

Union wage premium

Tony Fang and Anil Verma

Everyone 'knows' that unions raise wages.

— Freeman and Medoff (1984, 43)

HOW MUCH MORE do unionized workers earn than non-unionized workers? Since the 1970s, the wage gap has varied between 10 and 25% in Canada (Renaud 1997) and between 21 and 32% in the U.S. (Freeman and Medoff 1984). However, since that time, wage differentials may have shifted in light of external pressures such as globalization, technological advancement, and demographic changes. Many changes have occurred in workplace practices, such as flexibility, employee involvement, and the adoption of technology. Since unionized and non-unionized workplaces are free to adopt innovations from each other, how they were implemented may also have contributed to shifts in wage differentials.

Some components of wage differences between the two groups of workers may persist because of union policies—for example, union insistence on standard wages with no variable pay component or seniority rules. But other differences may narrow or widen as union and non-union workplaces 'compete' with each other (or with a common foreign competitor) by adopting workplace innovations to enhance quality, productivity, safety, or other outcomes of interest.

This article investigates differences between union and non-union wages using data from the first Workplace and Employee Survey (WES). When compared with historical differences in wages, the results provide a dynamic view of wage differences between the two groups of workers (see *Data source*).

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Union and non-union wages over time

In a perfectly free market, differences between union and non-union wages may not sustain themselves in the long run. However, in practice they do persist even though their magnitude may vary over time. There are at least two explanations for their persistence:

One way for unions to create a sustainable wage premium would be to organize all (or nearly all) the employers in a given industry. They could then 'take wages out of competition' by forcing all (or most of) the employers to pay the same wage.

Another explanation is the 'shock effect' hypothesis (Slichter 1941; Slichter, Healy and Livernash 1960). The arrival of unions in a workplace spurs management to

Data source

Household surveys such as the Labour Force Survey (LFS), the Labour Market Activity Survey (LMAS), and the Survey of Labour and Income Dynamics (SLID) have been major sources of data on unionization (Lemieux 1993). However, research based on such data has not been able to control for the effect of firm characteristics—other than industry and firm size—on wage levels because of the lack of suitable data for more comprehensive analysis. The **Workplace and Employee Survey (WES)**, first conducted in 1999, offers the chance to examine the effect of workplace characteristics in addition to industry and firm size effects.

The sample used in this analysis was based on 23,540 employees in 5,733 workplaces in 1999. About 28% of the employees were either union members or covered by collective agreements. However, in workplaces with more than 50 employees, the rate rose to 46%. In larger workplaces (more than 100 employees), the proportion was almost identical (51% unionized, 49% not).

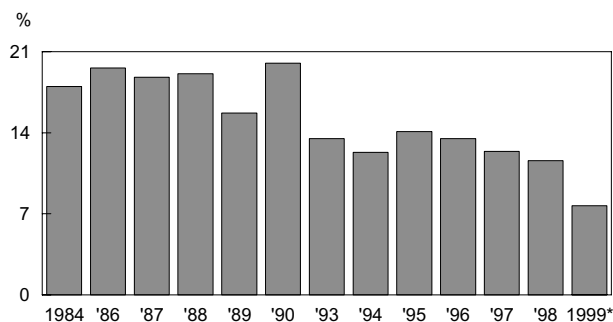
In the 1999 WES, the earnings reported are based on wages (or salary) before taxes as well as any other earnings (tips, commissions, bonuses, overtime pay) and other types of variable pay (profit-sharing, productivity bonuses, piecework) for the previous 12 months. WES allows respondents to report different bases of pay (hourly, daily, weekly, annually). All wages are expressed as an hourly rate.

adopt standard and formal procedures for a whole range of personnel activities such as hiring, promotion, record keeping, communication, and so on. By extension, therefore, unionized firms should be more efficient, given their use of formal systems of modern management. In contrast, non-union firms may engage in more ad hoc practices since no union is forcing management to be more systematic. Indeed, unionization is associated with lower turnover, both voluntary and involuntary (Freeman 1981, Brown and Medoff 1978, and Clark 1980).

Generally, wage differences are measured at a given point in time. They may persist, or they may narrow or widen. Spillovers may occur across the two groups. Some non-union employers may emulate union practices in wages and benefits (Foulkes 1980), while unionized employers may introduce employee involvement and flexible work designs fashioned after innovations in leading non-union firms (Kochan and Osterman 1994). In this dynamic view, differences between the two groups may be viewed as a series of leapfrogging rounds of workplace innovation (Verma 1984, 1985). Each group learns from the other and narrows the gap by adopting leading-edge innovations. Even as one group catches up, another round of innovations is set off.

As to historical context, the union wage differentials for selected years between 1984 and 1998 were estimated from various sources (Chart A). The data and

Chart A: The adjusted union wage premium has dropped since the mid-1980s.



Sources: 1984, *Survey of Union Membership*
 1986-1990, *Labour Market Activity Survey*
 1993-1996, *Survey of Labour and Income Dynamics*
 1997-1998, *Labour Force Survey*
 1999, *Workplace and Employee Survey*

* The model specification differed from previous years.

model used in the estimation are generally consistent across these years—with some limitations (see *Trends*).¹ The gap between union and non-union wages narrowed somewhat over time, from the high teens in the 1980s to the low teens in the 1990s. The narrowing was particularly evident in the later 1990s when most Canadian workplaces were finishing a dramatic wave of restructuring begun in the mid-1980s. The year 1990 is the only exception to the trend, when the wage gap was at an all-time high of 20%. This is not surprising, given that 1990 was a recession year, and the union effect on wages tends to be larger during recessions. Union wages are less sensitive than non-union wages to business cycles, partially because union workers have long-term wage contracts (Gunderson and Hyatt 2001). In 1990, average union wages increased \$0.85 per hour—far more than the non-union increase of \$0.30 per hour.

Trends

The historical trends use data drawn from various Statistics Canada surveys that cover most of the 1980s and 1990s: the Survey of Union Membership (1984), the Labour Market Activity Survey (1986-1990), the Survey of Labour and Income Dynamics (1993-1997), the Labour Force Survey (1997, 1998), and the Workplace and Employee Survey (WES) (1999).

Union status is defined as being either a union member or covered by a collective bargaining agreement, consistent with WES. The hourly wage is taken from the main job in December or the end of the reference year, and is based on usual wage or salary (rather than total compensation as in WES) and total hours of work.

When other factors (personal, job and firm characteristics) are accounted for, the trends of adjusted union wage premiums over time start to emerge. The model specifications are uniform across all the surveys except for WES. The factors deemed to affect wages include age (4 categories), education (university degree), job tenure (5 categories), part-time status, region (9 categories), industry (50 categories, excluding fishing and trapping, and public administration to be comparable with WES), and occupation (7 categories). In the 1980s, adjusted union wage premiums were in the high teens (16% to 20%), but they dropped to the lower teens in the 1990s (12% to 14%).

However, these union wage premium estimates should be viewed with caution because of differences between surveys in both data and model specifications. For example, the industry code is probably more accurate in WES because it is derived from a business profile rather than employee responses.

Results

In 1999, the average unionized worker earned \$20.36 per hour while the average non-unionized worker earned \$17.82, an overall union wage premium of 14.3% before differences in individual, job, workplace, industry, and regional characteristics were adjusted for (Table 1).

Table 1: Individual and job characteristics

	Employees	Union	Non-union
		'000	
Total	10,778	3,007	7,770
		\$/hr	
Wage	18.53	20.36	17.82
		years	
Job tenure	6.4	8.8	5.5
Experience	16.2	17.3	15.7
		%	
Men	47.9	50.4	47.0
Married	71.8	73.7	71.1
With children	43.1	45.4	42.2
High school graduate	17.5	15.0	18.4
Trade school	12.3	14.8	11.3
College	21.2	21.1	21.2
Undergraduate or higher	19.2	21.2	18.5
Immigrant	17.5	14.3	18.8
Foreign language at home	7.4	6.2	7.8
Part time	15.2	15.7	15.0
Production worker	7.4	12.6	5.4
Manager	15.1	3.3	19.6
Professional	16.2	24.3	13.0
Technical and trades	39.0	43.1	37.4
Clerical and administrative	8.4	3.2	10.4
Marketing and sales	14.0	13.5	14.2

Source: Workplace and Employee Survey, 1999

Personal and job characteristics

The union ranks had more men (50% versus 47%), more married people (74% versus 71%), and more people with children (45% versus 42%). Unionized workers were somewhat better educated: more had trade school education (15% versus 11%) or undergraduate or higher education (21% versus 18%), and fewer had only high school education (15% versus 18%). Unionized workers also had longer job tenure (9 versus 6 years). Relatively fewer immigrants were in the union ranks. In terms of occupation, union members were more likely to be production, professional or technical workers and less likely to be managers or clerks.

Virtually the same proportion of employees worked part time (15.7% versus 15.0%), had a college education (21.1% versus 21.2%), immigrated during the 1970s or earlier, or had an occupation in marketing.

Workplace characteristics

The workplace characteristics of unionized employees also differed. They were more likely to be in primary manufacturing, communications and utilities, or education and health-care industries (Table 2). Union members were more likely to be found in larger firms (45% versus 11%) and in not-for-profit organizations (45% versus 11%). In terms of location, Quebec and British Columbia workers were more unionized.

Table 2: Industry and workplace characteristics

	Employees	Union	Non-union
		%	
Industry			
Forestry, mining, oil and gas	1.7	1.6	1.8
Labour intensive tertiary			
manufacturing	4.6	5.5	4.3
Primary product manufacturing	3.7	6.4	2.7
Secondary product manufacturing	3.4	2.5	3.8
Capital intensive tertiary			
manufacturing	5.4	5.5	5.4
Construction	3.9	3.5	4.1
Transportation, wholesale, and warehousing	10.3	4.9	12.4
Communications and utilities	2.3	4.2	1.5
Retail trade and consumer services	24.1	11.3	29.0
Finance and insurance	4.7	2.1	5.7
Real estate, rental and leasing	1.7	1.2	1.9
Business services	9.3	2.7	11.8
Education and health care	21.7	44.4	12.9
Information and culture	3.3	4.4	2.8
Firm size (employees)			
1 to 19	31.6	7.2	41.1
20 to 49	16.7	8.1	20.0
50 to 499	31.0	39.8	27.6
500 or more	20.7	44.8	11.4
Region			
Ontario	39.9	30.9	43.3
Atlantic	6.6	6.4	6.7
Quebec	23.8	32.4	20.5
Prairie	6.9	7.6	6.5
Alberta	10.3	6.9	11.6
British Columbia	12.6	15.8	11.3
Ownership			
Canadian	83.6	83.7	83.6
Foreign	16.4	16.3	16.4
Status			
For profit	79.2	55.0	88.6
Not for profit	20.8	45.0	11.4

Source: Workplace and Employee Survey, 1999

Ontario and Alberta had significantly more non-unionized employees.

Raw and adjusted wage differentials

The gross wage differential was adjusted for differences in employee and workplace characteristics (see *Estimation*). The adjustments reduced the union wage differential between comparable workers in comparable workplaces from 14.3% to 7.7% (Table 3). Since the size of establishment differed significantly for the two groups, the adjustment was also done for two sub-samples: workplaces with more than 50 employees and those with more than 100. Although sample sizes were smaller, a better balance was gained between unionized and non-unionized workers: 46.4% in workplaces with more than 50, and 50.7% in workplaces with more than 100. The union wage differential was further reduced to 6.2% and 6.0% respectively in the two sub-samples. Since both unionization and size are closely associated with formalization of workplace policies, a better estimate of the true union effect on wages should result from a sub-sample of larger workplaces.

Table 3: Union wage differential

	Employees	Mean wage	Union premium*	T-statistic
	'000	\$/hr	%	
Total	10,778	18.53	7.7	8.3
Workplace size				
51 or more	5,462	21.25	6.2	7.4
101 or more	4,353	22.20	6.0	5.7
Sex				
Men	5,167	20.71	7.6	6.3
Women	5,610	16.52	7.0	5.0

Source: *Workplace and Employee Survey, 1999*
 * Statistically significant at 1%.

The union wage differential appeared to be similar for men and women (7.6% versus 7.0%). The union effect tended to be larger for women, but women are less likely to be union members. The two factors work in opposition so that, overall, the union effect on wages is not much different for men than for women.

Industry and occupation

The gap also varied by industry (Chart B). Construction, retail trade and consumer services, and education and health care groups were near the top of the scale—

Estimation

In practice, union wages are generally observed to be higher than non-union wages. But the gross wage difference does not provide a true picture of the differences between comparable workers within comparable workplaces—thus the need to adjust the gross wage differential for factors such as organizational size, occupation, industry or region.²

To determine the effect of union status on wages, a wage function was estimated:

$$\ln W_{ij} = \alpha + \beta X_{ij} + \gamma Y_j + \delta U_i + \varepsilon$$

Where, $\ln W_{ij}$ is the natural logarithm of the observed hourly wage of the i^{th} worker in the j^{th} workplace; α is a constant; X_{ij} is a vector of human capital variables for the i^{th} worker in the j^{th} workplace; Y_j is a set of characteristics of the j^{th} workplace; U_i is the union status of the i^{th} worker; and ε is a randomly distributed error term. The co-efficient δ gives an estimate of the union/non-union differential in wages, controlling for observed employee and workplace characteristics.

The variables in the analysis include both personal and job characteristics: sex, marital status, presence of children, education (8 categories), job tenure, tenure squared, years of experience, experience squared, part-time, time of immigration (4 categories), foreign languages at home, and occupation groups (5 categories). Some firm characteristics such as industry (13 categories), firm size (3 categories), and region (5 categories) are also included.³ Because the Workplace and Employee Survey (WES) excludes most of the public sector (all levels of public administration), the control for public versus private sector is not included in the wage equation. Standard errors of various estimates have been adjusted for the complex survey design of WES by using bootstrap weights.

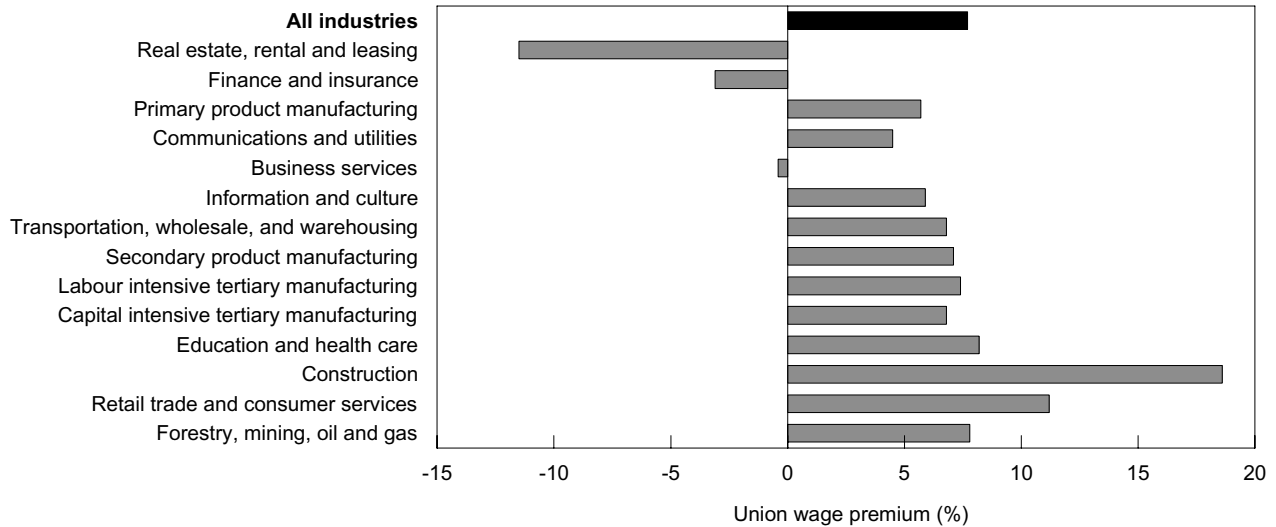
19%, 11% and 8% respectively. At the low end were business services, finance and insurance, and communication and utilities, all of which had no discernible wage gap. In labour-intensive tertiary manufacturing, the gap (7%) was close to the mean. Real estate, rental, and leasing was the only industry in which non-union wages were higher (11%).

Occupations such as construction (15%); chefs, protective, childcare and home support workers (14%); and teachers and arts (13%) had large differentials (Chart C). The management and professional group (-1%) had the smallest differential, followed by financial, administrative and clerical group (2%), one of the largest occupational groupings in the WES sample.

Regional variation

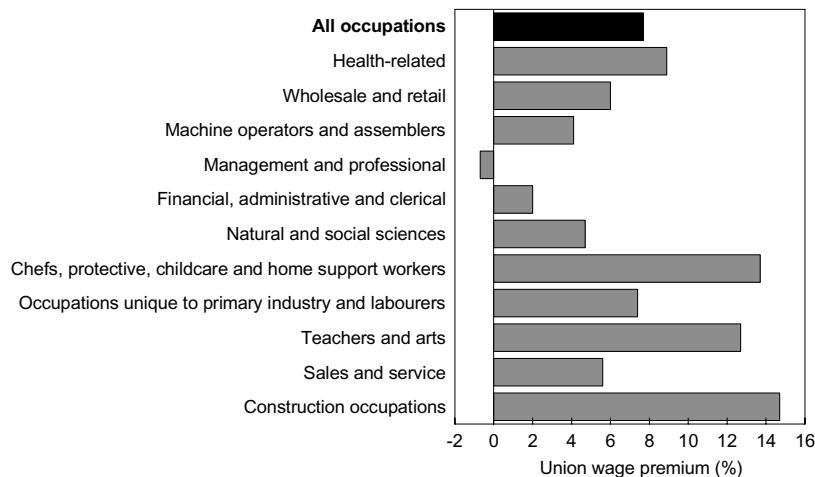
British Columbia had one of the higher wage differentials at 14% (Chart D). Three other regions showed a wage gap in favour of unionized workers: the Atlantic

Chart B: The greatest adjusted union wage premium was in construction.



Source: Workplace and Employee Survey, 1999

Chart C: Construction trades also had the greatest adjusted wage premium.



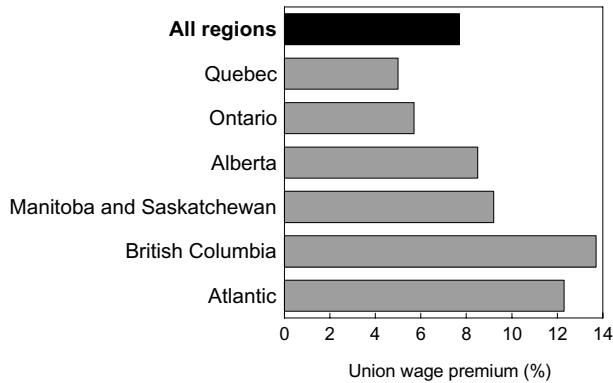
Source: Workplace and Employee Survey, 1999

provinces (12%), Manitoba and Saskatchewan (9%), and Alberta (8%). Quebec, the most unionized region in Canada, showed a modest gap of 5%; Ontario, a relatively less unionized province, had a union wage premium of 6%, somewhat below the national average.

Explaining the union wage premium

Previous research has shown that the union wage premium can be partially explained by differences in personal, job and workplace characteristics. The proportion ‘explained’ tends to be higher if the non-unionized group or the total economy is used as the base line (see *Decomposition*). About 75% of the pay differential can be attributed to differences in various wage determinants. Even so, a significant portion (25%) still cannot be explained. In fact, returns to additional amounts to various productivity-related personal characteristics—such as education, experience, skill, and marital status—are generally lower in the union group than in the non-union group (Benjamin, Gunderson and Riddell 1998). However, because unionized workers start off on average with higher wages—indicated by the larger intercept of the

Chart D: British Columbia had the highest adjusted union wage differential.



Source: Workplace and Employee Survey, 1999

union wage equation, the lower returns reflect the structural difference between the two groups in compensation policies.

Conclusion

These findings provide a glimpse into the nature of union–non-union wage differentials toward the end of the 1990s. An average wage gap of 7.7% (6.0% in workplaces with more than 100 employees) is somewhat smaller than reported previously in the literature. This, along with evidence from other Statistics Canada surveys between 1981 and 1998 suggests a narrowing of the wage gap over time. This narrowing could be partially attributed to the diminishing ability of unions to seek monopoly *rents*, due to factors such as technological advancement, greater competition from overseas, and deregulation. Another explanation could be a strategic reorientation of unions to objectives other than wages, such as employment and job security or less costly forms of employee voice (Gunderson and Hyatt 2001). In addition, results based on the 1999 WES show that some traditionally observed union wage premiums appear to hold across nearly all industries, occupations and regions.

Decomposition

The wage structure of the union sector, non-union sector, and both sectors combined can be estimated by the following equation:

$$\ln W_i = \alpha + \beta X_i + \mu$$

Where, $\ln W_i$ is the natural logarithm of the observed hourly wage of the i^{th} worker; α is a constant; X_i is a vector of personal, job and workplace characteristics associated with the i^{th} worker; and μ is the error term.

Following the property of ordinary least squares regression (Drolet 2002), the union wage differentials can be decomposed into three components: the explained portion, or the union/non-union wage differentials due to the differences between the union and non-union sectors in terms of personal, job and workplace characteristics (\bar{X}) evaluated at the competitive wage structure β^* . The choice of β^* (the coefficient from non-union sector β_n , from union sector β_u , from a weighted structure (weighted by the percentage of union and non-union workers), or from the pooled regression β') affects the decomposition outcomes. The unexplained portion reflects the differences in the returns to various characteristics (X_i), which consist of the union advantage (second term) and non-union disadvantage (third term).

$$\overline{\ln W_u} - \overline{\ln W_n} = (\bar{X}_u - \bar{X}_n)\beta^* + \bar{X}_u(\beta_u - \beta_n) + \bar{X}_n(\beta^* - \beta_n)$$

		Log hourly wage difference=0.190	
		β^*	
		Explained	Unexplained
Non-union	β_n	0.124 65.4%	0.066 34.6%
Union	β_u	0.087 45.9%	0.103 54.1%
Weighted	$\beta_u P_u + \beta_n P_n$	0.114 59.9%	0.076 40.1%
Pooled	β'	0.142 75.0%	0.034 25.0%

Source: Workplace and Employee Survey, 1999

Perspectives

Notes

1 For instance, union density was overestimated in the Survey of Union Membership of 1984. Nevertheless, the estimates obtained here could be viewed as an approximation of trends in the union wage premium over the selected years.

2 Researchers studying union/non-union wage differentials have pointed out that the possibility of reverse causality exists in the union-wages relationship. Rather than driving up wages, unions may find it easier to organize workplaces with particular characteristics—for example, large firms, or ones that use a lot of technology or are concentrated in certain geographic areas. In this case, it would be necessary to control for the simultaneous effects of unions on wages and wages on unions before the ‘true’ effect of unions on wages could be extracted. In this study, a two-stage model in which both wages and union status would be simultaneously determined has not been estimated. Since several researchers have found OLS estimates to be just as good as 2SLS models, OLS estimates are reported for the sake of simplicity.

3 The analysis also incorporates other firm characteristics and management practices deemed to affect wage levels, such as non-profit status, foreign ownership, organizational flexibility, incentive pay, classroom and on-the-job training, use of teams, and use of technology.

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