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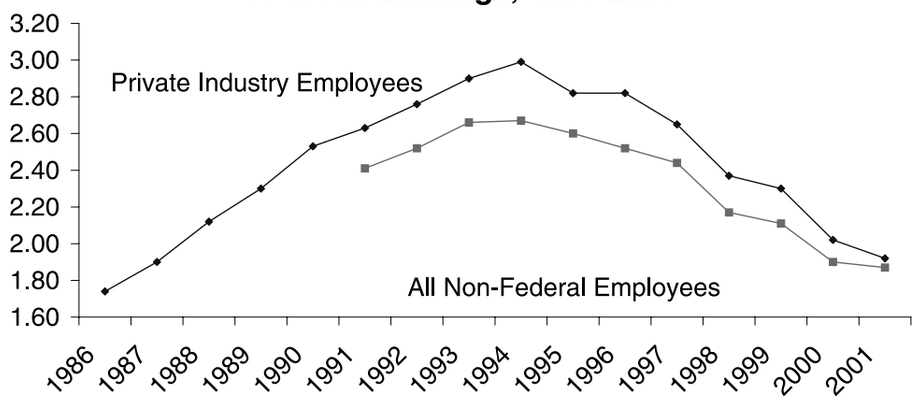
Summary of the Contents

Workers' compensation costs for employers measured as a percent of payroll (gross earnings) continued to decline in 2001 for both private industry employees and all non-federal employees. As shown in Figure WCC, costs in the private sector were 1.74 percent of payroll in 1986, increased rapidly through 1994, when costs peaked at 2.99 percent of payroll, and then declined through 2001, when costs represented 1.92 percent of payroll. The data for all non-federal employees (which includes the private sector and the state and local government sector) show a similar pattern: costs were 1.49 percent of payroll in 1991 (the first year with data), increased until 1994 when they peaked at 2.67 percent of payroll, and then declined through 2001, when costs represented 1.87 percent of payroll.

This issue's lead article examines these and other trends in more detail. One noteworthy development is that an alternative measure of the employers' costs of workers' compensation – namely employer expenditures per hour worked – held steady between 2000 and 2001 in the private sector and increased slightly for all non-federal employees.

The second article provides a partial explanation of the declining costs of workers' compensation costs during the 1990s by examining the effects of statutory changes in Oregon on benefits received by employees and costs paid by employers. The authors conclude that the more restrictive rules for establishing eligibility enacted by the Oregon legislature in the early 1990s reduced employee benefits and employer costs by about 20 to 25 percent below the amounts that would have otherwise been received by workers or paid by employers in the state by the mid-1990s. While Oregon's statutory changes may have been particularly effective in limiting access to the workers' compensation program, other jurisdictions also tightened eligibility rules during the late 1980s and early 1990s, which contributed to the national decline in employers' costs shown in Figure WCC.

Figure WCC
Workers' Compensation Costs as a Percentage of Gross Earnings, 1986-2001



Source: Table 1, "Workers' Compensation Costs for Employers: Mixed Messages for 2001."

Workers' Compensation Costs for Employers: Mixed Messages for 2001

by John F. Burton, Jr.

The 2001 data on the employers' costs of workers' compensation present mixed messages about recent trends, depending on the sector of the economy examined and the exact measure of costs being utilized.[1] Workers' compensation costs as a percentage of gross earnings (payroll) declined in the private sector in 2001, continuing a trend that began in 1995. As shown in Figure A, employers' expenditures on workers' compensation in private industry represented 1.74 percent of payroll in 1986, increased in each of the next eight years until peaking at 2.99 percent of payroll in 1994, and then declined for seven years until reaching 1.92 percent of payroll in 2001.

Workers' compensation costs for all non-federal employees, a category that includes private industry employees along with state and local government employees, represented 2.41 percent of payroll in 1991,[2] increased to a peak of 2.67 percent in 1994, and then declined from 1994 to 2001, when it was 1.87 percent of payroll (see Figure B). The non-federal category, which includes approximately 95 percent of employees in the private and public sectors, has a pattern in the last decade that resembles the trends in the private sector.

The employees who account for the difference between the private sector and the entire non-federal sector are in the state and local government sector. This sector's workers' compensation costs started at 1.49 percent of payroll in 1991, peaked in 1995 at 1.59 percent of payroll, and then dropped to 1.34 percent of payroll in 2000 before rebounding to 1.42 percent of payroll in 2001 (see Figure C). The state and local government sector is thus distinctive because workers' compensation costs as a percentage of payroll peaked later (in 1995) than in the other sectors (private and all non-federal) and because the costs increased in 2001 in the state and local government sector while costs continued to decline in the other sectors in 2001.

Costs per Hour Worked

An alternative measure of the employers' costs of workers' compensation is expenditures on the program in dollars per hour worked. Using this measure of employers' costs for the private sector, the costs began at $0.19 per hour in 1986, increased to $0.41 per hour in 1994, declined in most years until reaching $0.33 per hour in 2000, and then held steady at $0.33 per hour in 2001 (see Figure D).

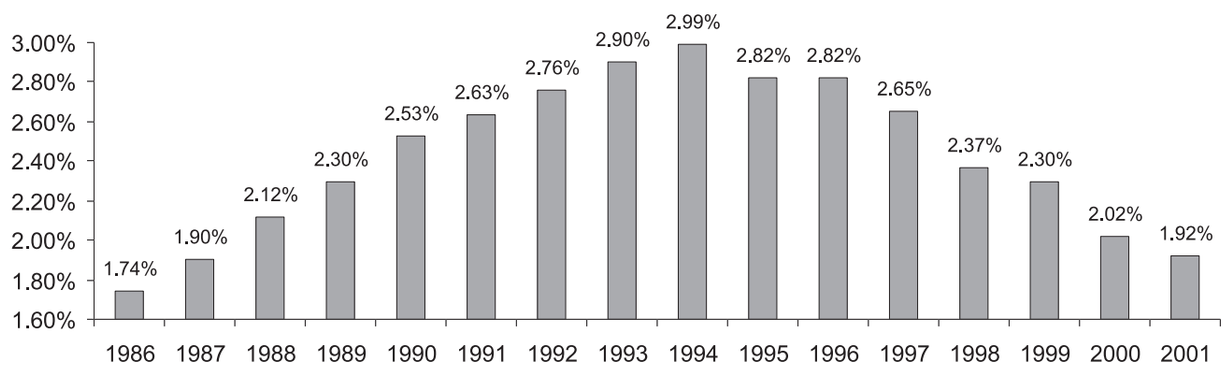
Workers' compensation costs per hour worked for all non-federal employees were $0.32 in 1991 (the first year with available data), increased to $0.39 in 1994, declined to $0.33 in 2000, and then increased to $0.34 in 2001 (see Figure E).

The employers' costs of workers' compensation per hour worked in the state and local government sector were $0.26 in 1991 (the first year with data), increased to $0.31 in 1994, fluctuated in a narrow band between $0.30 and $0.31 per hour from 1994 to 2000, and finally "spurted" to $0.34 per hour in 2001 (see Figure F).

Source of the Information

The information contained in Table 1 and Figures A through F is based on data published by the Bureau of Labor Statistics (BLS), which is a part of the U.S. Department of Labor.[3] Data are available since 1986 for private sector employers' expenditures per hour on employees' total remuneration, and (as shown in Table 1, Panel A) on a number of components of remuneration, including wages and salaries, paid leave, insurance, and legally required benefits (including separate information on

Figure A - Workers' Compensation Costs as a Percentage of Gross Earnings, Private Industry Employees, 1986-2001



Source: Table 1, Panel A

Table 1 - Total Remuneration, Wages and Salaries, and Workers' Compensation, 1986-2001
(In Dollars Per Hour Worked)

Panel A: Private Industry Employees		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
(1)	Total Remuneration	13.25	13.42	13.79	14.28	14.96	15.40	16.14	16.70	17.08	17.10	17.49	17.97	18.50	19.00	19.85	20.81
(2)	Gross Earnings	10.90	11.08	11.32	11.72	12.24	12.55	13.06	13.43	13.69	13.81	14.19	14.69	15.19	15.62	16.37	17.16
(3)	Wages and Salaries	9.67	9.83	10.02	10.38	10.84	11.14	11.58	11.90	12.14	12.25	12.58	13.04	13.47	13.87	14.49	15.18
(4)	Paid Leave	0.93	0.93	0.97	1.00	1.03	1.05	1.09	1.11	1.11	1.09	1.12	1.14	1.16	1.20	1.28	1.37
(5)	Supplemental Pay	0.30	0.32	0.33	0.34	0.37	0.36	0.39	0.42	0.44	0.47	0.49	0.51	0.56	0.55	0.60	0.61
(6)	Benefits Other Than Pay	2.36	2.35	2.47	2.56	2.72	2.85	3.07	3.26	3.39	3.29	3.31	3.29	3.31	3.38	3.48	3.65
(7)	Insurance	0.73	0.72	0.78	0.85	0.92	1.01	1.12	1.19	1.23	1.15	1.14	1.09	1.10	1.13	1.19	1.28
(8)	Retirement Benefits	0.50	0.48	0.45	0.42	0.45	0.44	0.46	0.48	0.52	0.52	0.55	0.55	0.55	0.57	0.59	0.62
(9)	Legally Required Benefits	1.11	1.13	1.22	1.27	1.35	1.40	1.47	1.55	1.60	1.59	1.59	1.62	1.63	1.65	1.67	1.73
(9A)	Workers' Compensation	(0.19)	(0.21)	(0.24)	(0.27)	(0.31)	(0.33)	(0.36)	(0.39)	(0.41)	(0.39)	(0.40)	(0.39)	(0.36)	(0.36)	(0.33)	(0.33)
(10)	Other Benefits	0.02	0.02	0.02	0.02	*	*	0.02	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02
(11)	Workers' Compensation as Percent of Remuneration	1.43%	1.56%	1.74%	1.89%	2.07%	2.14%	2.23%	2.34%	2.40%	2.28%	2.29%	2.17%	1.95%	1.89%	1.66%	1.59%
(12)	Workers' Compensation as Percent of Gross Earnings	1.74%	1.90%	2.12%	2.30%	2.53%	2.63%	2.76%	2.90%	2.99%	2.82%	2.82%	2.65%	2.37%	2.30%	2.02%	1.92%

Panel B: State and Local Employees		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
(1)	Total Remuneration	22.31	23.49	24.44	25.27	24.86	25.73	26.58	27.28	28.00	29.05	30.06
(2)	Gross Earnings	17.48	18.40	19.07	19.71	19.48	20.16	20.90	21.53	22.19	23.08	23.94
(3)	Wages and Salaries	15.52	16.39	17.00	17.57	17.31	17.95	18.61	19.19	19.78	20.57	21.34
(4)	Paid Leave	1.75	1.80	1.86	1.94	1.95	1.99	2.06	2.11	2.17	2.26	2.34
(5)	Supplemental Pay	0.21	0.21	0.21	0.20	0.22	0.22	0.23	0.23	0.24	0.25	0.26
(6)	Benefits Other Than Pay	4.84	5.08	5.36	5.57	5.38	5.56	5.69	5.76	5.81	5.97	6.13
(7)	Insurance	1.63	1.84	2.02	2.15	2.03	2.07	2.09	2.15	2.22	2.38	2.56
(8)	Retirement Benefits	1.85	1.82	1.87	1.90	1.78	1.90	1.95	1.94	1.91	1.84	1.73
(9)	Legally Required Benefits	1.34	1.40	1.44	1.49	1.55	1.56	1.61	1.63	1.64	1.70	1.78
(9A)	Workers' Compensation	(0.26)	(0.28)	(0.30)	(0.31)	(0.31)	(0.31)	(0.30)	(0.30)	(0.30)	(0.31)	(0.34)
(10)	Other Benefits	0.02	0.02	0.03	0.03	0.02	0.03	0.04	0.04	0.04	0.05	0.06
(11)	Workers' Compensation as Percent of Remuneration	1.17%	1.19%	1.23%	1.23%	1.25%	1.20%	1.13%	1.10%	1.07%	1.07%	1.13%
(12)	Workers' Compensation as Percent of Gross Earnings	1.49%	1.52%	1.57%	1.57%	1.59%	1.54%	1.44%	1.39%	1.35%	1.34%	1.42%

Panel C: All Non-Federal Employees		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
(1)	Total Remuneration	16.45	17.27	17.88	18.30	18.21	18.68	19.22	19.76	20.29	21.16	22.15
(2)	Gross Earnings	13.30	13.89	14.29	14.58	14.62	15.05	15.59	16.11	16.57	17.33	18.14
(3)	Wages and Salaries	11.81	12.33	12.68	12.95	12.98	13.36	13.85	14.30	14.72	15.36	16.07
(4)	Paid Leave	1.16	1.20	1.22	1.23	1.21	1.24	1.27	1.30	1.34	1.42	1.51
(5)	Supplemental Pay	0.33	0.36	0.39	0.40	0.43	0.45	0.47	0.51	0.51	0.55	0.56
(6)	Benefits Other Than Pay	3.16	3.38	3.59	3.72	3.59	3.64	3.63	3.66	3.73	3.83	4.00
(7)	Insurance	1.10	1.23	1.32	1.37	1.28	1.27	1.23	1.25	1.29	1.36	1.46
(8)	Retirement Benefits	0.65	0.67	0.70	0.73	0.70	0.75	0.75	0.75	0.76	0.77	0.78
(9)	Legally Required Benefits	1.39	1.46	1.53	1.58	1.58	1.59	1.62	1.63	1.65	1.67	1.73
(9A)	Workers' Compensation	(0.32)	(0.35)	(0.38)	(0.39)	(0.38)	(0.38)	(0.38)	(0.35)	(0.35)	(0.33)	(0.34)
(10)	Other Benefits	0.02	0.02	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
(11)	Workers' Compensation as Percent of Remuneration	1.95%	2.03%	2.13%	2.13%	2.09%	2.03%	1.98%	1.77%	1.72%	1.56%	1.53%
(12)	Workers' Compensation as Percent of Gross Earnings	2.41%	2.52%	2.66%	2.67%	2.60%	2.52%	2.44%	2.17%	2.11%	1.90%	1.87%

Notes: * = $0.01 or less

(1) Table 1 and the text of this article use the term "remuneration" in place of the term "compensation" that is used in the BLS publications, and use the term "All non-federal Employees" in place of the term "Civilian workers'" that is used in the BLS publications.
(2) Total remuneration (row 1) = gross earnings (row 2) + benefits other than pay (row 6).
(3) Gross earnings (row 2) = wages and salaries (row 3) + paid leave (row 4) + supplemental pay (row 5).
(4) Benefits other than pay (row 6) = insurance (row 7) + retirement benefits (row 8) + legally required benefits (row 9) + other benefits (row 10).
(5) Workers' compensation (row 9A) is one of the legally required benefits (row 9).
(6) Workers' compensation as percent of remuneration (row 11) = workers' compensation (row 9A)/total remuneration (row 1).
(7) Workers' compensation as percent of gross earnings (row 12) = workers' compensation (row 9A)/gross earnings (row 12).
(8) Results in rows (2), (6), (11), and (12) were calculated by Florence Blum and John F. Burton, Jr.

Sources: Data in rows (1), (3) to (5), and (7) to (10) of Panels A, B, and C:

1986-1990: U.S. Department of Labor, 2000a, Tables 140, 150, 158, 165, 169.
1991-1999: U.S. Department of Labor, 2000a, Tables 1, 3, 5, 17, 19, 21, 33, 35, 37, 49, 51, 53, 65, 67, 69, 81, 83, 85, 97, 99, 101, 112, 114, 116, 126, 128, 130
2000: U.S. Department of Labor, 2000b, Tables 1, 3, and 5.
2001: U.S. Department of Labor, USDL: 01-194, Tables 1, 3, and 5.

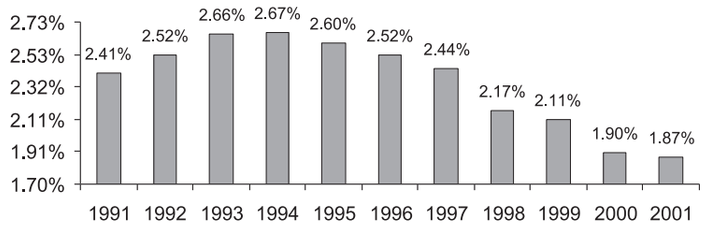
workers' compensation).[4] Comparable data pertaining to state and local government employees (Table 1, Panel B) and to all non-federal employees (Table 1, Panel C) are available for the period 1991 to 2001.

The only employees not included in this BLS data series are federal government, agriculture, and household workers, who in aggregate account for only about 5 percent of all employees. Of the 95 percent of all employees who are included in the BLS data, private industry employees clearly predominate (82 percent of all employees), whereas state and local government employees account for the remaining 13 percent of all employees.[5]

Private Industry Employees

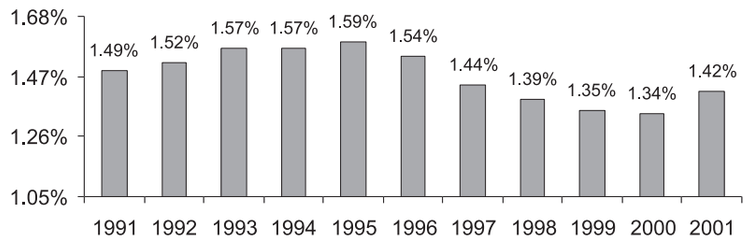
The data for private industry employees that are presented in Panel A of Table 1 further explain the BLS data series. In 2001, private sector employers spent, on average, $20.81 per hour worked on *total remuneration* (row 1). The $20.81 of total remuneration included *gross earnings* of $17.16 per hour (row 2) and *benefits other than pay* of $3.65 per hour (row 6).[6] *Gross earnings*, or *payroll*, included wages and salaries ($15.18 per hour; row 3), paid leave ($1.37 per hour; row 4), and supplemental pay ($0.61 per hour; row 5). *Benefits other than pay* included insurance ($1.28 per hour; row 7), retirement benefits ($0.62 per hour; row 8), legally required benefits ($1.73 per hour; row 9), and other benefits ($0.02 per hour; row 10). *Workers' compensation*, which averaged $0.33 per hour worked (row 9A), is one of the legally required benefits (row 9).[7]

Figure B - Workers' Compensation Costs as a Percentage of Gross Earnings, All Non-Federal Employees, 1991-2001



Source: Table 1, Panel C

Figure C - Workers' Compensation Costs as a Percentage of Gross Earnings, State and Local Government Employees, 1991-2001



Source: Table 1, Panel B

The BLS data in Table 1 indicate that private sector employers' workers' compensation expenditures ($0.33 per hour) were 1.59 percent of total remuneration (row 11) and 1.92 percent of gross earnings (row 12) in 2001. The results for the years 1991 to 2001 are shown in Figure A and Panel A of Table 1. Table 2 and Figure A also show the results for the years 1986 to 1990.

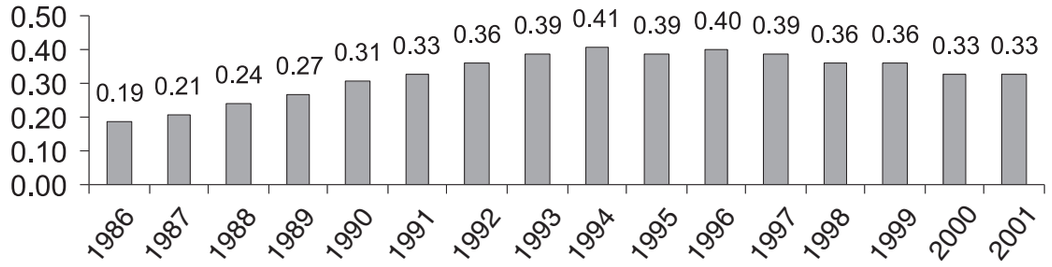
Workers' compensation costs as a percentage of gross earnings (or payroll) is the most common comparison used in the workers' compensation literature. The BLS data indicate that workers' compensation costs as a percentage of payroll in the private sector increased noticeably between 1986 and 1994, but not in a steady progression. Workers' compensation costs represented 1.74 percent of payroll in 1986; increased at least 0.10 percent of payroll each year between 1987 and 1993; and grew at a somewhat more modest rate (0.09 percent) between 1993 and 1994. Workers' compensation costs as a percent of payroll then plunged from 2.99 percent of payroll in 1994 to 1.92 percent in 2001.

State and Local Government Employees

The BLS data with respect to state and local government employees' remuneration are only available since 1991. As shown in Panel B of Table 1, in 1991 state and local government employers expended $22.31 per hour worked on total remuneration, a figure that increased to $30.06 per hour in 2000.

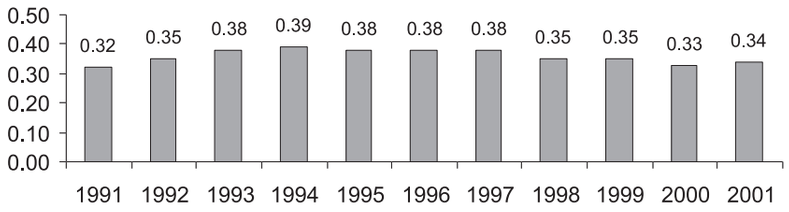
There are several interesting differences between the employer expenditure patterns in the state and local government sector (Panel B of Table 1) and in the private sector (Panel A). In 2001, for example, the state and local sector had higher figures than the private sector for gross earnings per hour ($23.94 vs. $17.16); benefits other than pay ($6.13 vs. $3.65); and, therefore, total remuneration ($30.06 vs. $20.81). Moreover, for the first time in the history of the data series that began in 1991, workers' compensation expenditures per hour worked in 2001were higher in the state and local government sector than in the private sector ($0.34 vs. $0.33, respectively).

Figure D - Workers' Compensation Costs for Private Industry Employees, 1986-2001 (In Dollars per Hour Worked)



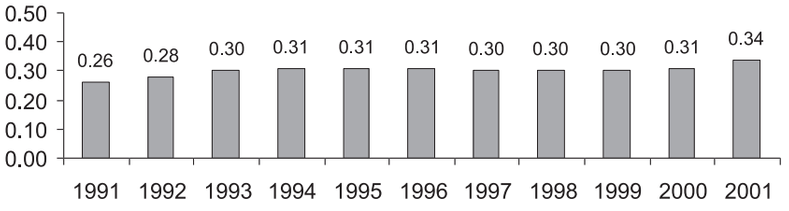
Source: Table 1, Panel A

Figure E - Workers' Compensation Costs for All Non-Federal Employees, 1991-2001 (In Dollars per Hour Worked)



Source: Table 1, Panel C

Figure F - Workers' Compensation Costs for State and Local Government Employees, 1991-2001 (In Dollars per Hour Worked)



Source: Table 1, Panel B

Even though workers' compensation costs per hour worked were higher in the state and local sector than in the private sector, because of the higher wages in the government sector, workers' compensation costs as a percentage of gross wages and salaries in 2000 were lower in the state and local government sector than in the private sector (1.42 percent vs. 1.92 percent), as they have been each year from 1991 to 2001. The gap between the two sectors was growing from 1991 to 1994 (a 1.14 percent difference to a 1.42 percent difference). However, the gap between the private and the state and local government sectors for workers' compensation costs as a percentage of payroll narrowed between 1994 and 2001 (when there was only a 0.50 percent difference).

All Non-Federal Employees

The most comprehensive variant of the BLS data, the data for all non-federal employees, is shown in Panel C of Table 1. Available since 1991, this grouping covers about 95 percent of all U.S. employees, as previously noted.

In 1991, total remuneration per hour worked averaged $16.45 per hour and gross earnings (payroll) averaged $13.30 per hour. Workers' compensation expenditures were $0.32 per hour in 1991,

which represented 2.41 percent of payroll. The percentage of payroll devoted to workers' compensation for all non-federal employees increased until its peak in 1994 (2.67 percent of payroll), and has since decreased each year to its 2001 level (1.87 percent of payroll), as shown in Figure B.

Conclusion

The BLS information on total remuneration, gross earnings, and benefits other than pay (including workers' compensation) have some advantages over other sources of data on national workers' compensation trends. One significant advantage, compared to the annual data prepared by the National Academy of Social Insurance (NASI), is timeliness: the most recent NASI data pertain to 1999, while BLS data for 2001 are already available.[8] The BLS data are also disaggregated by region, major industry group, occupational group, establishment employment size, and bargaining status — useful distinctions that are not available in the NASI data.

The BLS data also have their limitations when compared to the NASI data. The NASI data, for example, provide state-specific information on benefit payments that distinguish among the types of insurance arrangements (private carriers, state funds, and self-insurers) and that distinguish between medical and cash benefit payments. The NASI national data also include the federal sector, which are missing from the BLS data.

The NASI data and BLS data are thus, to a considerable degree, complementary and, as such, both sources of information are valuable. One problem, however, is that the two data series are not entirely consistent with one another. For example, the NASI data for 1999 (the latest year with data available from that source) indicate that the employers' costs of workers' compensation were 1.29 percent of covered payroll for employers in all sectors (including the federal government); the BLS data for all non-federal employees in 1999 yield an estimation of workers' compensation costs for that group of 2.11 percent of payroll.[9] In addition, the NASI data showed 1993 as the peak year (with employers' costs at 2.17 of payroll). The BLS data (as shown in Table 1) for all non-federal employees showed continuing **increases** in workers' compensation costs as a percent of payroll through 1994, with a decrease in costs only beginning in 1995. But even though the NASI and BLS data have different peak years, both sources of data indicate that employers' costs of workers' compensation measured as a percent of payroll have substantially declined since the mid-1990s.

ENDNOTES

1. U.S. Department of Labor 2001. The data are from the survey conducted in March 2001. The BLS uses the current-cost approach. That is, the costs do not pertain to the costs for the previous year. Rather, annual costs are based on the current price of the benefits and current plan provisions as of March 2001. The annualized cost of these March 2001 benefits are then divided by the annual hours worked to yield the cost per hour worked for each benefit, including workers' compensation benefits. Thus, if the annual workers' compensation premium per worker is $800 and the employee works 2,000 hours per year, the workers' compensation cost is $0.40 per hour worked. For further explanation of the BLS data, see Appendix A of U.S. Department of Labor 2000a.

2. Data on workers' compensation costs as a percentage of gross earnings for all non-federal employees are only available since 1991.

3. Citations to the U.S. Department of Labor publications containing the data used to prepare this article are provided in the references.

4. This article uses the term "remuneration" in place of the term "compensation" that is used in the BLS publications in order to more clearly distinguish between workers' compensation and remuneration.

5. U.S. Department of Labor 1999. See Chart 1, "Coverage of the Employment Cost Index, Total Civilian Employment, 1998." Comparable data for 2001 are not yet available, but should not differ much from the 1998 data.

6. The terms "gross earnings" and "benefits other than pay" are not used in the BLS publications. These terms are used here to make the base for calculating workers' compensation costs as a percentage of payroll comparable to measures used in other publications.

7. The parentheses around the workers' compensation figures in row 9A of each panel in Table 1 and in Table 2 are to show that these figures are included in the legally required benefits figures in row 9 of each panel.

8. Mont, Burton, Reno, and Thompson 2001.

9. The differences in the employers' costs of workers' compensation as a percentage of payroll are greater than is immediately obvious. The NASI data relate the employers' costs for workers' compensation only to the payroll of employers who are covered by state or federal workers' compensation programs. The costs would be a lower percentage if the base were payroll for all employers (whether covered or not), which is the base that the BLS data use.

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The Effects of Changes in the Oregon Workers' Compensation Program on Employees' Benefits And Employers' Costs

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This article examines whether several changes during the 1980s and1990s in the Oregon workers' compensation statute relating to benefit eligibility affected the benefits paid to workers and the costs to employers and provides estimates of the overall magnitude and distribution of any such effects. This study is based on an analysis of workers' compensation claims involving injuries that occurred between 1986 and 1996 and that resulted in payment of cash benefits. The results of this study should be considered in conjunction with other complementary research prepared as part of the *Oregon Major Contributing Cause Study* (Welch 2000) conducted by the Workers' Compensation Center of Michigan State University.[1]

Section A: Changes In The Oregon Workers' Compensation Statute

Between 1987 and 1995, the Oregon legislature passed a series of amendments to the workers' compensation statute that made it harder for workers to quality for benefits. These include HB 2271, which increased or clarified the burden of proof on workers in order to qualify for benefits. HB 2271 was enacted in 1987 and was effective for accidents that occurred on January 1, 1988 or later.

The 1990 Oregon legislature enacted SB 1197, which *inter alia* provided that claims were compensable under the Oregon workers' compensation statute only if work was the "major cause" of the permanent disability or need for treatment. This provision is generally referred to as the major contributing cause (MCC) requirement. SB 1197 also required the worker to provide medical evidence based on "objective findings" in order to establish compensability. The statute was applicable to all cases with accident dates of July 1, 1990 or later as well as cases with prior accident dates that were still active as of July 1, 1990 except for cases then in litigation.

The 1995 Oregon legislature enacted SB 369, which inter alia amended the workers' compensation statute to provide further restrictions on claims that involved a "combined condition." This provision applied to accidents occurring on or after June 7, 1995 as well as cases with prior accident dates that were active as of that date, including cases in litigation. Because some of our statistical analysis relies on data in six-month periods, we treat SB 369 as if the effective date were July 1, 1995.

As described elsewhere in the *Oregon Major Contributing Cause Study* (Welch 2000), there were other changes in the Oregon workers' compensation program that also potentially affected the compensability of certain claims during the period of our study. In particular, the State Accident Insurance Fund (SAIF) engaged in an aggressive strategy of denying claims from about mid-1989 until about mid-1992. Because SAIF insures a large proportion of the covered workforce, this strategy had a significant impact on the overall denial rate.

We rely on statistical controls to account for the effects of HB 2271 after January 1988 and for the aggressive denial policy of SAIF between mid-1989 to mid-1992. However, our primary interest is the effects of SB 1197 and SB 369, and so we partition the study period as follows:

(1) January 1986 – June 1990
(Pre SB 1197)

(2) July 1990 – June 1995
(SB 1197 only)

(3) July 1995 – December 1996
(SB 1197 plus SB 369)

To evaluate the impact of these legislative changes on Oregon benefits and costs, we estimate multiple regression models predicting claim frequency, average benefits per claim, and the average benefit per worker.[2] In Section B, we present the results of our regression analyses evaluating the effects of the Oregon legislation on benefits and costs. In Sections C and D we provide information on the aggregate effects of SB 1197 and SB 369 on benefits paid to workers and costs to employers. Sections E and F provide comparisons between Oregon benefits and Oregon costs to those in other jurisdictions. Section G provides our conclusions.

Section B: Empirical Results For Benefits Based On Our Analysis Of Accepted Claims

One way to evaluate the impact of legislation on benefit payments would be

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Table 1
Predicted Claim Rates Not Controlling for Trend, By Type of Injury and Period, 1986-1996
(Model I)

Type of Injury	1986 - 1989	1990	1991-1994	1995	1996
Back Strains & Sprains	0.9339%	0.8425%	0.7512%	0.6672%	0.5832%
		-9.78%	-19.57%	-28.56%	-37.56%
Other Strains & Sprains	1.0302	0.9488	0.8673	0.7726	0.6778
		-7.91	-15.81	-25.01	-34.21
Trauma Injuries	0.5560	0.5260	0.4961	0.5211	0.5461
		-5.39	-10.77	-6.27	-1.78
Open Wounds	0.3020	0.2795	0.2570	0.2447	0.2324
		-7.45	-14.89	-18.97	-23.06
Other Injuries	0.3413	0.3185	0.2956	0.2768	0.2579
		-6.69	-13.39	-18.92	-24.45
Carpal Tunnel Syndrome	0.1295	0.1195	0.1096	0.0907	0.0718
		-7.69	-15.38	-29.98	-44.58
Musculo Skeletal Diseases	0.1463	0.1306	0.1149	0.1084	0.1020
		-10.74	-21.48	-25.89	-30.31
All Other Diseases	0.3229	0.2713	0.2196	0.2341	0.2487
		-16	-32.00	-27.5	-22.99
Total	3.7856	3.4624	3.1391	2.9321	2.7251
		-8.54	-17.08	-22.55	-28.02

Source: Thomason and Burton (2000), Table 7-1.

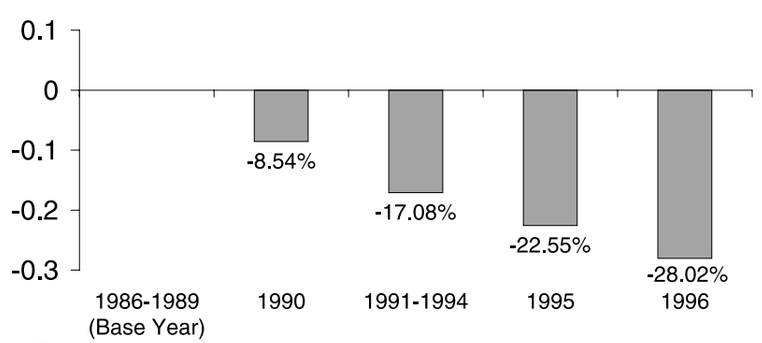
to compare payments made before the effective date of the legislation with payments made after that date. Such a comparison could be misleading, however, if there were other changes concurrent with the legislation that also affected benefit payments. For example, changes in the benefit structure or in the wage rate paid to injured workers could affect the average benefit paid to claimants, and, through the benefit utilization effect, claim frequency.

Thus, it is necessary to control for any simultaneous changes in other factors influencing benefit costs. A list of the control variables used in our analyses, as well as other details of our methodology, is provided in the Appendix to this article.

However, we do not have data on all of the time-related factors potentially affecting claim frequency and average benefit costs. For example, over time we might expect that employers would increasingly utilize safer production technologies that would result in a decline in the claims rate. Lacking data on the relative safety of production technologies, this decline might be erroneously attributed to the changes in the Oregon statute. For this reason, we also included a time trend variable in some of our regression equations. Regression equations that include a time trend are labeled Model II, while equations that do not are labeled Model I.

The Model II estimates are obviously more conservative than those produced by Model I, in that the Model II estimates control for time-related changes

Figure A - Percentage Decline in Predicted Claim Rates Not Controlling for Trend, for All Injuries, 1986-1996



Source: Table 1.

in the claims rates that may be wrongly attributed to the legislation in Model I. On the other hand, it is possible that some of the effects of the legislation are being captured by the trend variable in Model II. For statistical purposes, we treat SB 1197 as effective on July 1, 1990 and SB 369 as effective on July 1, 1995. However, as previously noted, these laws were retroactive for certain claims with earlier injury dates and thus the trend variable may be absorbing the retroactive effects of the legislation. Further complicating the analysis is the possibility that there are unobserved, time-related effects that have a non-linear impact on claims rates (e.g., employers' safety programs may have grown slowly until 1990 and then rapidly proliferated), in which case Model II may still overestimate the effect of SB 1197 and HB 369. We will consider the plausibility of the Model I and Model II results in our conclusions.[3]

Subsection B.1: Changes in Frequency of Claims

Model I for the Total Sample of Claims

Table 1 and Figure A provide information on the estimated claims rates for eight types of conditions as well as for total claims (bottom row) for five different periods, corresponding to the various legislative regimes: (1) 1986-89, prior to the enactment of SB 1197 and SB 369; (2) 1990, when SB 1197 was in effect for half of the year; (3) 1991-94, after the enactment of SB 1197 and before the enactment of SB 369; (4) 1995, when SB 1997 was in effect for the entire year and SB 369 was in effect for half of the year; and (5) 1996, when SB 1197 and SB 369 were both in effect for the entire year. These claims rates were estimated using the Model I regression so they control for all variables except the time trend.[4]

For 1986-1989, the average predicted total claims rate per year for Oregon workers was 3.7856%. SB 1197 became effective on July 1, 1990, and we estimate that the annual total claims rate for 1990 was 8.54% lower than it was in the pre-SB 1197 period.[5] The 17.08% reduction shown in the 1991-94 column for the total row in Table 1 reflects the effect of SB 1197 during each of those years. We treat SB 369 as having become effective on July 1, 1995, and so for 1995, we estimate that the annual claims rate was 22.55% lower than its level in 1986-89. [6] In 1996, when SB 369 and SB 1197 were both in effect for the entire year, the combined effect of these laws was to reduce the annual claims rate by 28.02% below the claims rate in 1986-1989, before either law was enacted

Model I for Eight Types of Injuries

Table 1 also presents information on predicted claims rates for eight specific types of injuries. The sum of the claim rates for the eight types of injuries is the claims rate for the total sample. The results for each type of injury can be interpreted in a manner similar to the interpretation of the results for the total sample. For example, the predicted claims rate for back strains and sprains was 0.9339% of all workers per year in 1986-1989. The claims rate for backs fell by 19.57% (relative to the 1986 – 1989 level) in 1991-94, when SB 1197 was in effect for the entire year. And in 1996, when SB 1197 and SB 369 were both in effect for the entire year, back claims were 37.56% below the claims rate during 1986 –1989.

The results for the eight types of injuries can be used to assess the plausibility of the statistical analysis. The effects of SB 1197 and SB 369 could be expected to have a greater effect on certain types of injuries than on others. Specifically, the legislative changes requiring the injury to be the major contributing cause of the disability and for the medical evidence to be based on objective findings could have been expected to have the following effects on the frequency of claims relative to the average reduction in claims for the total sample:

Back Strains & Sprains
Greater than average effect

Other Strains and Sprains
Greater than average effect

Carpal Tunnel Syndrome
Greater than average effect

Musculoskeletal Diseases
Greater than average effect

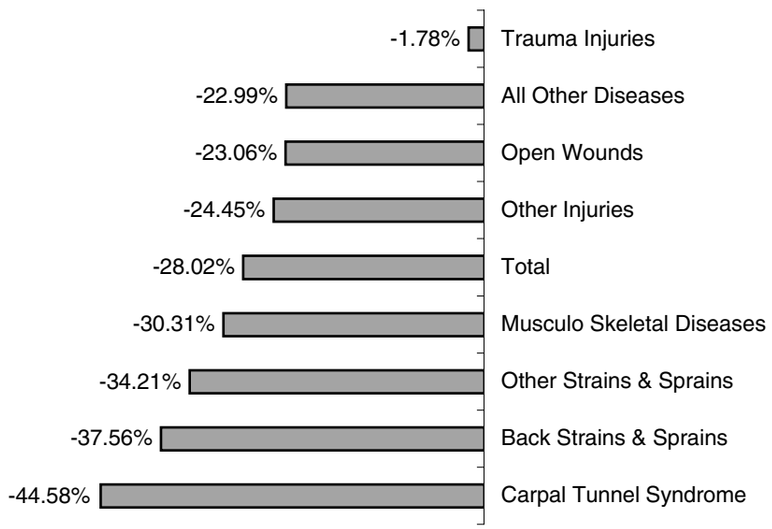
Trauma Injuries
Less than average effect

Open Wounds
Less than average effect

Other injuries
Not Clear

Other diseases
Not Clear

Figure B
Percentage Decline in Predicted Claim Rates Not Controlling for Trend, By Type of Injury, 1996 Compared to Base Years (1986-1989)



Source: Table 1.

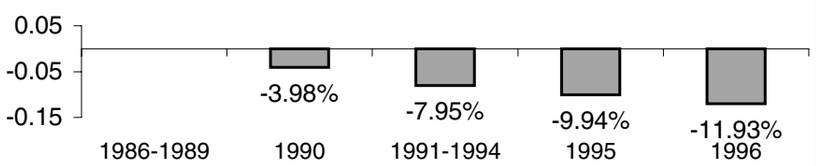
Table 2
Predicted Claim Rates Controlling for Trend, By Type of Injury and Period, 1986-1996
(Model II)

Type of Injury	1986 - 1989	1990	1991-1994	1995	1996
Back Strains & Sprains	0.8445%	0.8134%	0.7824%	0.7384%	0.6944%
		-3.68%	-7.36%	-12.57%	-17.77%
Other Strains & Sprains	0.9677	0.9274	0.8872	0.8188	0.7505
		-4.16	-8.32	-15.38	-22.45
Trauma Injuries	0.5293	0.5167	0.5041	0.5469	0.5897
		-2.37	-4.74	3.34	11.42
Open Wounds	0.2907	0.2759	0.2610	0.2548	0.2485
		-5.1	-10.19	-12.35	-14.51
Other Injuries	0.3105	0.3099	0.3093	0.3090	0.3088
		-0.19	-0.38	-0.47	-0.56
Carpal Tunnel Syndrome	0.1256	0.1180	0.1104	0.0927	0.0749
		-6.04	-12.07	-26.2	-40.33
Musculo Skeletal Diseases	0.1461	0.1305	0.1149	0.1085	0.1021
		-10.68	-21.37	-25.75	-30.13
All Other Diseases	0.2868	0.2590	0.2313	0.2695	0.3077
		-9.68	-19.35	-6.04	7.28
Total	3.5046	3.3653	3.2259	3.1563	3.0866
		-3.98	-7.95	-9.94	-11.93

Source: Thomason and Burton (2000), Table 7-2.

For all of the four types of injuries for which a greater than average effect was expected, the results in the 1996 column of Table 1, which are also shown in Figure B, indicate that the decline in claims relative to 1986-89 was greater than the total sample decline of 28.02% for all four of the types. Also, for the two conditions for which a smaller than average effect was expected (trauma injuries and open wounds), the decline was less than the total sample decline of 28.02%. Thus among all six types of injuries for which declines relative to the total sample average was predicted, the actual decline corresponded to the predictions for all six of the injury types. This is reasonably persuasive evidence to support the plausibility of the model.

Figure C
Percentage Decline in Predicted Claim Rates Controlling for Trend, for All Injuries, 1986-1996



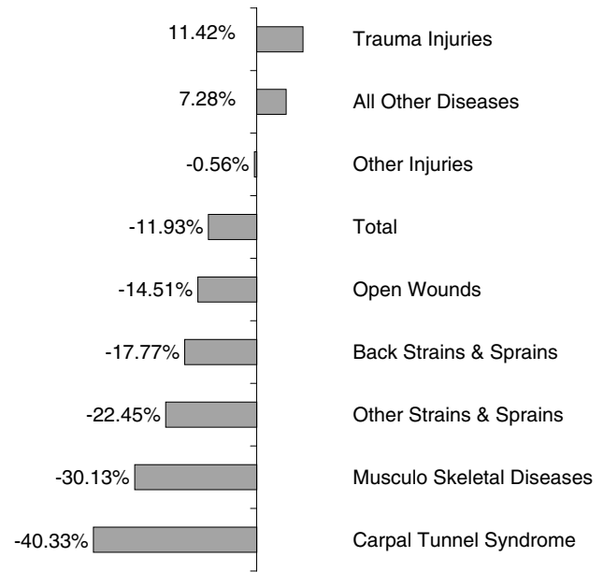
Source: Table 2

Model II for the Total Sample of Claims

Table 2 provides information on the estimated frequency of compensated workers' compensation claims in Oregon based on the Model II regressions (that is, including a time trend variable).[7]

The "Total" row in Table 2 and Figure C report the predicted claims rate for all injury types. For 1986-1989, the average predicted claims rate per year for Oregon workers was 3.5046%. After July 1, 1990, when SB 1197 became effective, the predicted claims rate fell by 3.98% relative to the pre-SB 1197 period.[8] In 1991-94, when SB 1197 was in effect for the entire year, the predicted claim rates were down 7.95% compared to the 1986-89 rates. We treat SB 369 as having become effective on July 1, 1995, and so for 1995, the predicted annual claims rate fell to a level that was 9.94% below the 1986-89 claim rates[9]. In 1996, when both SB 1197 and SB 369 were in effect for the entire year, the combined

Figure D
Percentage Decline in Predicted Claim Rates Controlling for Trend, By Type of Injury, 1996 Compared to Base Years (1986-1989)



Source: Table 2.

effect of both laws was to reduce the claims rate by 11.93% relative to its 1986-1989 level.

Model II for Eight Types of Injuries

Table 2 also presents information on predicted claims rates for eight specific types of injuries in regressions including a control variable for time. The sum of the claim rates for the eight types of injuries is the claims rate for the total sample. The results for each type of injury can be interpreted in a manner similar to the interpretation of the results for the total sample. For example, the predicted claims rate for back strains and sprains was 0.8445% of all workers per year in 1986-1989. Then in 1991-94, when SB 1197 was in effect for the entire year, the claims rate for backs was 7.36% lower than the claims rate for back sprains and strains during the pre-SB 1197 period. And in 1996, when SB 1197 and SB 369 were both in effect for the entire year, back claims were 17.77% below the predicted rate for the 1986 – 1989 period when neither law was in effect.

The results for the eight types of injuries can be used to assess the plausibility of the statistical analysis. The effects of SB 1197 and SB 369 could be expected to have a greater effect on four types of injuries and a less than average effect on two other types of injuries, as was previously indicated.

The results in Table 2 and Figure D show these expected relationships were found for five of the six injury types. The exception was for open wounds, where we expected SB 369 and SB 1197 to have a smaller effect in reducing the claims rate than they do on the total claims rate, but the evidence indicates that claims for open wounds declined 14.51% in 1996 compared to an overall decline of 11.93% in claims for all injury types combined. Despite this exception, we feel the individual injury type results in Tables 1 and 2 and Figures B and D support the plausibility of our models.

Summary of Model I and Model II for Total Sample of Claims

The information in the "Total" rows of Table 1 and Table 2 has been transferred to Table 3 in order to provide a convenient summary of the range of estimated effects of SB 1197 and SB 369 on the frequency of claims.

The Model I results in Table 3 suggest that the combined effect of SB 1197 and SB 369 was to reduce claims in 1996 by about 28% below what they otherwise would have been. The Model II results (which are obviously the "most conservative" but not necessarily the most accurate numbers) suggest that the combined effect of SB 1197 and SB 369 was to reduce claims in 1996 by about 12% below what they otherwise would have been.

Subsection B.2: Changes in Average Benefits Per Claim

In this subsection we discuss our estimates of the effect of SB 1197 and SB 369 on the average cost of a claim. Specifically, we use regression analysis to estimate the impact of the MCC legislation on: (1) the probability that the claim would be resolved with a disputed claim settlement (DCS), (2) the amount of the award for claimants receiving a DCS, (3) the duration of temporary total disability in the average lost time claim, (4) the probability of a permanent partial (PPD) disability, (5) the average PPD award for claimants with a scheduled PPD, (6) the average PPD award for claimants with a nonscheduled PPD, (7) the average medical benefit paid, (8) the

Table 3
Oregon Claims Rates in Years Shown as Percent Reduction From Estimated Claims Rates if Legislation had not been Enacted for Total Sample of Claims

	1990	1991-1994	1995	1996
Model I	8.54%	17.08%	22.55%	28.02%
Model II	3.98%	7.95%	9.94%	11.93%

Source: Thomason and Burton (2000), Table 7-A.

probability that the claimant will receive vocational rehabilitation (VR) benefits, and (9) the average VR benefit payment for claimants receiving VR. We did not attempt to estimate the cost of fatal and permanent total disability (PTD) claims for two reasons: (1) these claims represent a very small portion of the universe of workers' compensation claims and (2) because they are such a small number of claims, statistical estimates of the impact of the legislation on these costs are unreliable. A description of the methodology used to construct these estimates is in the Appendix.

As previously indicated, the value of each cost component was estimated using two different regression specifications, the more conservative of which (Model II) included a trend variable (the date of injury) that controls for changes related to time.

After estimating the cost of the various claim types and cost components separately (as well as the probability that a particular type of cost would be incurred), we combined these predicted cost component estimates into a single estimate of the average expected cost of a disabling workers' compensation claim under each legislative regime. This average expected cost per claim is reported in the top row of Table 4 and in Figure E for Model I and in the bottom row of Table 4 and in Figure F for Model II.

The Model I results in Table 4 and Figure E indicate that the expected total costs per claim in 1996 were $7,572, which is 40.47% less than the estimated cost of claims in 1986-89. As expected, smaller declines in expected costs per claim were found in the Model II results in Table 4 and Figure F. For example, the expected total costs were $10,827 in 1996, which is only 1.37% less than the predicted costs in 1986-89

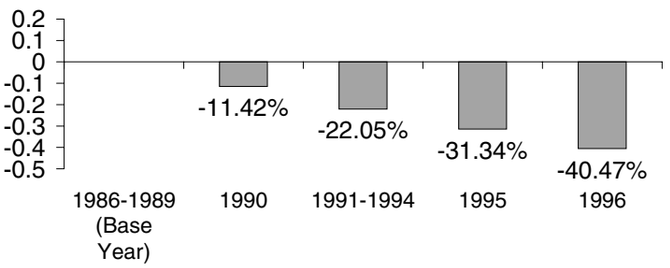
The Model II results in Table 4 and Figure F suggest that SB 1197 and SB 369 had very little effect on the average cost per claim, which could result from

Table 4
Model I and Model II Results: Increases or Decreases in Oregon Average Benefits per Claim Shown as Percent of Average Benefits per Claim if Legislation had not been Enacted

	1986-1989	1990	1991-1994	1995	1996
Model I	$ 12,721	$ 11,268 -11.42%	$ 9,916 -22.05%	$ 8,735 -31.34%	$ 7,572 -40.47%
Model II	$ 10,972	$ 11,064 0.84%	$ 11,168 1.74%	$ 11,035 0.53%	$ 10,827 -1.37%

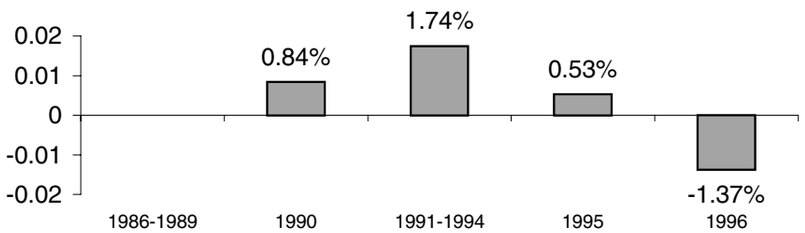
Source: Thomason and Burton (2000), Tables 7-B, 7-3, and 7-4

Figure E
Percentage Decline in Predicted Benefits Per Claim Not Controlling for Trend, For All Injuries, 1986-1996



Source: Table 4.

Figure F
Percentage Change in Predicted Benefits Per Claim Controlling for Trend, For All Injuries, 1986-1996



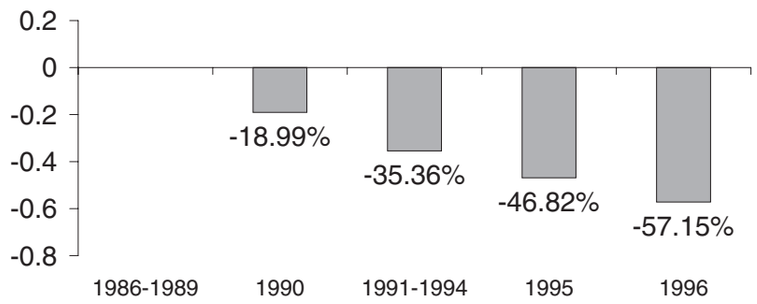
Source: Table 4.

Table5
Predicted Benefits per Worker, By Type of Estimate and Period, 1986 - 1996

Estimate	1986 - 1989	1990	1991-1994	1995	1996
Model I -- Model I	$481.55	$390.13	$311.26	$256.11	$206.34
% change from 1986-1989		-18.99	-35.36	-46.82	-57.15
Model I Rate & Model II Average Cost	$415.55	$383.25	$350.56	$323.56	$295.03
% change from 1986-1989		-7.77	-15.64	-22.14	-29.00
Model II Rate & Model I Average Cost	$445.81	$379.19	$319.87	$275.69	$233.72
% change from 1986-1989		-14.94	-28.25	-38.16	-47.57
Model II -- Model II	$384.70	$372.51	$360.26	$348.30	$334.18
% change from 1986-1989		-3.17	-6.35	-9.46	-13.13

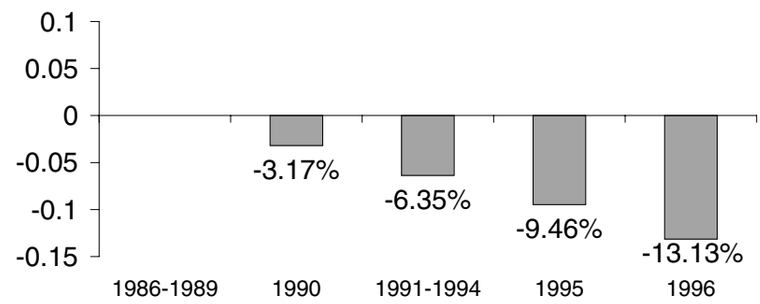
Source: Thomason and Burton (2000), Table 7-5.

Figure G
Percentage Change in Predicted Benefits Per Worker Not Controlling for Trend, For All Injuries, 1986-1996



Source: Model I-Model I results from Table 5

Figure H
Percentage Change in Predicted Benefits Per Worker Controlling for Trend, For All Injuries, 1986-1996



Source: Model II-Model II results from Table 5.

the reduced number of claims being the more serious claims.

Subsection B. 3: Changes in Average Benefits Per Employee

In this subsection, we report the impact of SB 1197 and SB 369 on the average cost of workers' compensation claims per employee. We obtain these results by multiplying the predicted claims rate for each period (as reported in Table 1 and Table 2) by the predicted average cost per claim for each period (as reported in Table 4). Since we estimate both claims rate and cost variables using two regression specifications (for Models I and II), we have four different estimates of the expected per employee cost of workers' compensation. These are shown in Table 5.

The range of estimates of the effect of SB 1169 and SB 369 is considerable. Use of Model I results for both frequency and average cost indicate that benefits per worker as of 1996 were 57.15% below what they would have been if the legislation had not been passed. These results are shown in the top row of Table 5 and in Figure G. Use of Model II results for both frequency and average cost indicate that benefits per worker as of 1996 were 13.13% below what they would have been if the legislation had not been passed. These results are shown in the bottom row of Table 5 and in Figure H. We return to the plausibility of these estimates in our conclusion in Section H.

Table 6
Oregon Workers' Compensation Benefits
1986-1998 (in Millions of Dollars)

	Total	Private Carriers		State Fund		Self-Insurance	
	$	$	%	$	%	$	%
1986	451.637	185.637	41.1	196.000	43.4	70.000	15.5
1987	509.584	201.584	39.6	230.000	45.1	78.000	15.3
1988	555.769	217.505	39.1	245.264	44.1	93.000	16.7
1989	576.080	236.038	41.0	244.042	42.4	96.000	16.7
1990	572.785	250.785	43.8	227.000	39.6	95.000	16.6
1991	586.623	236.623	40.3	250.000	42.6	100.000	17.0
1992	476.050	232.047	48.7	161.646	34.0	82.357	17.3
1993	468.459	224.950	48.0	162.466	34.7	81.043	17.3
1994	468.017	234.719	50.2	157.823	33.7	75.475	16.1
1995	462.822	228.562	49.4	159.607	34.5	74.653	16.1
1996	505.761	254.310	50.3	174.266	34.5	77.185	15.3
1997	470.828	239.823	50.9	166.455	35.4	64.551	13.7
1998	492.854	260.300	52.8	168.744	34.2	63.810	12.9

Source: Thomason and Burton (2000), Table 7-6.

Section C: The Effects Of The Statutory Changes On Benefits Received By Oregon Workers

Table 6 provides data on the benefit payments by type of insurance arrangements for Oregon workers from 1986-1998 based on data published by the Social Security Administration (SSA) or the National Academy of Social Insurance (NASI). The benefits include medical and cash benefits actually paid in the years shown and are in current dollars. Although there are year-to-year fluctuations around the trends, in general, total benefits increased from $452 million in 1986 to a peak of $587 million in 1991, then declined to $463 million in 1995, and then increased to $493 million in 1998.

Table 6 also provides information on the dollar amounts and shares of benefit payments accounted for by the three primary insurance arrangements in Oregon. The State Fund (SAIF) accounted for the largest share of benefit payments in most years from 1986 to 1991, but then SAIF's share dropped to about one-third of the benefits from 1992 to 1998. Private carriers accounted for about 40% of Oregon benefits from 1986 to 1991, and accounted for about half of all benefits from 1992 to 1998. Self-insuring employers accounted for about 15% of benefit payments in Oregon throughout most of the 1986 to 1998 period, although the share declined somewhat in recent years (probably reflecting the aggressive pricing by private carriers since the mid-1990s).

Table 7 uses the information from Table 6 on total benefits by year in combination with the information from Table 5 on the effects of SB 1197 and SB 369 to estimate the dollar amounts of the reductions in benefits paid to Oregon workers as a result of these laws. Panel A of Table 7 presents estimates based on the results in Table 5 suggesting the largest effect of the legislation, namely the Model I estimates of the effects of the laws on frequency and the Model I estimates of the effects of the laws on average cost. Column (1) in Panel A reports the actual benefits paid to Oregon workers in each year, as already shown in Table 6. In 1990, for example, Oregon workers were paid $573 million in cash and medical benefits. Column (2) in Panel A provides the Model I/ Model I results from Table 5. In 1990, the estimated effect was to reduce benefits paid to Oregon workers by 18.99%. By 1996, the results in Table 5 indicate that the combined effect of SB 1197 and SB 369 was to reduce benefits paid to Oregon workers by 57.15%. Since these laws remained in effect after 1996, we assume that benefits were also reduced by 57.15% in 1997 and 1998.

Column (3) of Panel A of Table 7 uses the information from columns (1) and (2) to estimate the benefits that Oregon workers would have received in the laws had not been enacted. In 1990, we estimate that Oregon workers would have received $707 million in benefits had SB 1197 not been in effect. Column (4) shows the estimates of the reduction in benefits paid to Oregon workers as a result of the laws. In 1990, we estimate that benefits paid to Oregon workers were reduced by $134 million as a result of the legislation. Finally, column (5) of Table 7 and Figure I show the cumulative reduction in benefits paid to Oregon workers as a result of SB 1197 (and SB 369 after 1995). The cumulative amount of reduction of benefits was $134 million in 1990 and reached $3.595 billion by 1998.

Panel B of Table 7 presents estimates based on the results in Table 5 suggesting the smallest effect of SB 1197 and SB 369, namely the Model II estimates of the effects of the laws on frequency and the Model II estimates of the effects of the laws on average costs. The

Table 7
Oregon Workers' Compensation Benefits, 1990-1998
Actual and Estimated If No Legislative Changes
(In Millions of Dollars)

Panel A: Model I/Model I

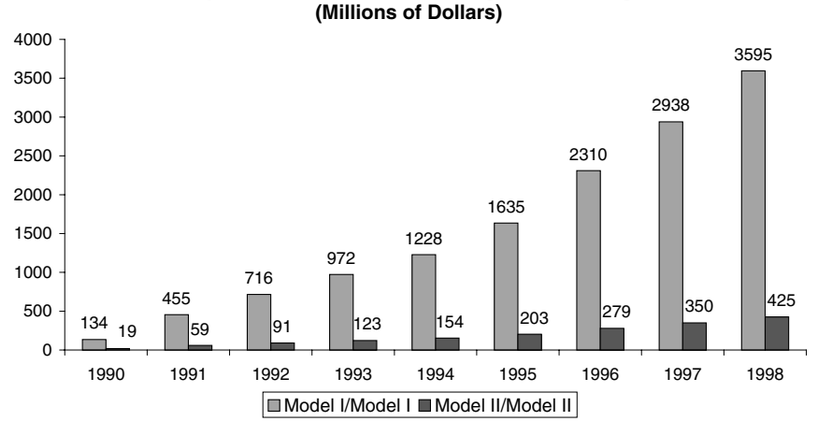
	Actual	Model I/Model I Effect	Estimated Benefit If No Legislation	Reduction In Benefits	Cumulative Reduction In Benefits
	(1)	(2)	(3) = (1)/[1-(effect)]	(4) = (3) - (1)	(5)
	$	%	$	$	$
1990	572.785	-18.99	707.055	134.270	134.270
1991	586.623	-35.36	907.523	320.900	455.170
1992	476.050	-35.36	736.463	260.413	715.583
1993	468.459	-35.36	724.720	256.261	971.844
1994	468.017	-35.36	724.036	256.019	1,227.864
1995	462.822	-46.82	870.293	407.471	1,635.335
1996	505.761	-57.15	1,180.306	674.545	2,309.880
1997	470.828	-57.15	1,098.782	627.954	2,937.833
1998	492.854	-57.15	1,150.184	657.330	3,595.164
Total	4,504.199		8,099.363	3,595.164	

Panel B: Model II/Model II

	Actual	Model II/Model II Effect	Estimated Benefit If No Legislation	Reduction In Benefits	Cumulative Reduction In Benefits
	(1)	(2)	(3) = (1)/[1-(effect)]	(4) = (3) - (1)	(5)
	$	%	$	$	$
1990	572.785	-3.17	591.537	18.752	18.752
1991	586.623	-6.35	626.399	39.776	58.528
1992	476.050	-6.35	508.329	32.279	90.807
1993	468.459	-6.35	500.223	31.764	122.571
1994	468.017	-6.35	499.751	31.734	154.305
1995	462.822	-9.46	511.180	48.358	202.663
1996	505.761	-13.13	582.204	76.443	279.106
1997	470.828	-13.13	541.991	71.163	350.270
1998	492.854	-13.13	567.347	74.493	424.762
Total	4,504.199		4,928.961	424.762	

Source: Thomason and Burton (2000), Table 7-7.

Figure I
Estimated Cumulative Reduction in Oregon Workers' Compensation Benefits Due to Legislative Changes
(Millions of Dollars)



Source: Table 7, Column 5 of Panels A & B.

Model II / Model II effects are shown in column (2) of Panel B of Table 7. The balance of Panel B uses these estimates effects to calculate the reduction in benefits paid to Oregon workers resulting from the legislation using the same process previously discussed for Panel A. The Panel B data suggest that SB 1197 and SB 369 reduced benefits paid to Oregon workers by $19 million in 1990, and that the cumulative effect of the legislation was to reduce benefits by $425 million between 1990 and 1998. These cumulative effects of Model II/Model II are also shown in Figure I.

The estimated reductions in benefits paid to Oregon workers between 1990 and 1998 as a result of SB 1197 and SB 369 shown in Table 7 and Figure I thus range from about $425 million to about $3.6 billion, depending on which Models are used to produce the estimates. We will examine the plausibility of these estimates in the concluding section of our study.

Section D: The Effects of the Statutory Changes on Costs for Oregon Employers

We make the assumption for this analysis that the provisions of SB 1197 and SB 369 did not have an independent effect on the spread between benefits paid and insurance premiums. We therefore project that a 10% decrease in benefits paid to workers will result in a 10% decrease in insurance costs to employers. We recognize that spread between benefits paid to workers and costs to employers varies over time and is affected by certain types of legislative and regulatory changes. In particular, the nature of regulations of the private insurance market can affect the costs of workers' compensation insurance, which is a subject we recently examined (Thomason, Schmidle, and Burton 2001). However, we are unaware of any reason for the spread to be affected by the legislative changes that are the focus of this study.

Although we assume that SB 1197 and SB 369 have equal percentage effects on benefits and costs, we have relied on completely separate sources of information for data on the aggregate workers' compensation benefit pay-

ments to Oregon workers and for data on the employers' costs of workers' compensation. As a result, the aggregate dollar amounts of the effects of the Oregon legislation can be much different for benefits than for costs.

Table 8 provides our estimates of the employers' costs of workers' compensation in Oregon from 1986 to 1998. Column (1) of Table 8 contains data on the Net (Direct) Earned Premium for Oregon as reported in various issues of the *Annual Statistical Bulletin (ASB)* published by the National Council on Compensation Insurance (NCCI). The premiums include the calendar year experience of SAIF as well as private carriers. Net premium reflects the impact of rate departures, experience rating, schedule rating, retrospective rating, and premium discounts. Net premium does not, however, reflect the dividends paid to Oregon employers. Column (2) of Table 8 contains the dividend ratio, which is the percentage of net earned premium returned to employers as dividends. As the data indicate, the dividends paid to Oregon employers varied considerably over the period form 1986 to 1998. Column (3) shows the Net Costs for Employers Purchasing Insurance after taking into account the effects of dividends.

Column (4) of Table 8 indicates the amount of workers' compensation benefits paid by self-insuring employers as reported by SSA/NASI and as shown in Table 6. An estimate of costs for self-insurers was constructed by using self-insurers' benefit payments with a loading for administration expenses. We have adopted the procedure used by the NASI in recent years, which assumes that administrative costs for self-insuring employers are equivalent to 11% of benefit payments. We use that procedure to calculate the costs of workers' compensation for self-insuring employers for Oregon employers, which means that the costs in column (5) of Table 8 are 111% of the benefits paid by self-insuring employers shown in column (4) of the Table.

The total costs of workers' compensation for Oregon employers are shown in column (6) of Table 8, which is the sum of the net costs for employers purchasing insurance in column (3) and the self-insurers' costs in column (5). We estimate that Oregon employers' costs of the workers' compensation program were $560 million in 1986. These costs increased to a peak of $796 million in 1990, and then declined in almost every year until reaching $494 million in 1998.

Table 9 uses the information from Table 8 on total employer costs by year in combination with the information from Table 5 on the effects of SB 1197 and SB 369 to estimate the dollar amounts of the reductions in workers' compensation costs paid by Oregon employers as a result of these laws. Panel A of Table 9 presents estimates based on the results in Table 5 suggesting the largest effect of the legislation, namely the Model I estimates of the effects of the laws on frequency and on average cost. Column (1) in Panel A of Table 9 reports the workers' compensation costs paid by Oregon employers in each year, as already shown in Table 8. In 1990, for example, Oregon employers expended $796 million on workers' compensation. Column (2) in Panel A contains the Model I/ Model I results from Table 5. In 1990, the estimated effect was to reduce costs for Oregon employers by 18.99%. By 1996, the results in Table 9 indicate that the combined effect of SB 1197 and SB 369 was to reduce employers' costs in Oregon by 57.15%. Since these laws remained in ef-

Table 8
Oregon Employers' Costs of Workers' Compensation Insurance, 1986-1998
(In Millions of Dollars)

	Net (Direct) Earned Premium Private Carrier and State Fund (1)	Dividend Ratio (2)	Net Cost for Employers Purchasing Insurance (1) x [100 % - (2)] (3)	Self-Insurance Benefits (4)	Estimate of Self-Insurance Costs (4) x 1.11 (5)	Total Costs (3) + (5) (6)
	$		$	$	$	$
1986	488.167	1.1%	482.797	70.000	77.700	560.497
1987	568.731	0.6%	565.319	78.000	86.580	651.899
1988	589.552	1.3%	581.888	93.000	103.230	685.118
1989	642.760	1.3%	634.404	96.000	106.560	740.964
1990	717.575	3.8%	690.307	95.000	105.450	795.757
1991	655.928	4.1%	629.035	100.000	111.000	740.035
1992	643.608	5.5%	608.210	82.357	91.416	699.626
1993	591.092	7.0%	549.716	81.043	89.958	639.673
1994	593.811	7.0%	552.244	75.475	83.777	636.021
1995	592.278	15.1%	502.844	74.653	82.865	585.709
1996	581.884	10.1%	523.114	77.185	85.675	608.789
1997	561.699	13.6%	485.308	64.551	71.652	556.960
1998	554.674	23.7%	423.216	63.810	70.829	494.045

Source: Thomason and Burton (2000), Table 7-11.

Table 9
Oregon Employers' Costs of Workers' Compensation Insurance, 1990-1998
Actual and Estimated If No Legislative Changes
(In Millions of Dollars)

Panel A: Model I/Model I

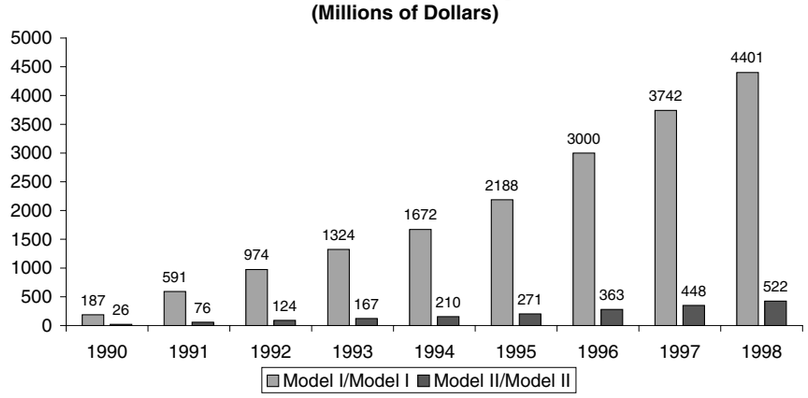
	Actual	Model I/Model I Effect	Estimated Cost If No Legislation	Reduction In Costs	Cumulative Reduction In Costs
	(1)	(2)	(3) = (1)/[1-(effect)]	(4) = (3) - (1)	(5)
	$	$		$	$
1990	795.757	-18.99%	982.295	186.538	186.538
1991	740.035	-35.36%	1,144.856	404.821	591.359
1992	699.626	-35.36%	1,082.342	382.716	974.075
1993	639.673	-35.36%	989.594	349.920	1,323.995
1994	636.021	-35.36%	983.944	347.923	1,671.918
1995	585.709	-46.82%	1,101.371	515.662	2,187.580
1996	608.789	-57.15%	1,420.745	811.956	2,999.535
1997	556.960	-57.15%	1,299.789	742.829	3,742.365
1998	494.045	-57.15%	1,152.965	658.919	4,401.284
Total	5,756.616		10,157.899	4,401.284	

Panel B: Model II/Model II

	Actual	Model II/Model II Effect	Estimated Cost If No Legislation	Reduction In Costs	Cumulative Reduction In Costs
	(1)	(2)	(3) = (1)/[1-(effect)]	(4) = (3) - (1)	(5)
	$	$		$	$
1990	795.757	-3.17%	821.808	26.051	26.051
1991	740.035	-6.35%	790.214	50.179	76.230
1992	699.626	-6.35%	747.065	47.439	123.668
1993	639.673	-6.35%	683.046	43.373	167.042
1994	636.021	-6.35%	679.147	43.126	210.168
1995	585.709	-9.46%	646.906	61.197	271.365
1996	608.789	-13.13%	700.805	92.016	363.381
1997	556.960	-13.13%	641.142	84.182	447.563
1998	494.045	-13.13%	568.718	74.673	522.235
Total	5,756.615		6,278.850	522.235	

Source: Thomason and Burton (2000), Table 7-12.

Figure J
Estimated Cumulative Reduction in Oregon Workers' Compensation Employers' Costs Due to Legislative Changes
(Millions of Dollars)



Source: Table 9, Column 5 of Panels A & B.

fect after 1996, we assume that costs were also reduced by 57.15% in 1997 and 1998.

Column (3) of Panel A of Table 9 uses the information from columns (1) and (2) to estimate the costs that Oregon workers would have experienced if the laws had not been enacted. In 1990, we estimate that Oregon employers would have expended $982 million on workers' compensation had SB 1197 not been in effect. Column (4) shows the estimates of the reduction in costs for Oregon workers as a result of the laws. In 1990, we estimate that costs for Oregon employers were reduced by $187 million as a result of the legislation. Finally, column (5) of Table 9 and Figure J show the cumulative reduction in costs for Oregon employers as a result of SB 1197 (and after 1995, also due to SB 369). The cumulative amount of reduction of costs was $187 million in 1990 and reached $4.401 billion by 1998.

Panel B of Table 9 presents estimates based on the results in Table 5 suggesting the smallest effect of SB 1197 and SB 369, namely the Model II estimates of the effects of the laws on frequency and on average costs. The Model II / Model II effects are shown in column (2) of Panel B of Table 9. The balance of Panel B uses these effects to estimate the reduction in costs for Oregon employers resulting from the legislation using the same process previously discussed for Panel A. The Panel B data suggest that SB 1197 and SB 369 reduced costs for Oregon employers by $26 million in 1990, and that the cumulative effect of the legislation was to reduce costs by $522 million between 1990 and 1998. The cumulative effects of the Model II/Model II on employers' costs of workers' compensation are also shown in Figure J.

The estimated reductions in the costs of workers' compensation for Oregon employers between 1990 and 1998 as a result of SB 1197 and SB 369 as shown in Table 9 and Figure J thus range from about $522 million to about $4.4 billion, depending on which Models are relied upon to produce the estimates. We will examine the plausibility of these estimates in the concluding section of our study.

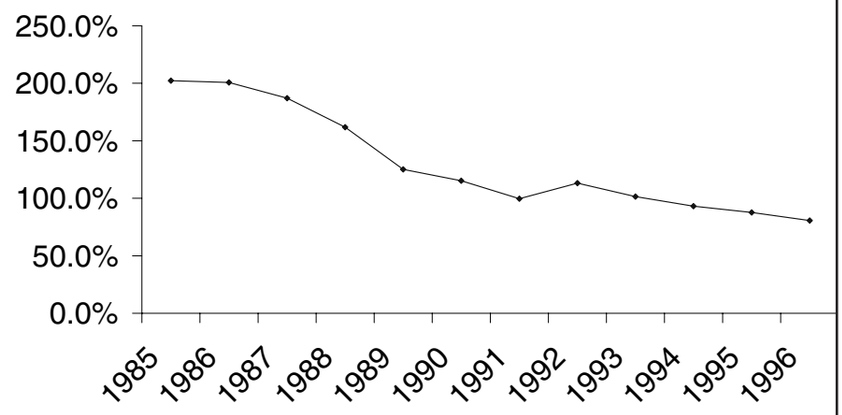
Table 10

**Workers' Compensation Cash Benefits per 100,000 Workers:
Oregon Payments Compared to National Payments, 1985-1996
(Dollar Amounts are Benefits per 100,000 Workers)**

Year	National Average of Dollar Amounts (1)	Change from Previous Year (2)	Oregon Dollar Amounts (3)	Change from Previous Year (4)	Oregon Benefits as Percentage of National Average (5) = (3)/(1)
	$	$			
1985	19,994,142	--	40,450,322	--	202.3%
1986	21,686,725	8.5%	43,524,360	7.6%	200.7
1987	24,070,018	11.0	45,008,067	3.4	187.0
1988	26,777,769	11.2	43,317,764	-3.8	161.8
1989	30,657,907	14.5	38,343,099	-11.5	125.1
1990	31,788,575	3.7	36,666,112	-4.4	115.3
1991	28,791,944	-9.4	28,673,452	-21.8	99.6
1992	25,843,136	-10.2	29,246,680	2.0	113.2
1993	22,954,373	-11.2	23,265,030	-20.5	101.4
1994	21,941,091	-4.4	20,427,780	-12.2	93.1
1995	20,001,465	-8.8	17,536,968	-14.2	87.7
1996	20,218,460	1.1	16,298,152	-7.1	80.6

Source: Thomason and Burton (2000), Table 7-14.

Figure K
Oregon Workers' Compensation Cash Benefits as Percentage of National Average



Source: Table 10, Column (5).

Section E: Workers' Compensation Cash Benefits Paid to Workers in Oregon Compared to Other Jurisdictions

Data are available from a recent article by Burton and Blum (2001) on the dollar amounts of benefits paid per 100,000 workers in Oregon as well as nationally (44 jurisdictions). The data are available for 1985 to 1996 and are presented for three measures of benefits: cash benefits, medical benefits, and total (cash plus medical) benefits. The analysis here is confined to an analysis of the payments for cash benefits, since other factors than the legislative changes in SB 1197 and SB 369, such as the effectiveness or lack thereof of managed care, have probably affected the payments for medical benefits.[10]

The data in column (1) of Table 10 show that the national average of cash benefits per 100,000 workers increased from $19.9 million in 1985 to $31.8 million in 1990; then rapidly declined until 1995 when the cash benefit payments were $20.0 million per 100,000 workers; and then increased slightly in 1996 to $20.2 million per 100,000 workers. The Oregon cash benefits, shown in column (3), were $40.5 million per 100,000 workers in 1985. As shown in column (5) this Oregon figure was 202.3% of the national average in 1985. Oregon payments increased between 1985 and 1987 but at a slower rate of growth than the national average, so by 1987 Oregon cash benefits were 187.7% of the national average. From 1988 to 1996, as shown in column (4), Oregon cash benefits per 100,000 workers dropped every year but 1992 (when there was a slight increase). Moreover, between 1988 and 1996, the drop in cash benefits was faster in Oregon than nationally in every year but 1992. As a result of the relatively steep drop in the state's payments, Oregon's cash benefits per 100,000 workers dropped (in an irregular pattern) from 187.0% of the national average in 1987 to 80.6% of the national average in 1996. This decline is shown in Column (5) of Table 10 and in Figure K.

Table 11
Adjusted Manual Rates, Selected Jurisdictions, 1975 - 1995
(dollars paid per $100 of payroll)

Year	Idaho	Washington	California	Contiguous States	US	Oregon	Oregon As Percentage Of National Average
1975	$1.122			$1.394	$0.949	$1.666	175.65%
1976	1.320			1.728	1.130	2.136	189.04
1977	1.373			2.034	1.294	2.694	208.16
1978	1.285			2.043	1.466	2.801	191.09
1979	1.413			2.085	1.582	2.756	174.21
1980	1.347			1.956	1.645	2.564	155.85
1981	1.606			1.871	1.613	2.135	132.32
1982	1.455			1.803	1.511	2.151	142.39
1983	1.452	$1.652		1.549	1.490	1.544	103.65
1984	1.467	1.958		1.716	1.466	1.724	117.58
1985	1.551	1.652		1.791	1.599	2.171	135.83
1986	1.666	1.958	$3.017	2.368	1.977	2.831	143.21
1987	2.064	1.879	3.449	2.607	2.189	3.034	138.62
1988	2.315	1.839	3.836	2.725	2.420	2.911	120.29
1989	2.198	1.838	3.876	2.709	2.653	2.924	110.21
1990	2.428	1.941	3.954	2.873	2.951	3.171	107.45
1991	2.409	2.001	4.244	2.919	3.096	3.023	97.62
1992	2.663	2.031	4.744	3.060	3.267	2.802	85.77
1993	2.838	2.053	4.856	3.061	3.478	2.497	71.80
1994	2.633	2.086	3.805	2.714	3.188	2.331	73.13
1995	2.394	1.981	3.150	2.450	2.973	2.275	76.52

Source: Thomason and Burton (2000), Table 7-16.

Another way to demonstrate the rapid decline in payment of cash benefits per 100,000 workers Oregon is to contrast the payments of $16.3 million per 100,000 workers in 1996 (the year with the lowest payments) with the payments of $45.0 million per 100,000 workers in 1987 (the peak year). Between 1987 and 1996, cash benefits paid per 100,000 workers declined by over 63% in Oregon.

Figure L
Adjusted Manual Rates: Oregon, Average of Contiguous States, US Average, 1975-95

Source: Table 11.

Table 12
Employers' Costs of Workers' Compensation per $100 of Payroll
1995-1999, U.S. and Oregon

	US: 48 States Weighted (1)	Change During Year (2)	Oregon (3)	Change During Year (4)	Oregon as Percentage of National Average (5)
	$	%	$	%	%
January 1995	2.973	--	2.275	--	76.5
December 1995	2.869	-3.5	2.275	--	79.3
December 1996	2.728	-4.9	2.234	-1.8	81.9
December 1997	2.526	-7.4	2.000	-10.5	79.2
December 1998	2.405	-4.8	1.688	-15.6	70.2
December 1999	2.364	-1.7	1.607	-4.8	68.0
Cumulative		-20.5		-29.4	

Source: Thomason and Burton (2000), Table 7-17.

Section F: The Costs Of Workers' Compensation Insurance In Oregon Compared To Other Jurisdictions

The costs of workers' compensation insurance for Oregon employers can be compared to the insurance rates in other jurisdictions in order to provide further information on the state's program.

Subsection F.1: 1975-95 Comparisons Based on Upjohn Institute Study

We calculated the average employers' costs of workers' compensation insurance for 71 insurance classifications for 48 jurisdictions (including the District of Columbia) for the rates in effect on January 1 of each year between 1975 and 1995. The methodology and results are presented in Thomason, Schmidle, and Burton (2001). One of our measures of costs is "adjusted manual rates," which is a measure that begins with manual rates (or pure premiums) and takes into account the modifying effects of factors such as premium discounts, experience rating, schedule rating, and dividends. The results for the U.S., Oregon, and the contiguous states to Oregon (namely California, Idaho, and Washington) are presented in Table 11 and Figure L.

The data in Table 11 indicate that Oregon employers were paying $1.666 per $100 of payroll for workers' compensation insurance in 1975, which can be restated as Oregon employers paying workers' compensation insurance premiums equal to 1.666% of payroll in 1975. Oregon insurance rates increased until 1978 (when they represented 2.801% of payroll), then declined until 1983 (when rates were 1.544% of payroll), then generally increased with some temporary declines until 1991, when Oregon employers were expending 3.023% of payroll on workers' compensation premiums. Subsequent to 1991, the insurance rates paid by Oregon employers rapidly declined, until they reached a low of 2.275% of payroll in 1995.

The data in Table 11 and the comparisons in Figure L indicate that from 1975 to 1990, Oregon's insurance rates were always higher than the national average and from 1984 to 1991 were always higher than the average for the contiguous states. After the end of those periods of higher than average rates, however, Oregon's insurance rates were consistently lower than insurance rates among contiguous states and the national average. In 1995, the final year included in Table 11 and Figure L, the insurance premiums for the Oregon employers in the 71 insurance classifications averaged 2.275% of payroll, compared to the national average of premiums representing 2.973% of payroll. Restated, the cost of workers' compensation insurance in Oregon in 1995 was 76.52% of the national average in 1995.

Subsection F.2: 1995-99 Comparisons Based on Projections

We do not have data on the employers' costs of workers' compensation insurance after 1995 using the methodology in our Upjohn Institute study. In order to provide a rough idea of what has happened to insurance rates in Oregon and nationally after 1995, we have relied on data from the 2000 edition of the *Annual Statistical Bulletin (ASB)* published by the NCCI.

Table 12 provides our calculations of developments through December 1999, the latest date with data available for national developments from the 2000 edition of the ASB. The January 1995 figures for the percentage of payroll expended on workers' compensation insurance in the U.S. and in Oregon are shown in the first row of Table 12. The data in columns (2) and (4) on changes in insurance rates during the years 1995 to 1999 are taken from the 2000 edition of the ASB. We have used these data on changes in insurance rates to project the adjusted manual rates in the U.S. and Oregon shown in the December 1995 through December 1999 entries in columns (1) and (3) in Table 12. The data indicate that between January 1995 and December 1999 adjusted manual rates declined by 20.5% nationally and by 29.4% in Oregon. As a consequence, Oregon's workers' compensation insurance costs for employers dropped from 76.5% of the national average in 1995 to 68.0% in 1999.

The employers' costs of workers' compensation insurance in Oregon relative to the national average of costs can

be followed over an extended period (from 1975 to 1999) by linking the results in Tables 11 and 12. During the time periods of greatest interest to the present study, Oregon's costs of insurance were about 140% of the national average in 1985-87, declined quickly to about 110% of the national average by 1990, continued a rapid decline until 1993, when Oregon's costs had dropped to about 70% of the national average, and then Oregon's costs fluctuated between about 70% to 80% of the national average between 1994 and 1999.

Section G: Conclusions

There is considerable evidence that the statutory changes in the workers' compensation statute in Oregon since the mid-1980s have significantly reduced payments to workers and reduced costs to employers. There is a considerable range of estimates in our analysis of the effects of the statutory changes on the frequency and average costs per claim of compensated claims as summarized in Table 5. The statistical results that do not control for time trends (Model I – Model I) suggest that benefits were 57% lower in 1996 than they would have been in the absence of the enactment of SB 1197 and SB 369. The statistical results that control for time trends (Model II – Model II) suggest that benefits were 13% lower in 1996 than they would have been if the two statutes had not been enacted.

Data from other sources indicate that cash benefits paid to Oregon workers declined much more rapidly in Oregon than in most states after the late 1980s. As shown in Table 10, cash benefits in Oregon per 100,000 workers dropped from about 200% of the national average in 1985, to about 115% of the national average in 1990, to about 80% of the national average in 1996.

The data on the employers' costs of workers' compensation insurance presented in Section F present a pattern similar to those for benefit payments per 100,000 workers. Costs dropped quickly from the mid-1980s until 1990, when they were about 110% of the national average, and then declined further at a rapid pace until 1993, when Oregon's costs were about 70% of the national average, and thereafter fluctuated between 70% and 80% of the national average for the balance of the 1990s.

The data on benefits paid per 100,000 workers and on the employers' costs of workers' compensation suggest that much of the declines in benefits and in costs took place prior to 1990, and (except for those claims that were affected by the retroactive provisions of the legislation) SB 1197 and SB 369 can not be responsible for those declines taking place before the legislation was in effect. However, there were also substantial declines in the payments of cash benefits and employer costs that occurred after 1990, in both cases amounting to a decline of about 30% to 40% relative to the national average by 1998.

This suggests that the Model II – Model II estimates presented in Table 5 – that Oregon benefits in the mid-1990s were about 13% below what they would have been if SB 1197 and SB 369 had not been enacted – are unduly conservative estimates of the effects of these laws on the benefits paid to Oregon workers and on the costs of the workers' compensation program for Oregon employers. On the other hand, the Model I – Model I estimates presented in Table 5 – which suggest that Oregon benefits in the mid-1990s were more than 50% below what they would have been if SB 1197 and SB 369 had not been enacted – are implausibly large. Our judgment based on the evidence we have developed is that by the mid-1990s the Oregon legislation had reduced costs and benefits by about 20% to 25% below what the amounts would have been if SB 1197 and SB 369 had not been enacted.

ENDNOTES

1. The *Oregon Major Contributing Cause Study* (Welch 2000), including the portion we contributed (Thomason and Burton 2000), can be downloaded from www.cbs.state.or.us/wcd

2. An extended version of our models and methodology is presented in Thomason and Burton (2000).

3. Additional information on the data set used for our empirical analysis, the specifications of the regressions, and descriptions of the estimating techniques are included in Welch (2000) Appendix E.

4. The full set of regression coefficients on which the information in the Total row of Table 1 is based is presented in Welch (2000) Appendix F, Table APPC.1.

5. In 1990, SB 1197 was in effect for only half of the year, and thus the 8.54% reduction is half of the full-year effect (8.54% = 17.08% X 0.5)

6. In 1995, SB 369 was in effect for only half the year, and so the 22.55% reduction shown in the total row in Table 1 and in Figure A is halfway between the 17.08% reduction in 1991-94 (when SB 1197 was in effect but not SB 369) and the 28.02% reduction in 1996 (when SB 1197 and SB 369 were both in effect for the entire year.

7. The full set of regression coefficients on which the information in the Total row of Table 2 is based is presented in Welch (2000), Appendix E, Table APPB.2.

8. In 1990, SB 1197 was in effect for only half of the year, and thus the 3.98% reduction is half of the full-year effect (3.98% = 7.95% X 0.5).

9. In 1995, SB 369 was in effect for only half the year, and so the 9.94% reduction shown in the total row in Table 2 is halfway between the 7.95% reduction in 1991-94 (when SB 1197 was in effect but not SB 369) and the 11.93% reduction in 1996 (when SB 1197 and SB 369 were both in effect for the entire year).

10. The data on medical costs per 100,000 workers in Oregon suggest that the state's costs increased from 98.6% of the national average in 1991 to 193.4% of the national average in 1996. This apparently rapid deterioration of the relative costs of medical benefits in Oregon seems implausible, and worthy of a separate study.

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APPENDIX A

The essence of our study is three equations pertaining to claims in the Oregon workers' compensation program with accident dates between 1986 and 1996. Two are based on statistical analyses of Oregon claims data and the third is a product of the other two equations.

(1B) Frequency of claims per worker per year

Dependent variable

Frequency. Number of claims paying cash benefits with accident dates in each of the 20 six-month periods between January – June 1987 and July – December 1996 in each of 68 or 69 (depending on the year) two-digit SIC industries divided by the total number employees in the corresponding two-digit industry during the same six month periods.

There are 1,378 observations using this measure of a dependent variable (20 six-month periods X 68 or 69 two-digit industries).

Control Variables

Benefit Index. Expected workers' compensation benefits per worker using actuarial assessment of generosity of Oregon workers' compensation statute in year of accident. Benefits are in constant (1996) dollars. Expected to have a positive relationship with frequency (i.e., higher benefits are expected to be associated with more claims).

Wages. Weekly wages in two-digit industry in year of accident. Wages are in constant (1996) dollars. Expected to have a positive relationship with frequency.

Changes in Employment. Percentage change in employment from previous year in two-digit industry. Expected to have a positive relationship with frequency because rapidly growing industries are likely to have more accidents.

Variables measuring significant periods in Oregon between 1986 and 1996

SAIF Effect. Variable with a value of 1 for each six months period from 7/1/89 to 6/30/92. Expected to have a negative relationship with frequency.

HB 2271 Effect. Variable with a value of 1 for each six months period from 1/1/88 to 12/31/96. Expected to have a negative relationship with frequency.

SB 1197 Effect. Variable with a value of 1 for each six months period from 7/1/90 to 12/31/96. Expected to have a negative relationship with frequency.

SB 369 Effect. Variable with a value of 1 for each six months period from 7/1/95 to 12/31/96. Expected to have a negative relationship with frequency.

(2B) Average benefits per claim

Dependent Variables

The following ten dependent variables are separately estimated for each of the relevant claims in the sample. (For most regressions, there were 289,414 observations. For regressions involving Disputed Claim Settlement (DCS) claims, there were additional 14,837 observations, for a total of 304,251 observations.) The results are then used to construct an estimate of the expected benefits in each case in a procedure that will be illustrated in Section 7.5 of this study.

Temporary Total Disability (TTD) Benefits Duration in TTD Case. TTD duration in each compensable claim that paid only TTD benefits.

Temporary Total Disability (TTD) Benefits Duration in Permanent Partial Disability (PPD) Case. TTD duration in each compensable claim that paid PPD benefits.

Probability of PPD Case. The proportion of compensable claims that paid PPD benefits.

Severity of Scheduled PPD Case. The number of degrees of scheduled permanent disability in each PPD case. For claims in which no scheduled permanent disability benefits were paid, the number of degrees was set equal to zero.

Severity of Unscheduled PPD Case. The number of degrees of unscheduled permanent disability in each PPD case. For claims in which no scheduled permanent disability benefits were paid, the number of degrees was set equal to zero.

Probability of Disputed Claim Settlement (DCS) Case. The probability that a claim was resolved with a DCS.

Amount of Benefits in DCS Case. The amount of benefits in dollars in each DCS case. This includes the payments for medical, vocational rehabilitation, and cash benefits made prior to the award as well as the amount of the DCS award itself.

Medical Benefits. The amount of dollars of medical benefits in each case.

Probability of Vocational Rehabilitation (VR) Benefits. The probability that a claim received VR benefits.

Amount of VR Benefits in VR Benefits Case. The amount of VR benefits in dollars in each VR case.

Independent Variables

Replacement Rate. The claimant's weekly TTD benefit as determined by his or her weekly wage, divided by this weekly wage. Expected to have a positive relationship with average benefits per claim.

Gender. Variable with a value of 1 if the claimant is a female. Expected to have a negative relationship with average benefits per claim.

Government Employee. Variable with a value of 1 if the claimant is a government employee. No prior expectation about relationship with average benefits per claim.

Age. Age of claimant at date of injury measured in days. Expected to have a positive relationship with average benefits per claim since older workers typically experience greater wage loss than younger workers.

Age Squared. Age of claimant at date of injury measured in day times age. No prior expectation about relationship with average benefits per claim.

Hospitalization. Variable with a value of 1 if the claimant was hospitalized. Expected to have a positive relationship with average benefits per claim.

Benefits Paid by Private Carrier. Variable with a value of 1 if the benefits are paid by private carrier (as opposed to SAIF or self-insuring employer). No prior expectation about relationship with average benefits per claim.

Benefits Paid by SAIF. Variable with a value of 1 if the benefits are paid by SAIF (as opposed to private carrier or self-insuring employer). No prior expectation about relationship with average benefits per claim after controlling for SAIF effect variable (discussed below).

Occupation. Four dummy variables with a value of 1 if worker was employed in a particular occupation (as opposed to the other three occupations with designated with dummy variables or the omitted occupation, which is operators, fabricators, and laborers). No prior expectation about relationship with average benefits per claim.

Industry. Eleven dummy variables with a value of 1 if worker was employed in a particular industry (as opposed to the other 10 industries designated with dummy variables or the omitted industry, which is wholesale and retail trade). No prior expectation about relationship with average benefits per claim.

Nature of Injury. Eight dummy variables with a value of 1 if worker had particular nature of injury category (as opposed to the other seven nature of injury categories designated with dummy variables or the omitted nature of injury, which is rheumatism except back). No prior expectation about relationship with average benefits per claim.

Body Part Injured. Twenty-one dummy variables with a value of 1 if worker had a particular body part injured (as opposed to the other 20 body part categories designated with dummy variables or the omitted body part category, which is multiple injuries). No prior expectation about relationship with average benefits per claim.

Variables measuring significant periods in Oregon between 1986 and 1996

SAIF Effect. Variable with a value of 1 for any claim with a date of injury between7/1/89 and 6/30/92 and zero otherwise. Expected to have a negative relationship with benefits.

HB 2271 Effect. Variable with a value of 1 for any claim with a date of injury between 1/1/88 and 12/31/96 and zero otherwise. Expected to have a negative relationship with benefits.

SB 1197 Effect. Variable with a value of 1 for any claim with a date of injury between 7/1/90 and 12/31/96 and zero otherwise. Expected to have a negative relationship with benefits.

SB 369 Effect. Variable with a value of 1 for any claim with a date of injury between 7/1/95 and 12/31/96 and zero otherwise. Expected to have a negative relationship with benefits.

(3B) Average benefits per worker per year

Claim rates (i.e., the number of compensation claims per worker per year) were predicted for each of the 1,378 industry-year observations in the data set using the results of the regression equations described in Section 1B and an average predicted claim rate was calculated for the entire data set. This average predicted claim rate was then multiplied by the average per claim benefit payment that was predicted using the results of the regression analyses described in Section 2B to produce an average expected benefit payment per worker per year. This can be represented by the following equation:

$$\frac{\text{Benefits}}{\text{Worker/Year}} = \frac{\text{Claims}}{\text{Worker/Year}} \times \frac{\text{Benefit}}{\text{Claim}}$$

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