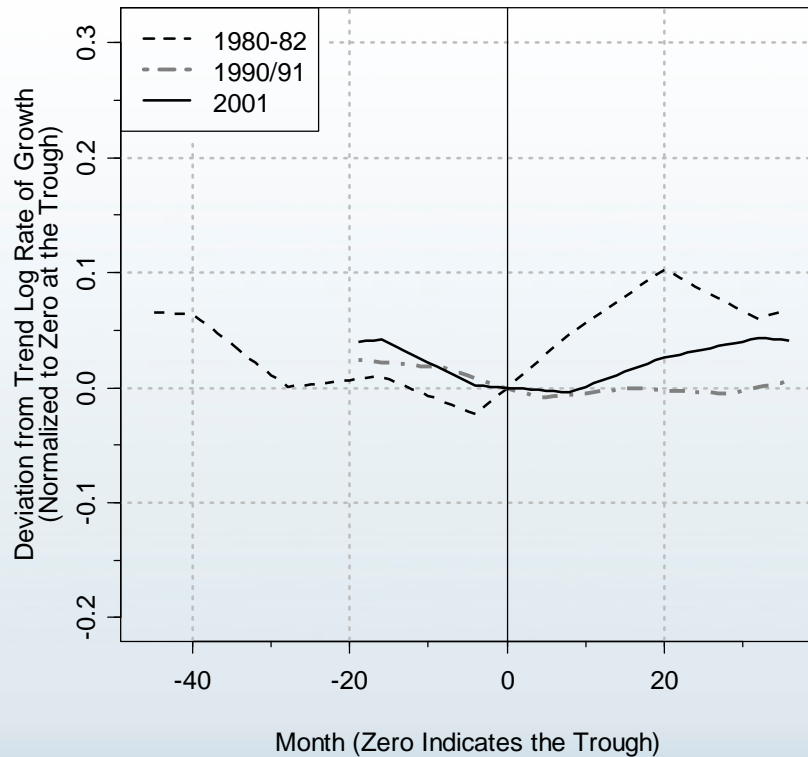
Manufacturing: 1927-2007

The chart rests on the estimated autoregressive process. The gray areas are envelopes of chart lines that start 12 months prior to the onset of the recession and end 36 months after the trough (i.e., end of the recession). There are 12 recessions, treating the 1980 and 1981/82 recessions as a single event

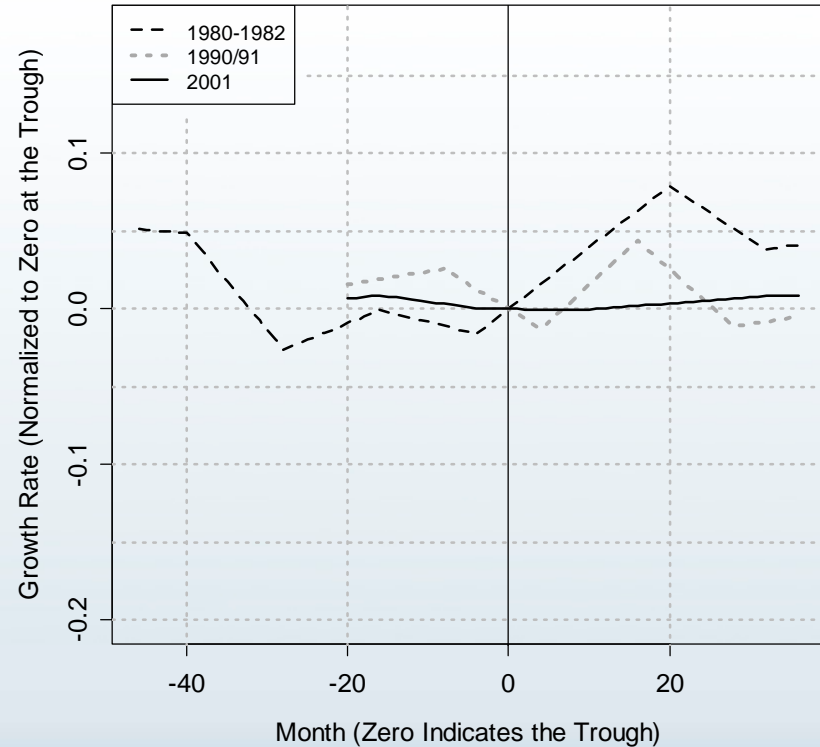
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# Manufacturing and All Private Industry in Comparison: Past 3 Recessions

## Manufacturing



## All Private Industry



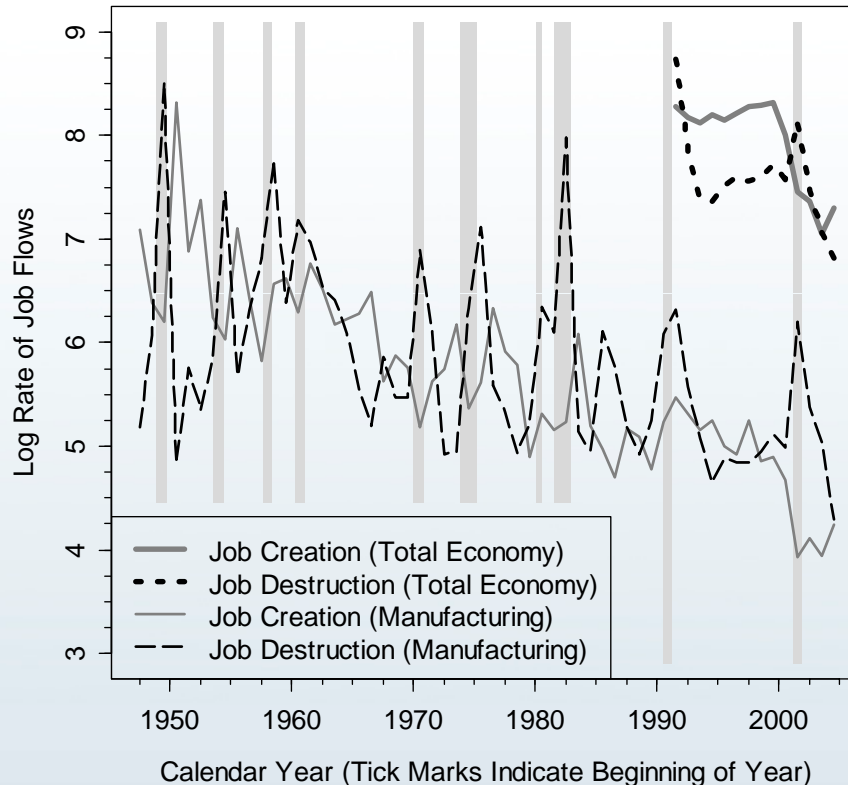
Manufacturing: 1927-2007

All Private Industry: 1973-2007

The chart rests on the estimated autoregressive process. The lines start 12 months prior to the onset of the recession and end 36 months after the trough (i.e., end of the recession). Displayed are the past three recessions, treating the 1980 and 1981/82 recessions as a single event



# Job Flows



- The job flow concepts of job creation and job destruction measure the number of jobs created or destroyed per number of existing jobs
- Measurement is *gross* at the establishment (e.g., plant) level
- The concept of establishment typically refers to the physical location of production

Total Economy: 1991-2004; Manufacturing: 1947-2004; geometric mean of Q1 through Q4

Data source: Davis, S.J., R.J. Faberman, and J. Haltiwanger (2006) "The Flow Approach to Labor Markets: New Data Sources and Micro-Macro Links," *Journal of Economic Perspectives* 20(3), pp. 3-26; recession information: NBER (National Bureau of Economic Research), [www.nber.org](http://www.nber.org)

# Conclusions: Explaining the Trend

- The nonfatal workplace injury and illness incidence rates in manufacturing and the private sector have experienced steep declines over their respective recorded histories
- By 2007, the incidence rate for the private sector had dropped to 40 percent of its 1972 value (which is the first value on record)
- It was shown (for the period 1977-2000) that only 15 percent of this decline is due to structural change in the economy; the remaining 85 percent are due to workplaces being safer by design

# Conclusions:

## Explaining Deviations from Trend

- Faster job destruction (as is observed in recessions) increases the growth rate of the workplace injury and illness incidence rate
  - This finding is indicative of moral hazard (opportunistic behavior following layoffs)
- Faster job creation (as is observed in economic recoveries) is also associated with an increase in the growth rate of the workplace injury and illness incidence rate
  - There is evidence of a positive relation between the likelihood of sustaining a workplace injury and job tenure (see appendix)
- Job creation dominates:
  - In recessions, the slowdown in job creation reduces the rate of frequency growth—the shortening of job tenure overcompensates the upward pressure on frequency growth that originates in layoffs
  - In economic recoveries, the acceleration in job creation increases the rate of frequency growth—with layoffs abating, moral hazard is greatly diminished

Note: The findings stated above were obtained from a structural time series model. For details see Frank Schmid (2009) *Workplace Injuries and Job Flows*, <http://www.ncci.com/Documents/WorkplaceInjuries-0709.pdf>

# Conclusions:

## Safer Workplaces through Openings

- There is an important difference between jobs created at existing establishments (expansions) and jobs created at openings
  - Whereas an acceleration of job creation through expansions increases frequency growth, a quickening of job creation through openings has the opposite effect for the private sector and no effect for manufacturing
  - This finding suggests that workplaces at openings are safer than the average existing workplace, thus pointing to new establishments as an important avenue toward safer workplaces

Note: The findings stated above were obtained from a structural time series model. For details see Frank Schmid (2009) *Workplace Injuries and Job Flows*, <http://www.ncci.com/Documents/WorkplaceInjuries-0709.pdf>

# Appendix:

## Workplace Injuries and Job Tenure

Panel A: Manufacturing

Length of Service	Proportion of Injuries and Illnesses				
	2003	2004	2005	2006	2007
Less than 1 Year	0.237	0.290	0.307	0.311	0.300
1 to 5 Years	0.325	0.311	0.287	0.297	0.311
5 Years or More	0.435	0.396	0.402	0.386	0.382
Not Reported	0.003	0.003	0.004	0.006	0.007

Panel B: All Private Industry

Length of Service	Proportion of Injuries and Illnesses					Proportion of Employment	
	2003	2004	2005	2006	2007	2006	2008
Less than 1 Year	0.321	0.334	0.347	0.352	0.338	0.244	0.229
1 to 5 Years	0.366	0.355	0.338	0.334	0.348	0.291	0.299
5 Years or More	0.306	0.304	0.306	0.305	0.302	0.465	0.472
Not Reported	0.007	0.007	0.008	0.009	0.012	---	---

Distribution of nonfatal injury and illnesses by length of service with the current employer. Manufacturing employment is not available by length of service. Proportions may not add up to 1 due to rounding

Data source: BLS (Bureau of Labor Statistics), [www.bls.gov](http://www.bls.gov)

# Appendix: Caveat

- “BLS occupational injury and illness numbers come from the BLS annual Survey of Occupational Injuries and Illnesses,” which “captures data from Occupational Safety and Health Administration (OSHA) logs of workplace injuries and illnesses maintained by employers” ([www.bls.gov/iif](http://www.bls.gov/iif))
- A 2006 study published in the Journal of Environmental Medicine documented “missing cases in individual firms, as determined by comparisons between BLS and state workers compensation data” ([www.bls.gov/iif](http://www.bls.gov/iif))