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Employer-Sponsored Health and Dental Plans – Who is Insured?

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by
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Abstract

This paper presents a multivariate analysis of the determinants of employer-sponsored health and dental plan coverage of Canadian workers based on Statistics Canada's 1995 Survey of Work Arrangements. The survey data, excluding full-time students, indicates that 63 percent of Canadian employees are entitled to an extended health plan through their employer while 59 percent of employees are entitled to a dental plan.

The main determinants of entitlement to employer-sponsored health and dental plans are: part/full-time hours, permanent/non-permanent employment status, union status, firm size, seniority and wages. Workers who are part-time, non-permanent, non-unionized, recent hires, those with low wages and those working in small firms are less likely to have extended health and dental insurance than those who are permanent, full-time, unionized, in high-wage positions in a large firm, with long tenure. Some non-covered workers have access to these benefits through a family member. This analysis underlines the tremendous variation in the workers covered by extended health and dental plans which occurs when these benefits are negotiated as part of individual compensation packages.

As with employer-sponsored pensions, the benefits analysed in this paper appear to coincide with other characteristics which are often used to describe "good" jobs. As the Canadian labour market continues to evolve, with continued trends to more "nonstandard" employment, the advantages of a strong universal health care system attached to the individual rather than the job become more apparent.

Résumé

Le présent document fait une analyse à plusieurs variables des déterminants de la couverture des travailleurs canadiens dans le cadre des régimes de soins médicaux et de soins dentaires de l'employeur, d'après l'Enquête sur les horaires et les conditions de travail menée par Statistique Canada en 1995. Abstraction faite des étudiants à temps plein, les données de l'Enquête indiquent que 63 % des employés canadiens sont admissibles à un régime de soins complémentaire de santé par l'entremise de leur employeur, et que 59 % des employés sont admissibles à un régime de soins dentaires.

Les principaux déterminants de l'admissibilité aux régimes de soins médicaux et de soins dentaires de l'employeur sont les suivants : le travail à temps partiel ou à temps plein, la permanence ou la non-permanence de l'emploi, l'appartenance à un syndicat, la taille de l'entreprise, l'ancienneté et le salaire. Les travailleurs à temps partiel, ceux dont l'emploi n'est pas permanent, ceux qui ne sont pas syndiqués, les travailleurs récemment embauchés, les travailleurs qui ont un faible salaire et ceux qui travaillent pour de petites entreprises sont moins susceptibles d'avoir un régime complémentaire de soins médicaux et soins dentaires que les travailleurs qui occupent un emploi permanent, ceux qui travaillent à temps plein, qui appartiennent à un syndicat, qui occupent un poste dont le salaire est élevé, qui travaillent dans une grande entreprise et qui ont beaucoup d'ancienneté. Certains travailleurs non assurés sont admissibles à des avantages sociaux par l'entremise d'un membre de leur famille. La présente analyse fait ressortir les variations considérables qui se retrouvent chez les travailleurs visés par les régimes complémentaires de soins médicaux et de soins dentaires lorsque de tels avantages sont négociés dans le cadre d'un régime individuel de rémunération.

Comme dans le cas des régimes de pension de l'employeur, les avantages examinés dans le présent document semblent coïncider avec d'autres caractéristiques qui sont souvent utilisées pour décrire les «bons» emplois. À mesure de l'évolution du marché du travail canadien, et compte tenu des tendances à l'emploi «atypique» qui se maintiennent, les avantages d'un bon régime universel de soins de santé visant le travailleur plutôt que l'emploi deviennent de plus en plus évidents.

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1. Introduction

Non-wage benefits, or supplementary labour income, are an important aspect of employee compensation growing from 8 percent of total labour income in 1976 to 13 percent in 1996.[1] These benefits hedge the financial stability of workers and their families through, for example, health and dental insurance, pension plans and employment insurance. "The challenge for North American countries is to improve the living standards of workers by encouraging the development of employment benefits that are transferable from one job to another, that can benefit workers in nonstandard jobs, and that can provide adequate, lifelong benefits in a cost-effective manner." (Labour Secretariat of the Commission for Labour Cooperation, 1996) To meet this challenge, there is a need for better information on the types and levels of benefits that workers receive across variables such as industry, occupation, hours of work, unionization, and temporary work. In addition, with increasing numbers of workers in nonstandard work arrangements (in particular, the significant recent growth in own-account self-employment) it is important to understand the relative levels of security which are associated with different employment forms.

The purpose of this paper is to address the information gap by examining the personal and job related characteristics of non-student, male and female, Canadian employees that are associated with two non-wage benefits, extended health and dental plans.[2] The second chapter describes the data used in this analysis, gives a priori reasoning for examining the effects of certain job and personal characteristics on *direct* extended-health and dental coverage and provides aggregate bivariate results. Chapter three introduces the logistic regression model and odds ratios and reports the results from the regression model. This chapter also provides additional evidence on the potential *indirect* coverage of married workers by spousal benefits

[1] Non-wage benefits, or supplementary income, are compromised of employers compulsory social contributions (workers' compensation, unemployment insurance, the Canada and Quebec Pension Plans and the Quebec and Ontario payroll taxes) and voluntary contributions (pension plans, medicare premiums, dental plans, short- and long-term disability insurance, etc.). Statistics Canada, National Economic and Financial Accounts, Cansim Matrix No. 1791, Catalogue No. 13-001-XPB.

[2] A recent study by Lipsett and Reesor (1997) entitled "Employer-Sponsored Pension ─ Who Benefits?" uses the SWA to examine the determinants of employer-sponsored pension plan coverage. With respect to job quality, it is expected that "good jobs" offer a package of non-wage benefits. This appears to be the case as over 83 percent of workers with pension plan coverage also have both health and dental coverage. On the other hand, only 23 percent of workers with no pension plan coverage have both health and dental coverage (while 68 percent of these workers are covered by neither medical benefit).

drawing on data from Statistics Canada's SWA family file. Conclusions follow in Chapter 4. The Appendix contains further detail: the proportion of paid workers with health and dental plan coverage broken down by the variables used in the multivariate analysis; married workers with possible spousal benefits by worker type; further details on the logistic regression technique and odds ratios; variable names and descriptions used in the regression models; significance levels of the variable groups (as determined by the likelihood ratio statistic); and finally, the parameter estimates of the regression models for each gender.

2. Data Source, Framework and Bivariate Results

2.1 Data Source

The bivariate and multivariate analysis that follow are based on the 1995 Survey of Work Arrangements (SWA), an addendum to the November 1995 Labour Force Survey.[3] In total there were 25,721 respondents to the SWA.[4] Of these, 21,261 were paid workers in their main job and the remaining 4,460 were self-employed. The self-employed are not included in this analysis since the questions regarding employer sponsored health and dental plan coverage do not pertain to their situation. Full-time students, who have a stronger attachment to school than to the labour force, were excluded from the analysis (this eliminated 1,428 records, or 6.7 percent of sample, from the data set). Additional screens reduced the sample used in the analysis to 18,540─9,498 males and 9,042 females.[5] For multiple job holders, information on health and dental plans was collected solely on their main job.

The potential for confusion between provincial medicare, individually purchased insurance and employer-sponsored health plans was controlled for in the survey question:

> "Through his/her employer, is ... entitled to a health plan other than provincial medicare?".

The question regarding dental plans was equally explicit. It asked,

> "Through his/her employer, is ... entitled to a dental plan?".

[3] Data regarding work arrangements (schedules, unionization, permanent/non-permanent work, paid and unpaid overtime, wages, non-wage benefits, etc.) of paid Canadian workers as well as some information on the self-employed were collected by the SWA. People who were unemployed, out of the labour force, in the Armed Forces, institutionalised or unpaid family workers were out of scope for this survey. Weights are used in this analysis to reflect the characteristics of this population.

[4] The SWA sampled approximately 29,000 individuals with a response rate of 90 percent.

[5] Any records that had missing values for any of; union status; permanent/non-permanent status; firm size; employer-sponsored pension plan (RPP) coverage; health coverage other than provincial medicare; and dental plan coverage were excluded from the analysis. This excluded 1,293 records or about 6.5 percent of the sample of non-full-time students. Although excluding these records may induce some selection bias, we believe it to be negligible and the main findings of the regression analysis to be valid. Also, if we used indicator variables for missing values and included these records in the analysis, we would not be able to look at the important interaction between unionization and firm size (i.e. the estimates of the regression model would not converge). RPP coverage was included in the selection criteria so that the same set of data can be analysed as that used in a similar study by Lipsett and Reesor of the determinants of this non-wage benefit (allows for easy comparisons between pension, health and dental plan determinants). In the case of wages, where 23 percent of the respondents had missing values, an indicator variable was used in the analysis.

There were no further questions addressing whether employees not eligible for health and dental insurance through their employers were self-insuring through other vehicles or on the quality of the plans. Certainly, specific details on aspects such as prescription drugs and home care would be of interest to policy makers assessing the desirability of national pharmacare and home care plans. Additionally, participation in flexible benefit plans would be of interest to human resource managers exploring tools to increase employee productivity. [6] However, these aspects cannot be addressed with the SWA data.

2.2 Empirical Framework and Preliminary Results

Overall, the SWA shows 63 percent of Canadian non-student employees are entitled to an extended health plan (59 percent to a dental plan) through their employer. Gender differences in coverage rates are apparent with 69 (59) percent of males having an extended health (dental) plan compared with 58 (54) percent of females.[7] A number of demand and supply factors potentially influence who is entitled to workplace benefits.

As a start to empirical investigation in this new area of research, regression models examining the effects of certain observable job and personal characteristics on the probability of extended health (and dental) coverage are developed. This section details the expected effects of these characteristics on extended health (dental) coverage, providing a basis for their inclusion in the models estimated in Chapter 3. Preliminary checks of these effects are made by presenting bivariate (not controlling for the effects of other variables) percentages of extended health (dental) plan coverage, classified according to each of the characteristics (see Table 1 in Appendix A.1 for the bivariate results). The gender differences evident in extended health (dental) coverage rates are due to differences in industry and occupation concentration, shares of part-time, non-permanent, small firm and unionized workers, and dissimilar wage distributions.

[6] For a discussion of the growing importance of flexible benefit packages, see *Flexible Benefits: A How to Guide* by Richard E. Johnson, 1996.

[7] According to the General Social Survey (GSS), cycle four, 63 percent of Canadian workers had extended health insurance through their employer in 1989. In that same year, dental plans covered 53 percent of workers. The GSS data also shows that 68 percent (57 percent) of working males have health (dental) plans respectively compared with 58 (49) percent of working females (Krahn 1992). However, the results from the 2 surveys are not strictly comparable due to differences in the questions regarding health and dental plan coverage and the fact that the groups analysed are not uniform. Results from the GSS are based on all workers aged 15-64 while the results reported from the SWA are based on workers aged 15-69 excluding full-time students. Including full-time students, the SWA estimates that 59 and 55 percent of workers have health and dental plans respectively (Lipsett, Harris and Reesor 1997).

If one regression model (for each benefit) were to be estimated for both genders, many interaction terms involving gender would need to be included in order to account for these differences. Doing so would greatly complicate the results, possibly dampen important effects, and be a hindrance in the interpretation of the model. For these reasons, separate models for each gender (and for extended health and dental coverage) are developed (4 models in total).

2.2.1 Job Related Characteristics

Part-Time and Non-Permanent Workers

Part-time and non-permanent workers provide flexibility in the labour market to respond to the daily, weekly, annual, and cyclical variations in demand.[8] It has also been suggested that nonstandard employment is one way for employers to circumvent the increase trend in non-wage labour costs since, historically, nonstandard workers have not received benefits. With the often peripheral and contingent nature of part-time and non-permanent jobs (where employers may be less concerned about incentives to reduce turnover and increase work effort) and the desire to reduce labour costs, we would expect that part-time and non-permanent workers are less likely to have extended health (dental) coverage than permanent full-time workers.

The coverage of nonstandard workers may be changing with the extension of benefits to part-timers increasingly common.[9] Additionally, the length of many non-permanent jobs suggest an implicit contract arrangement that may involve entitlement to benefits (Polivka 1996).[10] Tracking job quality for nonstandard workers is a topic for further research. In this paper, the influence of part-time and non-permanent work arrangements on the entitlement to benefits, controlling for other factors such as job tenure, is an important goal of the multivariate analysis presented in Chapter 3. Here, the bivariate results show that 69 (64) percent of full-timers have

[8] Roughly one quarter of the paid workers in Canada are part-time or non-permanent workers, with 13 percent classified as permanent part-time workers and the remaining 12 percent as non-permanent workers (both full and part-time) (Lipsett and Reesor 1997).

[9] For example, the Royal Bank extended benefits to 7500 part-time employees in April, 1996 (Ottawa Citizen 1996).

[10] The question regarding job permanency from the SWA asked "Is...job permanent, or is there some way that it is not permanent?" Many respondents who classified themselves as non-permanent had job tenures of more than one year (41 percent of non-permanent workers had a job tenure of more than one year and 16 percent of non-permanent workers had a tenure of *more than five years*). This challenges the widely held view that non-permanent jobs are of short duration.

extended health (dental) coverage compared with just 26 (23) percent of part-timers.[11] Furthermore, permanent workers are roughly three times as likely to have extended health (dental) coverage as non-permanent workers.

Union Status, Firm Size and Public/Private Sector Employees

Union status and firm size are expected to influence entitlement to extended health (dental) plan coverage. Unionized workers should be more likely to have medical coverage because of the influence of unions in the collective bargaining process.[12] Due to economies of scale, large firms should be more able to offer their employees a health (dental) plan than smaller firms. Another contributing factor to the lower coverage rates in small firms, given the role of profitability and age of firms in the provision of benefits, is recent policy that has tried to foster employment growth through the development and expansion of small firms. A further point to note is that large firms are more likely to be unionized than small firms raising the issue of the effect of unionization on benefits at different firm sizes. Therefore, an interaction term of union status and firm size is included in the regression models.

The bivariate coverage rates from the SWA, Table 1, support these expected effects in that unionized workers and those in large firms are more likely to have health (dental) coverage than nonunionized workers and those employed in small firms. Furthermore, an "equalization" effect of unionization is evident in the health and dental plan coverage rates (i.e. benefit coverage rates of workers in unionized small firms are closer to the coverage rates of workers in unionized large firms than the corresponding coverage rates of workers in nonunionized firms).[13]

There are strong perceptions about the "generosity" of the highly unionized public sector's non-wage benefits, including entitlement to extended health and dental plans. On the surface, the data in Table 1 support these perceptions as public sector employees are more likely

[11] The GSS reveals that 70 (59) percent of full-timers have extended health (dental) coverage compared with just 26 (20) percent of part-timers (Krahn 1992).

[12] Unionized workers, for the purpose of this analysis, refer to those who are union members or are covered by a union contract or collective agreement at their place of employment. According to the SWA, 33.4 percent of employees are union members while an additional 4.4 percent are covered by a union contract or collective agreement (Lipsett and Reesor 1997).

[13] Results from the GSS support these findings as unionized workers are more likely to have health and dental plan coverage than their nonunionized counterparts. Furthermore, the coverage rates of both health and dental plans increase monotonically with firm size (Krahn 1992).

to have health (dental) plan coverage than private sector employees (81 [74] percent of public sector employees versus 59 [55] percent of private sector employees). However, the incidence of unionization is much higher in the public sector. After controlling for union status, public sector employees remain only slightly better off in terms of health (dental) plan coverage than private sector employees. To formally test whether public and private sector unions have differing effects on the probability of health (dental) coverage, a union status and public/private sector employment interaction term is included in the model.

Job Tenure

Job tenure is a proxy for firm-specific experience (seniority) signalling the success of an employee/employer match. It may also serve as a proxy for promotion into job categories where benefits are available (especially in non-union settings) and the age and financial viability of private sector firms. Thus, we expect that the longer the job tenure, the higher the probability of entitlement to medical benefits. Furthermore, in many firms, new employees' access to non-wage benefits (e.g. health and dental plans) are restricted before completion of a probationary period of employment, reinforcing the notion that short-tenured (probationary) workers should be less likely to have medical coverage. The obvious potential correlation between job tenure, permanent/non-permanent status and age will be examined using the regression model.

Health (dental) coverage by job tenure, reported in Table 1, support the above notion of a greater likelihood of health (dental) coverage for longer job tenures as the coverage rates of both benefits increase monotonically with job tenure.

Industry and Occupation

In addition to the job related characteristics mentioned thus far, many unaccounted for characteristics and risk factors effecting total compensation and health (dental) coverage vary by industry and occupation. For example, efficiency wage theory suggests sustainable inter-industry wage differentials and inter-occupational differences in the cost of supervision and turnover justifying higher compensation. To capture these effects, industry and occupation are controlled for in the regression models.

The sectors with the lowest percentage of workers with health (dental) coverage are agriculture, business, personal and miscellaneous services, wholesale and retail trade and

construction, while utilities, communications, finance, insurance and real estate (often federally regulated sectors) and public administration have the highest extended health (dental) coverage rates.[14] The low coverage rates in the above industries are a concern as more than one in three workers in Canada are employed in these industries. Furthermore, since service and trade are rapidly growing sectors of the economy, the share of paid workers in these industries, along with the percentage of workers without extended health and dental coverage, is likely to increase. As expected, extended health (dental) coverage also varies considerably across occupations (see Table 1, Appendix A.1).

2.2.2 Personal Characteristics

Province

Health care is a responsibility of provincial governments and some aspects of provincial health care plans vary by province. Therefore, it is reasonable to expect inter-provincial variations in private extended medical/dental coverage as substitution takes place between the workplace and public plans. Results from the SWA exhibit this variation as Ontario has both the highest percentage of workers with extended health coverage at 67 percent and the highest percentage of workers with dental coverage at 66 percent. On the other hand, Saskatchewan has the lowest percentage of employees with extended health coverage at 48 percent, and Quebec has the lowest percentage with dental plan coverage at 45 percent. Low extended health coverage in Saskatchewan may be due to the extent of coverage of prescription drugs in the public health plan. Low dental coverage in Quebec may be due to a public health plan that covers dental care for children under 7 and the unique tax treatment of employer contributions to plans as the imputed taxable income of employees for provincial income tax purposes.

Education

It is well known that higher education levels lead to “good jobs”. Associated with these “good jobs” are high wages and substantial non-wage benefits, including health and dental plans. The data from Table 1 support the notion of higher education leading to better jobs and, hence, higher rates of extended health (dental) coverage. The proportion of workers with access to these benefits increases monotonically with education level.

[14] These high and low coverage rate sectors coincide with the high and low pension plan coverage sectors reported in Lipsett and Reesor (1997). This suggests that, in many instances, these benefits come together as a package.

Age, Marital Status and Presence of Dependents

Age can be used as a proxy for general labour market experience and, as such, one could expect to be compensated for such experience through higher wages or, possibly, extended medical and dental coverage. Also, older workers are more likely to have found an acceptable employee/employer relationship, which, for many workers would include having an extended health (dental) plan. As people grow older, they are likely to be more concerned with financial stability and security, increasing the importance of working at a job that provides extended health and dental insurance. The responsibilities of marriage and children should also contribute to the desirability of extended health and dental care.

The data from Table 1 show that younger workers (under 25 years) are roughly two times less likely than older workers (25 years and over) to have extended health or dental coverage.[15] When examining the effect of family status on extended health (dental) coverage, married workers with children are more likely to have extended health (dental) coverage than those without children. This reverses for single people, with single parents roughly half as likely as other singles to have health (dental) coverage.

2.2.3 Wages

Dual labour market hypothesis suggests that markets are segmented into a “good job” sector and a “bad job” sector. Jobs in the bad job sector are characterized by low pay, poor working conditions, few benefits and poor prospects for moving into the good job sector. In addition, workers in the bad job sector may not have the power to negotiate higher wages or employer-provided benefits, including supplemental health and dental plans (Hipple and Stewart 1996). Hedonic wage theory predicts a trade off between higher wages and entitlement to employer-sponsored benefits. This negative relationship is difficult to observe directly since the firms that pay high wages usually also offer benefits. However, this casual observation does not allow for the influence of other factors, such as the demands of the job and the quality of workers involved, that influence total compensation. Further, total compensation can be viewed in a hierarchical fashion with the need for wages being satisfied before other elements in the

[15] The GSS also shows that younger workers are less likely to have extended medical coverage than older workers (Krahn 1992), although the difference in the coverage rates between young and old workers is not as great as that from the SWA.

compensation package become important. While this hierarchy primarily reflects the concerns of employees, it can be relevant to the employers' ability to recruit and retain employees. Thus, we would expect to observe in the data entitlement to extended health and dental plans to increase with wages. The data from Table 1 supports this casual association between wages and the entitlement to benefits. However it is important to keep in mind that economic theory suggests that workers pay for their own benefits. Thus legislation designed to improve entitlements to employee benefits might well be paid for by workers in the form of lower future wage increases.

For workers without access to workplace medical coverage, private insurance is available, but more affordable for those with higher wages. This suggests greater differences in overall private coverage rates between the high and low wage earners. Therefore, the increased family market income inequality observed over the 1990s likely understates the inequality in living standards by excluding entitlement to these employer-sponsored benefits and further underlines the importance of a strong public health system in promoting security and equity.

3. The Logistic Regression Model and Multivariate Results

The relationship between entitlement to extended health (dental) plans and job and personal characteristics is estimated using the logistic regression model. The dependent variable, *HEALTH*, has two outcomes ─ extended health coverage or no extended health coverage ─ and the independent variables are contained in the vector x=(*JOB, PERSONAL, WAGE*). *JOB* contains information on weekly hours worked (part/full/long-time), permanent/non-permanent status, industry, occupation, union status, seniority (job tenure), class of worker (public/private sector) and firm size; *PERSONAL* contains information on age, education, marital status, presence of dependent children and province of residence; and *WAGE* contains hourly wage groupings.

With $\pi(x)$ defined as the probability of extended health coverage (conditional on x), then $(1-\pi(x))$ is the probability of no coverage (conditional on x). The *odds* of extended health coverage are defined as $\pi(x)/(1-\pi(x))$ ─ the ratio of the conditional probability of extended health coverage to the conditional probability of no coverage ─ and the *log-odds* is the natural logarithm of the odds, namely $\ln\{\pi(x)/(1-\pi(x))\}$. The logistic regression model is then

$$\textbf{(1)} \quad \ln\left(\frac{p(x)}{1-p(x)}\right) = b_0 + b_1 JOB + b_2 PERSONAL + b_3 WAGE ,$$

where β_0 is an intercept parameter,

β_1 is a vector of unknown parameters detailing the effect of job related characteristics on extended health coverage,

β_2 is a vector of unknown parameters detailing the effect of personal characteristics on extended health coverage, and

β_3 is a vector of unknown parameters detailing the effect of wages on extended health coverage.

The model is estimated by maximum likelihood, resulting in the maximum likelihood estimates β_0^{MLE}, β_1^{MLE}, β_2^{MLE} and β_3^{MLE} of β_0, β_1, β_2 and β_3 respectively. The reader is referred to

Appendices A.3 and A.4 for more information about the logistic model, model selection, statistical significance and model fit. Again, similar arguments apply for dental plans.

The results from estimating the logistic model are presented below in the form of relative odds, or odds ratios. Odds ratios are defined to be the ratio of the odds of extended health (dental) coverage between two or more groups, namely;

$$\textbf{(2)} \qquad Odds\ Ratio = \frac{p_1 / (1 - p_1)}{p_2 / (1 - p_2)},$$

where the subscripts 1 and 2 refer to the two groups being compared. [16] The reader is referred to the Appendix A.5 for an example of an odds ratio calculation from the parameter estimates of a logistic regression model.

Generally, the expected effects of the different characteristics on the probability of health (dental) plan coverage are confirmed by the results of the regression models. In addition, classification of the variables into job related characteristics, personal characteristics and wages appears to be an adequate decomposition as each of these groups of variables are significant (at the 0.001 level as determined by the likelihood ratio statistic) determinants of extended health (dental) coverage. [17]

3.1 Job Related Characteristics

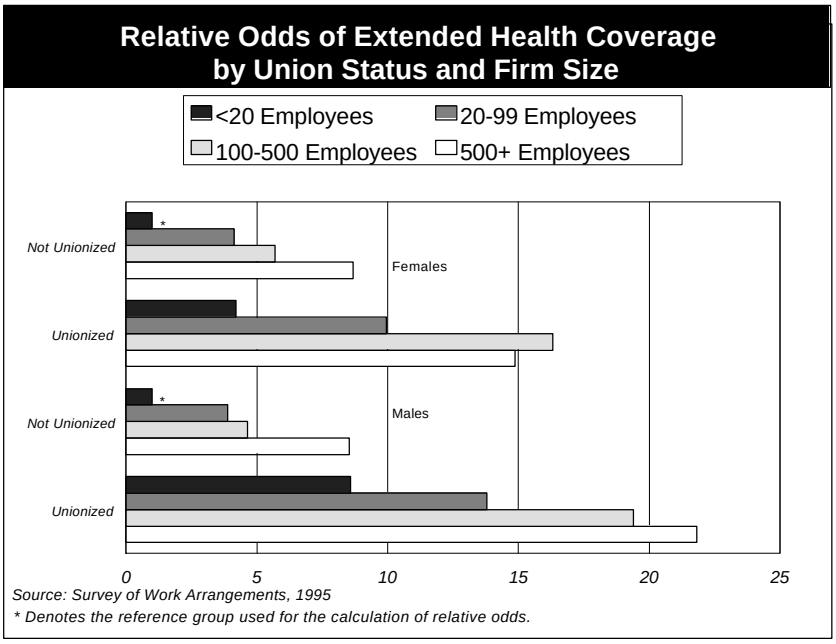
Union status and firm size are major factors in determining the probability of entitlement to extended health and dental plans for male and female employees (i.e. both union status and firm size are significant at the 0.001 level for all 4 models estimated). Their effects are as expected, with unionized workers and those working in large firms having better odds of

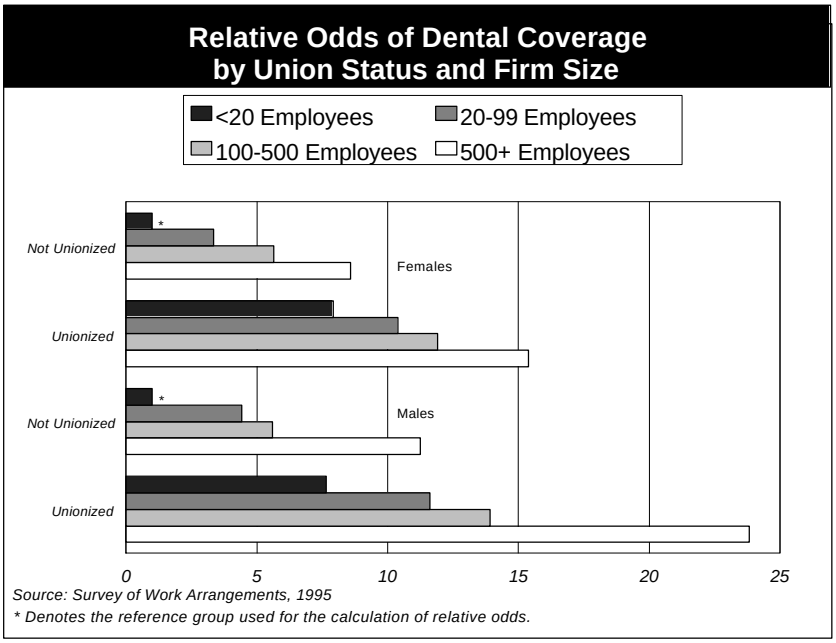
[16] Odds ratios are preferred on statistical grounds to probability ratios (the distributional properties of the estimators are better) and they have the added advantage of not varying with the choice of reference group. However, relative odds exaggerates (or minimizes) the differences between groups and the interpretation is less straightforward. As a hypothetical example, if 3 in 4 (probability is 75 percent) permanent workers drive cars to work and 2 in 4 (probability is 50 percent) temporary workers drive cars, then the relative probability ($=(\pi_1/\pi_2)=(.75/.5)$) is that permanent workers are *one and a half* times more likely to drive cars to work than temporary workers. However, the relative odds of taking cars to work is *three* times greater for permanent workers than for temporary workers since the

$$Odds\ Ratio = \frac{p_1 / (1 - p_1)}{p_2 / (1 - p_2)} = \frac{.75 / (1 - .75)}{.5 / (1 - .5)} = 3$$

[17] A table showing the significance of variable groups using the likelihood ratio statistic is given in Appendix A.7. Tables of the regression results are in Appendices A.8 and A.9.

extended medical (health/dental) coverage than their counterparts. In addition, the interaction effect of union status and firm size is significant (0.001 level) for both genders and both benefits, confirming the "equalization" effect of unionization across firm size on the likelihood of health (dental) plan coverage. This is illustrated in the following charts of the relative odds of extended health (dental) plan coverage by union status and firm size (the lengths of the bars representing the relative odds of extended health [dental] coverage, are more equal across unionized firm sizes than nonunionized firm sizes).



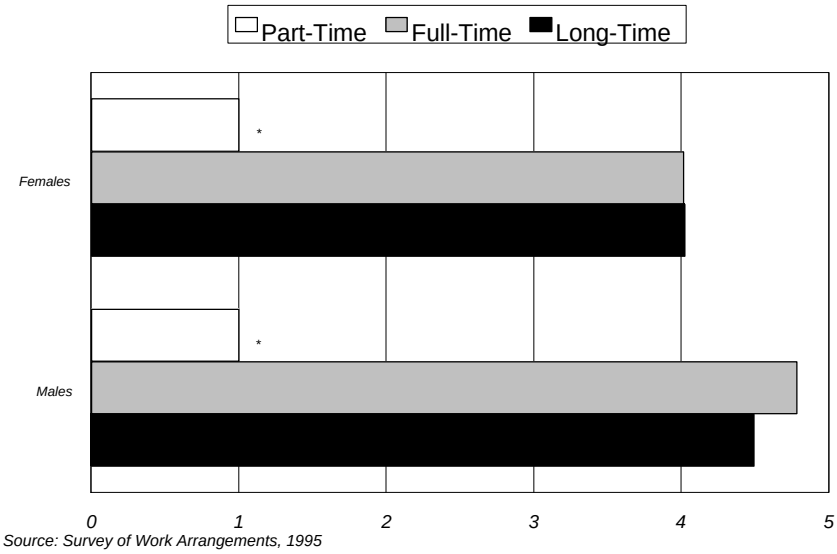


The interaction term used to explore the effect of public and private sector unions on extended health (dental) plan coverage is insignificant at the 0.1 level for both genders and benefits. This suggests that the ability or preference of unions to negotiate medical coverage is no different in the public and private sectors. Thus, the discrepancy in health and dental coverage rates between public and private sector workers is mostly due to the differences in unionization rates, not because the public sector is necessarily a more "generous" employer or has more powerful unions.

Both part-time and non-permanent job status have the expected effect on the probability of extended health (dental) coverage ─ part-time and non-permanent workers have lower odds of extended health (dental) coverage than full-time and permanent workers respectively[18]. The marked difference between permanent and full-time workers on the one hand, and temporary and part-time workers on the other reflects a general difference in the degree of commitment to core versus peripheral employees. The general availability of well-qualified temporary and part-time workers to whom benefits do not have to be offered is a function of the overall slack in the labour market. In a tighter labour market, it would be harder to find available temporary and part-time workers, and they may be able to demand benefits.

[18] Permanent/non-permanent job status is highly correlated with age and seniority (job tenure) and this variable tends to dampen the effects of the others (and vice-versa). However, since these variables (age, tenure, permanent/non-permanent status) are not perfectly correlated with one another, and because of prior reasoning for inclusion of each of these variables in the models (Chapter 2), all three are retained in the models. If one of these variables were removed, we would be losing some information on the determinants of extended health (dental) coverage, even though the effects of the other two would be more pronounced (see Appendix A.4 for discussion on robustness).

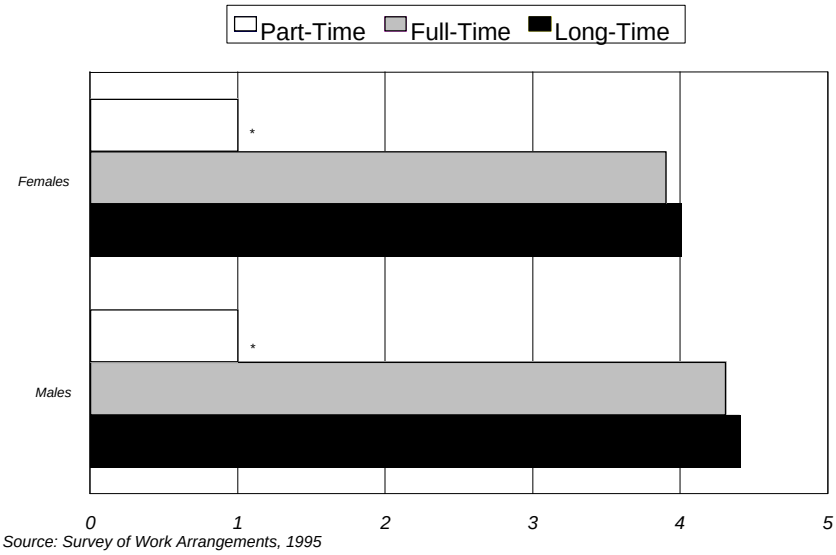
Relative Odds of Extended Health Coverage by Weekly Hours



Source: Survey of Work Arrangements, 1995

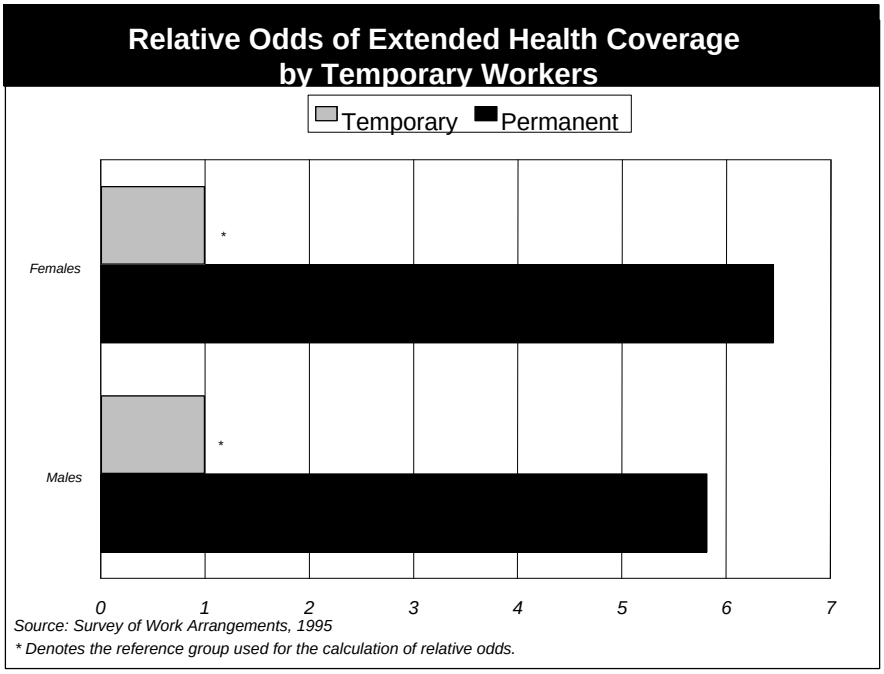
** Denotes the reference group used for the calculation of relative odds.*

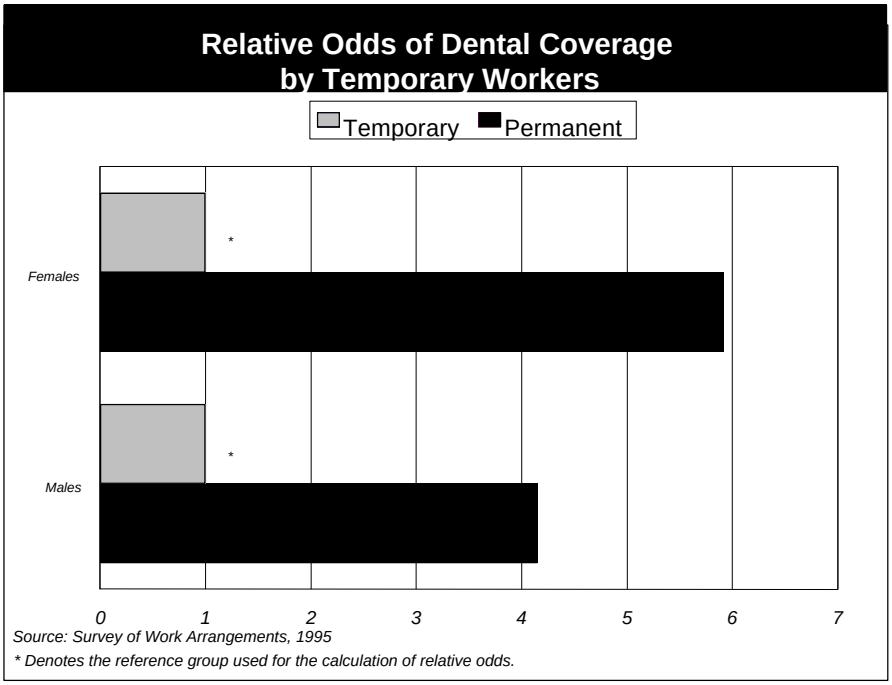
Relative Odds of Dental Coverage by Weekly Hours



Source: Survey of Work Arrangements, 1995

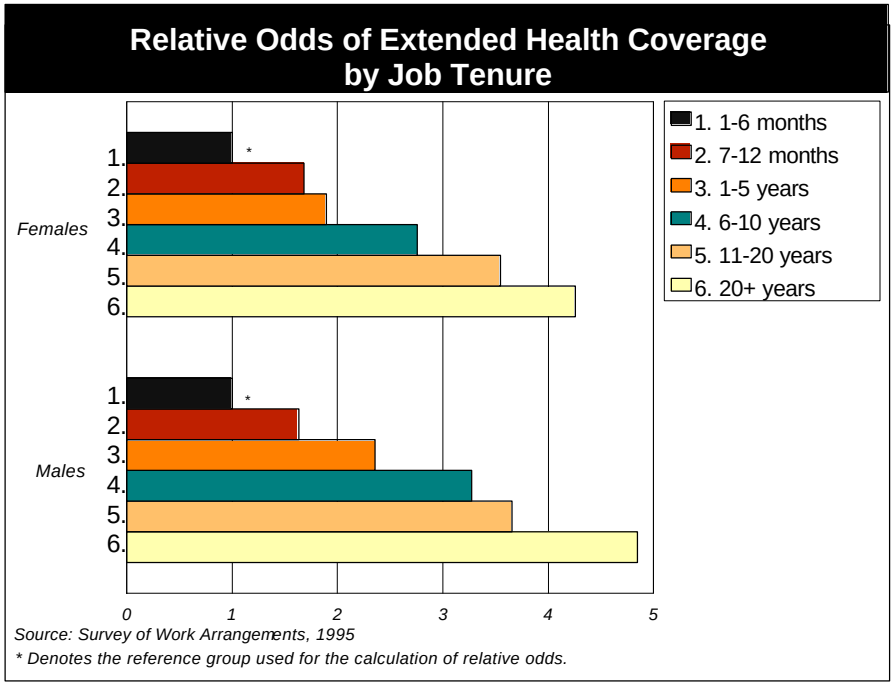
** Denotes the reference group used for the calculation of relative odds.*

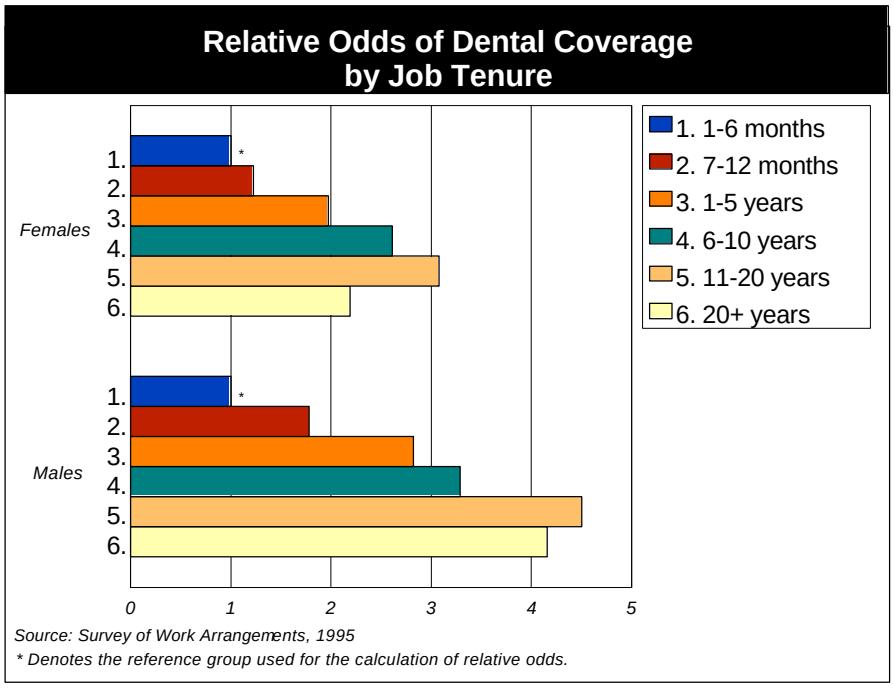




Seniority's (job tenure) effect in the multivariate analysis is consistent with its expected effect ─ the odds of extended health (dental) coverage increases with seniority. The one exception is that the odds of dental plan coverage of workers with 20+ years experience are less than the odds for worker with 11-20 years of seniority. The fact that job tenure is an important explanatory variable after the first year of employment which allows for a probation period before entitlement to benefits, suggests that job tenure may be serving as a proxy for other

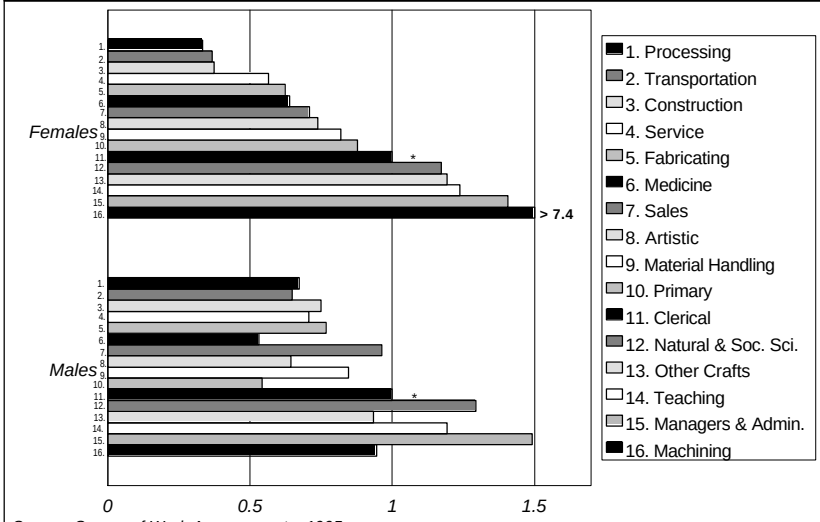
factors. Promotion into job categories where benefits are available, especially in non-union settings, and the age and financial viability of the firm are two possible explanatory factors.





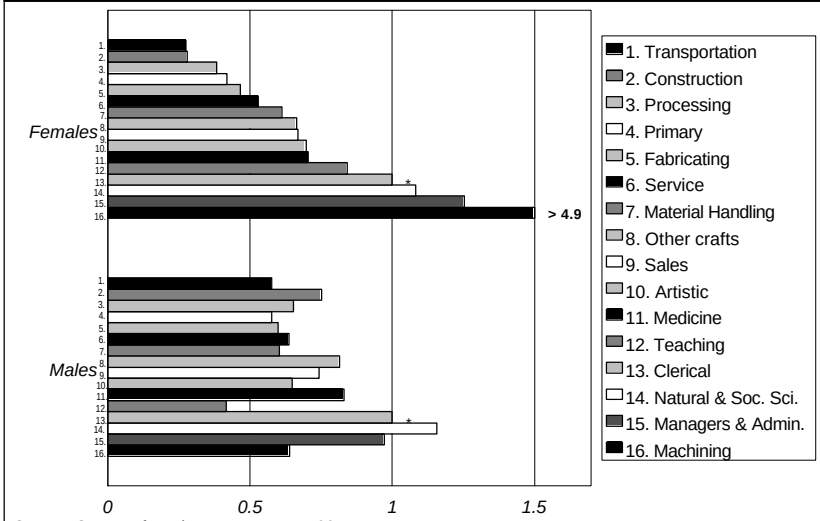
Occupation and industry are both statistically significant (0.001 level) in the regression models. By occupation, the relative odds of entitlement to extended health and dental coverage are highest for women in machining and managers and administrators and lowest in transportation, construction and processing. For men, occupation makes less of a difference. The highest relative odds of dental coverage is found in natural and social science occupations and of extended health coverage, among managers and administrators.

Relative Odds of Extended Health Coverage by Occupation



Source: Survey of Work Arrangements, 1995.
** Denotes the reference group used for the calculation of relative odds.*

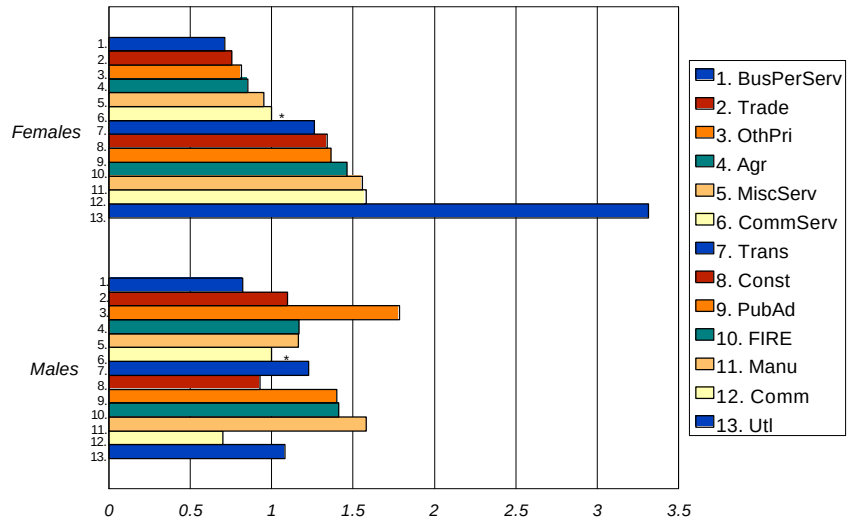
Relative Odds of Dental Coverage by Occupation



Source: Survey of Work Arrangements, 1995
** Denotes the reference group used for the calculation of relative odds.*

By industry, holding other factors constant, the highest relative odds of entitlement to extended health and dental plans for women is clearly in utilities while the lowest is in business and personal services. For men, the highest relative odds of dental coverage is in manufacturing and, for extended health coverage, in primary industries other than agriculture. The lowest relative odds of male dental coverage are in community service while lowest extended health coverage is in the communications industry. Health risks could be one factor playing a role in inter-industry differences.

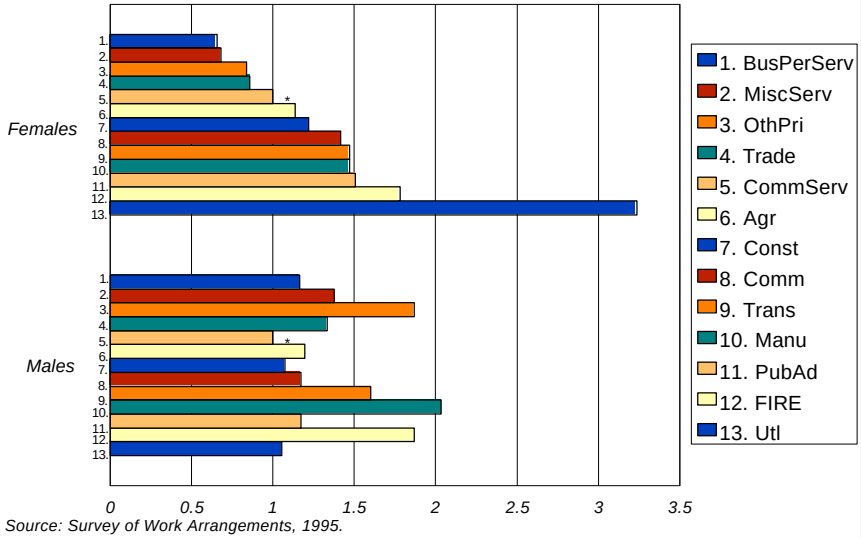
Relative Odds of Extended Health Coverage by Industry



Source: Survey of Work Arrangements, 1995

** Denotes the reference group used for the calculation of relative odds.*

Relative Odds of Dental Coverage by Industry

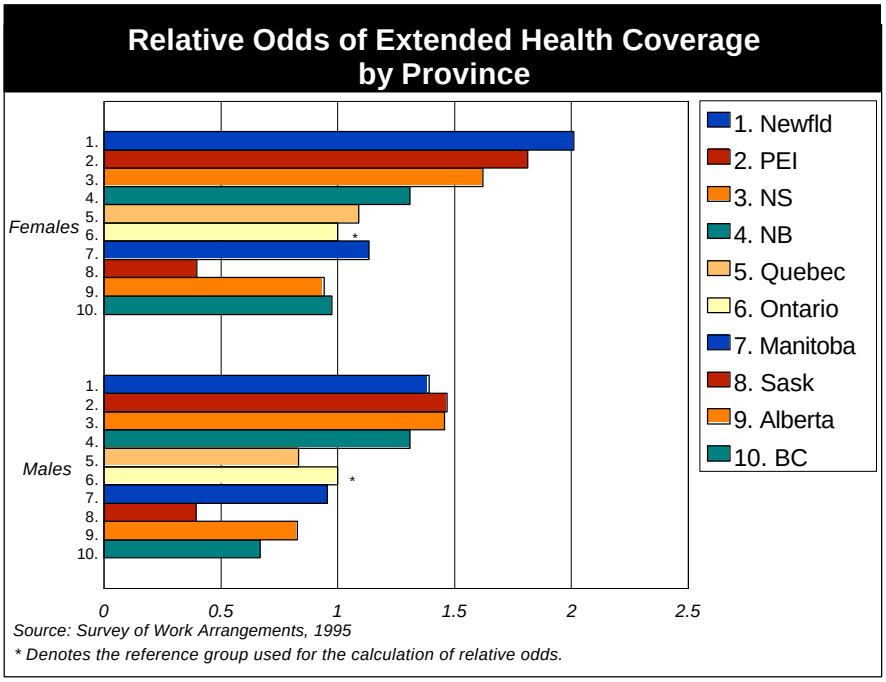


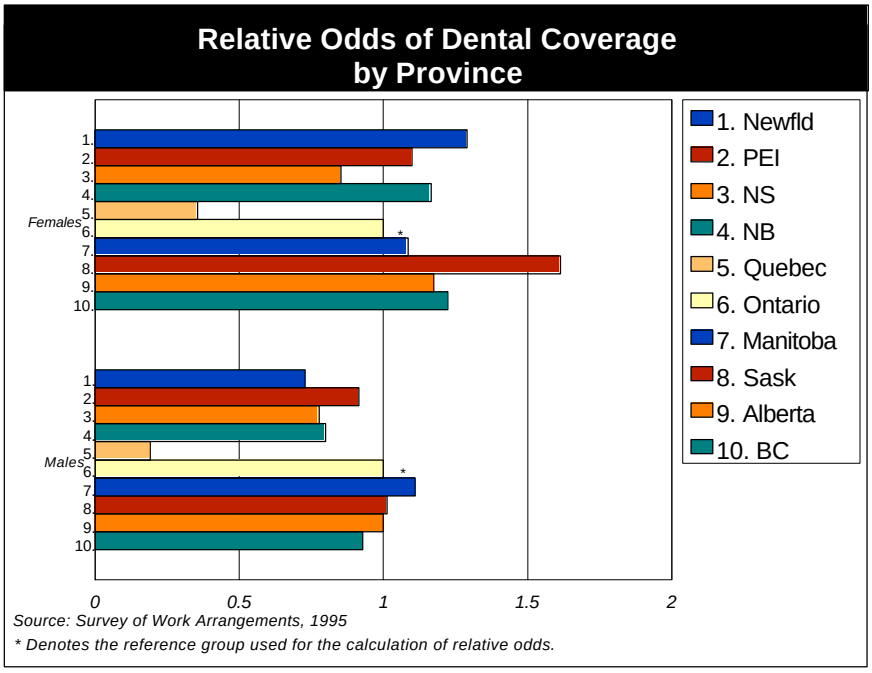
Source: Survey of Work Arrangements, 1995.

** Denotes the reference group used for the calculation of relative odds.*

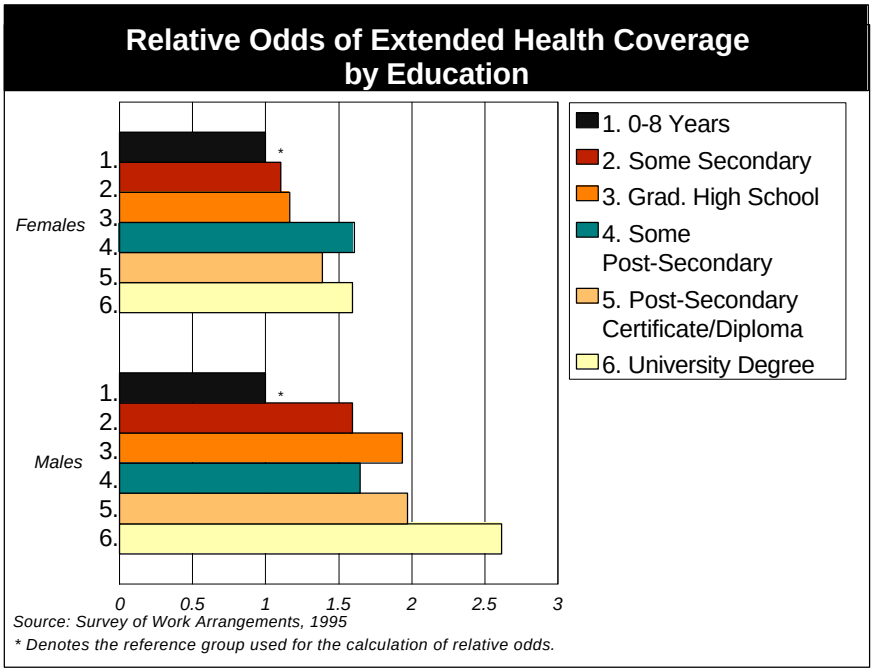
3.2 Personal Characteristics

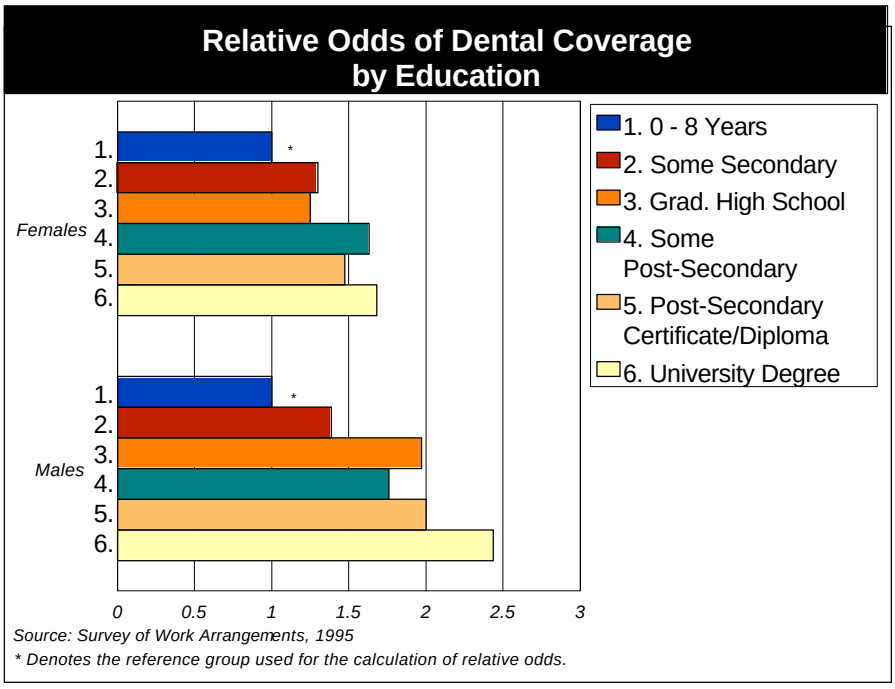
The variability of coverage rates by province, noted in Chapter 2, is reinforced in the regression analysis with province of residence a significant (0.001 level for both genders) determinant of extended health and dental coverage. Workers in the province of Saskatchewan have the lowest odds of extended health coverage of all of the provinces (this is consistent across genders and is in agreement with the coverage rates by province in Appendix A.1). Quebec workers' have the lowest odds of dental plan coverage compared with other Canadians. Ontario no longer has the largest effect on the chances of receiving extended health and dental benefits after controlling for other factors such as industrial structure. Workers in the Atlantic province have the highest relative odds of extended health coverage while (female) workers in Saskatchewan have the highest relative odds of entitlement to dental coverage.





Education is a statistically significant determinant of extended health (dental) plan coverage (see Appendix A.7). Furthermore, the hypothesis of increasing returns to education appears to be true. Generally, the odds of extended health (dental) coverage increase (although not monotonically) with educational attainment (see relative odds charts).





Age, marital status and presence of dependents are not major determinants of health or dental plan coverage. Much of the proposed effect of age is accounted for by other variables such as seniority, union status and permanent/non-permanent status. Age is insignificant for males at the 0.25 level (for both health and dental) and, although it is significant for females (for both health and dental), the differences in the odds of coverage between age groups is not large. One age effect to note, is that older female workers (55-69 years) are slightly worse off in terms of extended health and dental coverage than females under 55.

Although marital status and the presence of dependents (and their interactions) are statistically significant (see Appendix A.7 for details), their effect on the relative odds of extended health and dental plan coverage is small. One interesting point is that the coverage rates of single parents is quite comparable to those in other family types when other factors are controlled for, suggesting that their lack of benefits is related to factors such as education and job tenure. Therefore, there is sparse evidence that marriage and children provide strong incentives to “choose” a job that includes medical coverage as part of the overall compensation package. Given that age, marital status and the presence of children have an impact on the use of and desirability of extended health and dental benefits, an alternative explanation could be that what is an incentive for the employee (benefits) is a disincentive for the employer (costs).

A limiting factor in the regression analysis is that some workers without direct extended health (dental) coverage of their own, may be covered as dependents by the plans of a working spouse. Through examining extended health and dental plan coverage by family units,[19] we can calculate the extent to which married workers, who are not entitled to extended health (dental) insurance at their own place of employment, are potentially covered through spousal insurance. We can classify people into one of three categories ─ no coverage (nobody in the family unit has coverage), possible coverage (no personal coverage, but at least one person in the family unit has coverage), and own coverage (are entitled to their own insurance).[20] We find that an additional 16 percent of married employees are possibly covered through a spousal extended health or dental plan, raising the percentage of married workers who may have extended health (dental) coverage to 82 (77) percent, up from 66 (61) percent. Furthermore, we find that married women are more likely than married men to potentially access these benefits through their spouse (see Appendix A.2 for further details).[21] Despite this proviso, it remains clear that part-time and temporary married workers are much less likely to be entitled to extended health and dental plans.

3.3 Wages

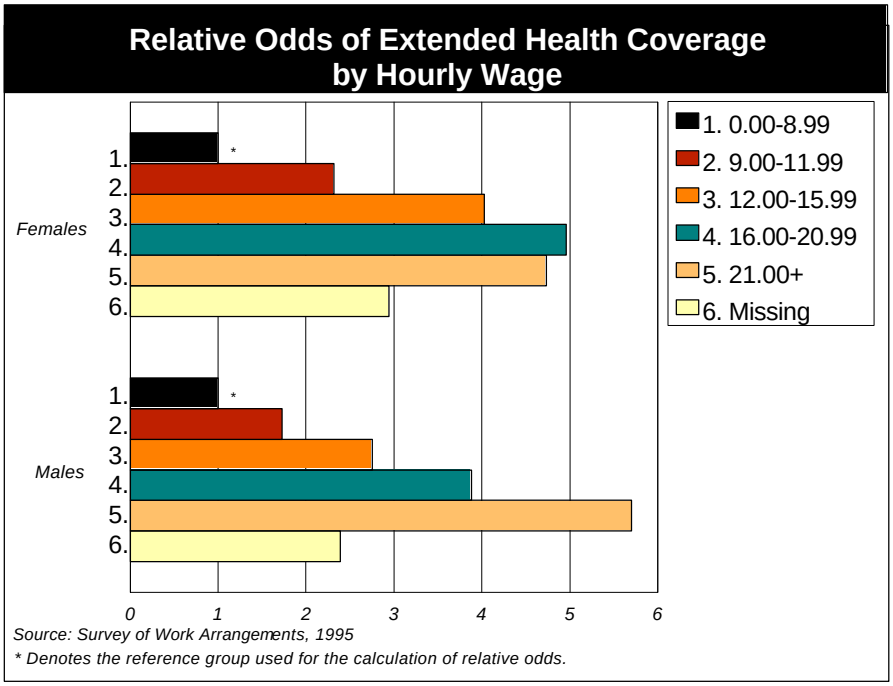
The notion of "good jobs" introduced in Chapter 2 is supported by the effect of wages in the regressions for men and women. Wages have a significant (0.001 level for both genders) effect on the odds of extended health (dental) coverage and this effect is as expected (the odds of extended health (dental) plan coverage increase with wages for both genders). Not only do these

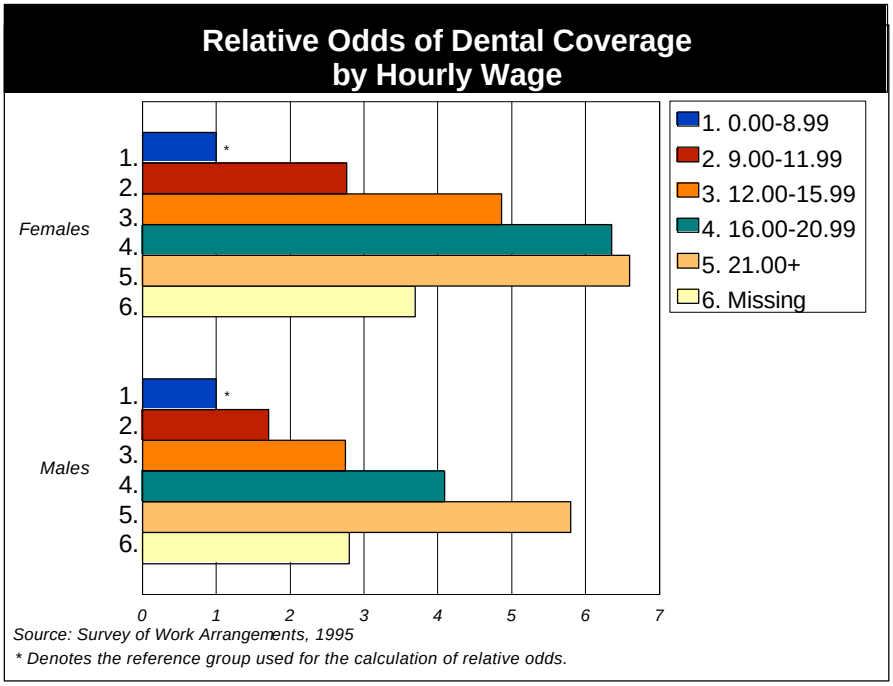
[19] A family, as defined by the Labour Force Survey, is any number of people living in the same household who are related either by blood or by marriage. For example, if there are three generations of married couples living in the same household, then these people are considered to be one family (Reesor and Lipsett 1997). A family for the purpose of benefit coverage would include only husband, wife and children.

[20] We say "possible coverage" for the following reason. It is possible for two married couples (all 4 paid workers) to be in the same family. If only one of these 4 workers has health coverage, then 3 of these 4 would be classified as "possible coverage" (the spouse and the other married couple). In reality only one of them (the spouse) would be covered, while the other couple would have no coverage. Thus, the estimated number of spouses who have health coverage through a spousal plan (i.e. possible coverage) is an overestimate of the actual number (although probably only slightly high). Through similar reasoning, it is easily seen that the number of married workers who are not covered is a slight underestimate.

[21] Married self-employed workers, who were not asked about health or dental coverage in the SWA, may have coverage through a working spouse, allowing them the security to pursue self-employment. Calculations show that this may be the case for nearly one third of these workers (32 and 30 percent of the married self-employed are possibly covered by spousal health and dental plans respectively).

results reinforce the concept of what makes for “good jobs”, but they also underline the multiple sources of insecurity for workers in “bad jobs”.





4. Conclusion

Vulnerability and insecurity for some groups of workers is the main policy issue emerging from the analysis. A lack of access to extended health and dental benefits can increase the individual's risks associated with illness. The major determinants of both extended health and dental plan coverage are permanent/non-permanent job status, part/full-time hours, unionization, firm size, seniority (as proxied by job tenure) and wages. Secondary determinants of coverage include class of worker (public/private sector), industry, occupation, age, education, province of residence, marital status and presence of dependents.

Overall results show that extended health (and dental) plan coverage applies to 63 (59) percent of paid workers. Additionally, some married workers access health and dental plans through spousal plans. Moreover, workers who enjoy the most financial security today (the permanent, full-time, unionized, senior, high wage earners ─ those with "good jobs") are the most likely to have extended health and dental coverage. Although improvements have been made in the medical coverage of part-timers, it still lags that of permanent full-time workers. Changes in employment shares away from jobs with high eligibility rates for extended medical benefits (eg. public sector, large firms) toward those with low eligibility rates (eg. part-time, temporary, small firm and, in particular, a shift to self-employment) suggest that more workers will lack these benefits in the future. As the Canadian labour market continues to evolve, with continued trends to more "nonstandard" employment, the advantages of a strong universal health care system attached to the individual rather than the job become more apparent.

This analysis of entitlement to extended health and dental plans through employers reveals a number of questions requiring further research. Who are the model employers that offer benefit plans to part-time and temporary workers? What is the impact of workplace benefits on a firm's ability to attract and retain quality staff? What is their impact on employee productivity? Is there a gap between actual benefit coverage rates and employee awareness of coverage? What role does workplace benefits have in influencing the rate of social assistance recidivism, especially for lone parents? What is the effect on the overall coverage of Canadian workers of the recent decline in employment in sectors with a high probability of entitlement to these benefits (for example, the shift from public to private sector and from paid- to self-employment)? The revised Labour Force Survey is a key data source for future research as it includes the SWA

question on workplace benefits in its November work arrangements module. Additionally, the Survey of Labour and Income Dynamics provides useful information on transitions between nonstandard and full-time paid employment. However, it provides specific data only on the associated benefit, employer-sponsored pension plans. Further data development would be required to determine whether employees not eligible for health and dental insurance through their employers were self-insuring through other vehicles; the quality of employee plans; and the extent of participation in flexible benefit plans. The goal of future research should be conducted with a view to increase understanding of the impact of extended health and dental plans on human capital accumulation, total factor productivity and worker insecurity.

Appendix A.1

Table 1: Percent of Paid Employees With Extended Health or Dental Plan Coverage

	Extended Health Plan			Dental Plan		
	Total	**Males**	**Females**	**Total**	**Males**	**Females**
Canada	63.3	68.6	57.6	58.9	63.9	53.6
Job Related Characteristics						
Weekly Hours						
Under 30	25.7	17.3	27.4	23.0	15.7	24.5
30 to 49	69.3	71.9	66.1	64.3	66.5	61.7
50 and Over	64.8	64.5	66.0	62.4	62.4	62.5
Temporary Workers						
Permanent	67.6	72.7	62.0	63.1	67.8	57.9
Non-Permanent	23.5	25.9	21.5	20.3	23.0	18.0
Union Status						
Unionized	84.3	88.4	79.3	77.3	80.7	73.1
Not Unionized	49.2	54.0	44.3	46.5	51.4	41.6
Firm Size						
Under 20	24.3	28.1	20.6	21.8	24.2	19.5
20-99	58.7	63.0	53.3	53.0	57.3	47.5
100-500	72.6	76.4	68.9	65.3	69.1	61.5
Over 500	81.1	87.1	74.4	77.6	83.4	71.0
Firm Size and Union Status						
Under 20, Non-Union	20.9	23.4	18.6	18.8	20.6	17.1
20-99, Non-Union	51.8	55.3	47.3	47.1	52.0	40.8
100-500, Non-Union	60.6	65.3	55.6	57.5	62.3	52.5
Over 500, Non-Union	72.5	79.9	65.5	70.9	78.5	63.8
Under 20, Union	61.9	66.9	53.1	55.5	54.0	58.3
20-99, Union	75.9	81.7	68.3	67.6	70.2	64.3
100-500, Union	84.3	88.1	80.8	72.8	76.2	69.7
Over 500, Union	87.7	91.7	82.4	82.6	86.7	77.4
Class of Worker						
Public Employee	81.0	88.2	74.4	73.7	80.3	67.6
Private Employee	58.9	64.2	53.0	55.3	60.2	49.7
Class of Worker and Union Status						
Public, Non-Union	58.8	73.3	46.0	53.5	67.0	41.7
Private, Non-Union	48.5	52.8	44.2	46.1	50.5	41.6
Public, Union	86.1	91.6	81.0	78.3	83.3	73.7
Private, Union	83.1	86.7	77.8	76.6	79.4	72.7

Table 1 (Continued)

	Extended Health Plan			Dental Plan		
	Total	**Males**	**Females**	**Total**	**Males**	**Females**
Job Tenure						
1-6 Months	26.8	30.9	22.8	24.1	27.4	20.9
7-12 Months	42.4	43.9	40.2	38.3	40.9	34.6
1-5 Years	54.7	61.5	48.2	52.2	58.2	46.5
6-10 Years	71.2	76.0	66.8	66.2	69.3	63.3
11-20 Years	81.4	85.2	76.8	77.4	81.5	72.5
Over 20 Years	89.0	92.0	84.1	78.7	83.9	70.1
Industry						
Agriculture	22.9	24.5	N/A	22.2	22.5	N/A
Other Primary	72.0	73.6	65.2	70.5	72.2	63.1
Manufacturing	75.3	78.5	67.6	69.8	73.6	60.8
Construction	46.5	46.7	45.4	43.6	44.1	40.3
Transportation	66.6	68.2	60.5	63.2	64.8	57.3
Communications	78.6	75.1	83.9	78.3	77.2	79.9
Utilities	84.9	83.7	89.2	78.3	76.3	85.0
Trade	48.4	57.1	38.5	45.0	51.6	37.6
Finance	75.6	76.8	75.0	75.1	74.9	75.2
Community Services	67.7	77.1	64.2	60.9	67.2	58.6
Business and Personal Services	39.8	48.4	33.8	37.4	47.8	30.1
Miscellaneous Services	43.5	47.5	39.7	38.1	43.2	33.1
Public Administration	85.0	89.5	79.4	78.5	81.2	75.1
Occupation						
Artistic	47.9	49.3	46.2	45.0	47.3	42.2
Clerical	61.7	73.7	58.8	59.0	71.7	55.9
Construction	53.9	54.3	N/A	52.5	52.9	N/A
Fabricating	67.4	69.8	57.7	60.6	64.2	45.5
Machining	75.2	74.0	N/A	69.0	67.7	N/A
Managers and Other Administrators	78.7	82.9	74.3	73.7	76.3	70.8
Material Handling	60.7	62.7	52.7	54.1	56.0	46.4
Medicine	67.1	72.3	66.1	63.8	69.4	62.8
Natural, Social Science and Religion	77.0	79.4	73.0	73.6	76.4	69.2
Other Crafts	78.2	84.1	N/A	70.5	78.0	N/A
Primary	43.8	48.0	N/A	42.0	46.5	N/A
Processing	68.5	76.1	41.9	65.4	72.9	39.0
Sales	47.6	59.1	37.4	44.8	54.3	36.4
Service	41.3	55.2	29.1	38.0	51.5	26.0

Table 1 (Continued)

	Extended Health Plan			Dental Plan		
	Total	**Males**	**Females**	**Total**	**Males**	**Females**
Teaching	75.7	85.3	71.2	63.5	68.2	61.2
Transportation	55.3	56.2	N/A	51.9	52.9	N/A
Personal Characteristics						
Age						
15-24	34.6	35.1	34.1	32.5	32.9	32.2
25-34	62.4	65.1	59.3	59.2	61.4	56.6
35-44	68.9	75.4	62.2	64.9	71.0	58.5
45-54	70.3	78.8	61.7	63.9	71.5	56.1
55-69	63.7	72.0	52.7	55.7	65.3	42.8
Education						
0-8 Years	48.3	52.9	39.8	38.3	43.3	29.3
Some Secondary	54.2	61.9	42.4	48.4	55.4	38.0
Graduated High School	58.2	63.9	52.6	55.8	61.8	50.0
Some Post-Secondary	62.1	63.6	60.6	60.0	62.4	57.5
Post-Secondary Certificate or Diploma	65.1	70.3	59.8	60.6	65.6	55.5
University Degree	76.5	82.9	69.9	71.1	76.6	65.5
Marital Status						
Married	66.0	73.7	57.6	61.5	68.9	53.4
Single, Never Married	54.1	53.9	54.5	50.7	49.5	52.2
Widowed, Separated/Divorced	66.9	71.0	64.1	61.1	66.2	57.7
Presence of Dependents						
At Least One Child	62.5	69.9	54.9	58.5	65.3	51.4
No Children	64.4	67.0	61.3	59.5	62.1	56.6
Marital Status and Presence of Dependents Combined						
Married With At Least One Child	66.8	75.2	57.1	62.4	70.5	53.2
Married No Children	64.4	70.5	58.7	59.5	65.5	53.9
Single With At Least One Child	33.5	30.7	36.2	31.5	28.6	34.4
Single No Children	62.9	62.0	64.4	58.9	56.8	61.9
Widowed, Separated, Divorced With At Least One Child	63.9	71.8	62.1	59.8	61.7	59.4
Widowed, Separated, Divorced Without Children	68.9	70.9	66.6	61.9	67.3	55.5
Province						
Newfoundland	63.8	68.8	58.4	56.8	60.7	52.7
Prince Edward Island	58.4	59.8	57.0	51.8	53.9	49.7
Nova Scotia	62.2	67.9	55.9	53.3	60.0	45.9
New Brunswick	57.7	63.1	52.0	53.4	57.6	48.9

Table 1 (Continued)

	Extended Health Plan			Dental Plan		
	Total	**Males**	**Females**	**Total**	**Males**	**Females**
Quebec	64.5	69.1	59.5	45.2	47.7	42.4
Ontario	66.6	72.2	60.4	66.2	72.2	59.5
Manitoba	63.0	67.7	57.7	62.9	69.3	55.9
Saskatchewan	47.8	53.8	42.3	61.3	64.3	58.6
Alberta	57.6	62.1	52.6	60.0	64.8	54.7
British Columbia	60.3	65.8	54.7	63.5	69.6	57.3
Hourly Wages						
0.00-8.99	19.9	22.6	18.5	16.4	19.2	14.9
9.00-11.99	45.5	43.2	47.2	41.2	37.2	44.1
12.00-15.99	68.7	66.4	70.8	63.2	59.5	66.4
16.00-20.99	81.7	82.4	80.9	77.2	77.8	76.3
21.00 and Over	87.4	91.3	79.8	83.2	86.9	75.9
Missing	63.4	67.4	58.0	59.3	63.6	53.6

Source: HRDC calculations based on the 1995 Survey of Work Arrangements, Statistics Canada

Appendix A.2

Table 2: Percent of Paid Married Workers by Extended Health Plan Coverage and Worker Type

Both Genders				
Worker Type	No Coverage	Possible Coverage	Own Job Coverage	Total
Permanent-Full-Time	14%	11%	75%	100%
Permanent-Part-Time	33%	35%	32%	100%
Temporary-Full-Time	36%	30%	34%	100%
Temporary-Part-Time	45%	40%	15%	100%
All Worker Types	18%	16%	66%	100%
Males				
Worker Type	No Coverage	Possible Coverage	Own Job Coverage	Total
Permanent-Full-Time	14%	8%	78%	100%
Permanent-Part-Time	47%	27%	26%	100%
Temporary-Full-Time	38%	25%	37%	100%
Temporary-Part-Time	72%	N/A	N/A	100%
All Worker Types	17%	10%	73%	100%
Females				
Worker Type	No Coverage	Possible Coverage	Own Job Coverage	Total
Permanent-Full-Time	15%	15%	70%	100%
Permanent-Part-Time	31%	36%	33%	100%
Temporary-Full-Time	32%	37%	31%	100%
Temporary-Part-Time	40%	44%	16%	100%
All Worker Types	21%	22%	58%	100%
Source: HRDC calculations based on the 1995 Survey of Work Arrangements, Statistics Canada				

Appendix A.2 (Continued)

Table 3: Percent of Paid Married Workers by Dental Plan Coverage and Worker Type

Both Genders				
Worker Type	No Coverage	Possible Coverage	Own Job Coverage	Total
Permanent-Full-Time	19%	11%	70%	100%
Permanent-Part-Time	37%	33%	30%	100%
Temporary-Full-Time	40%	29%	32%	100%
Temporary-Part-Time	49%	40%	11%	100%
All Worker Types	23%	16%	61%	100%
Males				
Worker Type	No Coverage	Possible Coverage	Own Job Coverage	Total
Permanent-Full-Time	19%	9%	72%	100%
Permanent-Part-Time	51%	26%	22%	100%
Temporary-Full-Time	41%	24%	35%	100%
Temporary-Part-Time	67%	N/A	N/A	100%
All Worker Types	21%	10%	68%	100%
Females				
Worker Type	No Coverage	Possible Coverage	Own Job Coverage	Total
Permanent-Full-Time	19%	15%	66%	100%
Permanent-Part-Time	36%	34%	30%	100%
Temporary-Full-Time	38%	35%	27%	100%
Temporary-Part-Time	46%	43%	12%	100%
All Worker Types	25%	21%	53%	100%
Source: HRDC calculations based on the 1995 Survey of Work Arrangements, Statistics Canada				

Appendix A.3

More on the Logistic Regression Model

With the regression model outlined in Chapter 3 and using (*JOB,PERSONAL,WAGE*)=*x* for brevity, it is easily seen that

$$\textbf{(3)} \qquad p(x) = Prob(HEALTH = 1 \mid x) = \frac{\exp(b_0 + b\,x)}{1 + \exp(b_0 + b\,x)}$$

and

$$\textbf{(4)} \qquad 1 - p(x) = Prob(HEALTH = 0 \mid x) = \frac{1}{1 + \exp(b_0 + b\,x)}$$

where $\beta=(\beta_1,\beta_2,\beta_3)$.

Returning to the discussion of maximum likelihood estimation of Chapter 3, if *I* and *j* are indices which refer to workers with and without extended health coverage respectively, then the likelihood function is

$$\textbf{(5)} \qquad L = \prod_i Prob(HEALTH = 1 \mid x_i) \prod_j Prob(HEALTH = 0 \mid x_j)$$
$$= \prod_i \frac{\exp(b_0 + b\,x_i)}{1 + \exp(b_0 + b\,x_i)} \prod_j \frac{1}{1 + \exp(b_0 + b\,x_j)}$$

This function is maximized to give parameter estimates for the model. Again, similar arguments hold for dental coverage.

Appendix A.4

Model Specifications, Statistical Significance and Model Fit

For each gender, the model specified in Equation 4 is estimated. In order to test if the independent variables have a statistically significant effect on the probability of extended health (dental) plan coverage, the likelihood ratio statistic is used as the test statistic.

The independent variables are “groups” of variables that indicate whether or not a worker has a certain characteristic. There is always one fewer indicator variables than the number of divisions within a group of variables (one of the divisions is used as a reference base, with inferences for the other divisions within this group made relative to the base division). For example, to determine the effect of age on the probability of extended health (dental) coverage, 4 indicator variables are used for the 5 age divisions. Variable groups with only 2 divisions (e.g. permanent/non-permanent workers) require only one indicator variable.

To test for the statistical significance of a variable group (e.g. age), the model containing all of the independent variables is estimated, resulting in a value for the log-likelihood and the number of degrees of freedom for the model. The indicator variables for that group are simultaneously removed from the model and it is re-estimated, giving another value for the log-likelihood and the degrees of freedom. The difference of the log-likelihoods between the full and reduced models is used as the test statistic. This statistic has an approximate Chi-Squared distribution, with the number of degrees of freedom being the difference in the number of degrees of freedom between the two models and statistical significance is determined from Chi-Squared tables.

For example, to test the significance of age on the probability of extended health (dental) coverage, all 4 of the age division indicator variables are simultaneously removed from the full model, and the reduced model is re-estimated. The difference in the log-likelihoods from the two models will have an approximate Chi-Squared distribution with 4 degrees of freedom. If only one of the age indicator variables is removed, you’re essentially grouping the removed age division with the reference base division. By examining the difference in the log-likelihoods between these two models, you’re testing whether these “new” age divisions have a statistically

Appendix A.4 (Continued)

different effect on the probability of extended health (dental) coverage than the "old" age divisions (i.e. whether the removed age division and the reference division have the same effect in the model). Thus, to test the overall significance of age, all of the indicator variables regarding age must be simultaneously removed from the model. To test whether one of the age divisions is significantly different from the base group, remove only that division's indicator variable form the model, and examine the difference in the log-likelihoods (equivalently, you could examine the univariate significance levels given in the regression results).

One diagnostic to check the model is a classification table. This technique calculates the probability of extended health (dental) coverage for each individual using the estimated model. Then according to these estimated probabilities and using an arbitrary cut-off probability (usually 0.5), it classifies individuals by extended health (dental) coverage.[22] The models for both genders performed quite well with respect to the classification table diagnostic (83.3 percent of men and 82.7 percent of women were classified correctly).

Another diagnostic for the model specification is to examine the robustness of the model. One method of doing this is to remove variable groups (e.g. age), re-estimate the model and examine the extent to which the estimated coefficients for the other variables have changed. If a model is robust, these estimates should be consistent and their signs (positive or negative) should remain the same. This can also be a diagnostic to check for multi-collinearity. If a variable group is removed and this changes the estimated coefficients of another group of variables, then these variables are collinear and may "dampen" the effect of each other in the model. In general, the models for males and females are robust. Not surprisingly age, job tenure and permanent/non-permanent job status affect the others' estimates when each is removed from the models, suggesting some degree of multi-collinearity. Although these three groups "dampen" the effect of one another on the probability of extended health (dental) coverage, they are not adequate substitutes for one another, as they are all statistically significant (e.g. although some of the effect of age on extended health (dental) coverage can be explained by job tenure, not all of it can).

[22] This is similar to the R-squared used in ordinary least squares regression to determine how much of the variability in the dependent variable is explained by the model.

Appendix A.5

More on Odds Ratio

The odds of extended health (dental) plan coverage, written in terms of the logistic model in Chapter 3, are

(6) $$\frac{p(x)}{1-p(x)} = e^{b_0 + b x}$$

Consider for example the case where x is a single indicator variable distinguishing two groups of people (x = 1 if group one, 0 if group 2). Then the odds of extended health (dental) plan coverage for group one relative to group two is

(7) $$Odds\ Ratio = \frac{p_1/(1-p_1)}{p_2/(1-p_2)} = \frac{e^{b_0 + b}}{e^{b_0}} = e^{b}$$

with π_1 and π_2 as defined in Chapter 3. This calculation is readily extended to the case of multiple variables and interaction terms.

Appendix A.6

Table 4: Variables Used in Logistic Regression Models

The following tables gives the names, descriptions and gender sample counts of the variables used in the logistic regression models. Sample counts for the interaction terms used in the models are not provided.

		Variable Name	Sample Counts	
			Men	Women
			9498	9042
Job Related Characteristics				
Hours of Work	Less than 30 hrs/week	PART-TIME	409	2117
	30-49 hrs/week	Base	7604	6446
	50+ hrs/week	LONGTIME	1485	479
Non-Permanent Workers	Permanent	Base	8526	7981
	Non-permanent	TEMPJOB	972	1061
Union Status	Unionized	UNION1	4197	3624
	Not unionized	Base	5301	5418
Firm Size	Less than 20 workers	FIRM1	2058	2234
	20-99 workers	FIRM2	1653	1402
	100-500 workers	FIRM3	1701	1813
	Over 500 workers	Base	4086	3593
Class of Worker	Public	GOVTEMP	1966	2287
	Private	Base	7532	6755
Job Tenure	1-6 months	TEN1	1222	1294
	7-12 months	TEN2	702	518
	1-5 years	Base	2233	2425
	6-10 years	TEN3	1778	2121
	11-20 years	TEN4	2080	1862
	Over 20 years	TEN5	1483	822
Industry	Agriculture	IND1	156	101
	Other primary	IND2	507	86
	Manufacturing	IND3	2279	848
	Construction	IND4	713	111

Table 4 (Continued)

		Variable Name	Sample Counts	
			Men	Women
	Transportation	IND5	648	146
	Communications	IND6	284	210
	Utilities	IND7	222	61
	Trade	IND8	1463	1405
	Finance	IND9	340	670
	Community services	Base	1178	3296
	Business and personal services	IND10	732	1236
	Miscellaneous	IND11	165	191
	Public Administration	IND12	811	681
Occupation	Artistic	OCC5	145	113
	Clerical	Base	504	2485
	Construction	OCC12	876	14
	Fabricating	OCC11	1277	267
	Machining	OCC10	346	21
	Managers and other administrators	OCC1	1417	1298
	Material handling	OCC14	377	74
	Medicine	OCC4	165	1100
	Natural, social science and religion	OCC2	723	457
	Other crafts	OCC15	192	50
	Primary	OCC8	418	77
	Processing	OCC9	485	155
	Sales	OCC6	598	713
	Service	OCC7	894	1283
	Teaching	OCC3	394	860
	Transportation	OCC13	687	75
Interactions				
Union Status and Firm ize	UNION1*FIRM1	UNFIRM1		
	UNION1*FIRM2	UNFIRM2		
	UNION1*FIRM3	UNFIRM3		
Union Status and Class of Worker	UNION1*GOVTEMP	UNGOVT		
Personal Characteristics				
Age Groups	15-24 years	AGE1	955	881

Table 4 (Continued)

		Variable Name	Sample Counts	
			Men	Women
	25-34 years	AGE2	2670	2583
	35-44 years	Base	3055	3034
	45-54 years	AGE3	2045	1944
	55-69 years	AGE4	773	600
Education	0-8 years	EDU1	584	279
	Some secondary	EDU2	1430	1024
	Graduated high school	EDU3	1982	2126
	Some post-secondary	EDU4	711	704
	Post-secondary certificate or diploma	Base	3209	3298
	University degree	EDU5	1582	1611
Marital Status	Married or living common law	Base	7045	6539
	Single, never married	SINGLE	1945	1539
	Widowed, divorced or separated	OTHER	508	964
Children	At least one child	Base	5748	5551
	No children	NOCHILD	3750	3491
Province	Newfoundland	NFLD	300	286
	Prince Edward Island	PEI	259	270
	Nova Scotia	NOVASC	598	582
	New Brunswick	NEWBRUN	578	575
	Quebec	QUEBEC	1898	1676
	Ontario	Base	3068	2887
	Manitoba	MANITOBA	698	642
	Saskatchewan	SASK	524	585
	Alberta	ALBERTA	790	757
	British Columbia	BC	785	782
Interactions				
Marital Status and Presence of Children	SINGLE*NOCHILD	SINGNOCH		
	OTHER*NOCHILD	OTHNOCH		
Hourly Wages				
	$0.00-$8.99 per hour	Base	854	1904
	$9.00-$11.99 per hour	WAGE1	1000	1434

Table 4 (Continued)

		Variable Name	Sample Counts	
			Men	Women
	$12.00-$15.99 per hour	WAGE2	1556	1688
	$16.00-$20.99 per hour	WAGE3	1733	1307
	$21.00+ per hour	WAGE4	1960	990
	Refused, not stated, don't know	WAGE5	2395	1719

Appendix A.7

Table 5: Significance of Variable Groups Using the Likelihood Ratio Test

	Extended Health Plan		Dental Plan	
Variable Group	**Males**	**Females**	**Males**	**Females**
Job Related Characteristics	****	****	****	****
Personal Characteristics	****	****	****	****
Wages	****	****	****	****
Part/Full/Long-Time Hours	****	****	****	****
Permanent/Non-permanent Status	****	****	****	****
Interaction Between Union Status and Firm Size	****	****	****	****
Interaction Between Union Status and Public/Private Sector				
Public/Private Sector (alone)		***		****
Union Status (alone)	****	****	****	****
Firm Size (alone)	****	****	****	****
Seniority	****	****	****	****
Industry	****	****	****	****
Occupation	****	****	****	****
Age		***		****
Education	****	***	****	**
Interaction Between Marital Status and Presence of Dependents	***		**	**
Marital Status (alone)			*	****
Presence of Dependents (alone)	**	***	*	**
Province of Residence	****	****	****	****
Wages	****	****	****	****

**** denotes significance at the 0.001 level, *** at the 0.01 level, ** at the 0.05 level and * at the 0.1 level.

Appendix A.8

Table 6: Results of Males' Extended Health Coverage Logistic Regression Model

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
INTERCPT	0.5277	0.2431	0.0299	1.695
Job Related Characteristics				
PARTTIME	-1.5667	0.1737	0.0001	0.209
LONGTIME	-0.0631	0.0871	0.4686	0.939
TEMPJOB	-1.7624	0.1156	0.0001	0.172
UNION1	0.9404	0.1271	0.0001	2.561
FIRM1	-2.1422	0.1024	0.0001	0.117
FIRM2	-0.7846	0.1033	0.0001	0.456
FIRM3	-0.6059	0.1149	0.0001	0.546
GOVTEMP	0.1016	0.2185	0.642	1.107
UNFIRM1	1.2103	0.2182	0.0001	3.354
UNFIRM2	0.3253	0.1895	0.086	1.384
UNFIRM3	0.4881	0.1874	0.0092	1.629
UNGOVT	-0.1435	0.2242	0.5222	0.866
TEN1	-0.8585	0.0989	0.0001	0.424
TEN2	-0.3684	0.1089	0.0007	0.692
TEN3	0.3287	0.088	0.0002	1.389
TEN4	0.4376	0.097	0.0001	1.549
TEN5	0.7196	0.1407	0.0001	2.054
IND1	0.1563	0.3536	0.6585	1.169
IND2	0.5788	0.257	0.0243	1.784
IND3	0.4586	0.1576	0.0036	1.582
IND4	-0.0726	0.2054	0.7238	0.93
IND5	0.2052	0.1978	0.2995	1.228
IND6	-0.3578	0.2187	0.1018	0.699
IND7	0.0765	0.2867	0.7895	1.08
IND8	0.0935	0.1601	0.5591	1.098
IND9	0.3464	0.2056	0.0921	1.414
IND10	-0.1968	0.1579	0.2126	0.821
IND11	0.1533	0.2369	0.5175	1.166
IND12	0.3369	0.2146	0.1165	1.401
OCC1	0.4008	0.1534	0.009	1.493
OCC2	0.2572	0.177	0.1462	1.293
OCC3	0.1771	0.268	0.5087	1.194
OCC4	-0.6312	0.262	0.016	0.532
OCC5	-0.4409	0.2544	0.0831	0.643
OCC6	-0.0362	0.1648	0.8262	0.964
OCC7	-0.348	0.1648	0.0347	0.706
OCC8	-0.6124	0.2782	0.0277	0.542
OCC9	-0.3979	0.1937	0.0399	0.672
OCC10	-0.0571	0.2149	0.7906	0.945
OCC11	-0.2658	0.1531	0.0824	0.767
OCC12	-0.288	0.1948	0.1393	0.75
OCC13	-0.4345	0.1818	0.0169	0.648
OCC14	-0.1658	0.2019	0.4116	0.847
OCC15	-0.0671	0.2858	0.8143	0.935

Table 6 (Continued)

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
Personal Characteristics				
AGE1	-0.0802	0.1306	0.5393	0.923
AGE2	-0.00109	0.0808	0.9893	0.999
AGE3	0.0534	0.0971	0.5821	1.055
AGE4	0.0322	0.1334	0.8091	1.033
EDU1	-0.6793	0.1454	0.0001	0.507
EDU2	-0.2126	0.0968	0.0281	0.808
EDU3	-0.0193	0.0853	0.8209	0.981
EDU4	-0.1811	0.119	0.1279	0.834
EDU5	0.2824	0.1052	0.0072	1.326
SINGLE	-0.4161	0.1491	0.0053	0.66
OTHER	-0.2286	0.2886	0.4284	0.796
NOCHILD	-0.00398	0.0828	0.9617	0.996
SINGNOCH	0.5609	0.1693	0.0009	1.752
OTHNOCH	0.1136	0.3271	0.7283	1.12
NWFLD	0.3295	0.2708	0.2236	1.39
PEI	0.3836	0.4951	0.4385	1.468
NOVASC	0.3757	0.186	0.0434	1.456
NEWBRUN	0.2684	0.206	0.1926	1.308
QUEBEC	-0.1827	0.0809	0.0239	0.833
ALBERTA	-0.1892	0.1049	0.0713	0.828
MANITOBA	-0.0447	0.1641	0.7854	0.956
SASK	-0.9294	0.1809	0.0001	0.395
BC	-0.4024	0.0994	0.0001	0.669
Wages				
WAGE1	0.5468	0.1288	0.0001	1.728
WAGE2	1.0139	0.1282	0.0001	2.756
WAGE3	1.3555	0.1382	0.0001	3.879
WAGE4	1.7403	0.1522	0.0001	5.699
WAGE5	0.8695	0.1222	0.0001	2.386

Appendix A.8 (Continued)

Table 7: Results of Females' Extended Health Coverage Logistic Regression Model

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
INTERCPT	0.1737	0.1719	0.3123	1.19
Job Related Characteristics				
PARTTIME	-1.3901	0.0771	0.0001	0.249
LONGTIME	0.00168	0.1383	0.9903	1.002
TEMPJOB	-1.8669	0.1098	0.0001	0.155
UNION1	0.5386	0.1183	0.0001	1.714
FIRM1	-2.1604	0.0973	0.0001	0.115
FIRM2	-0.7447	0.1036	0.0001	0.475
FIRM3	-0.4213	0.1093	0.0001	0.656
GOVTEMP	-0.4985	0.1697	0.0033	0.607
UNFIRM1	0.8967	0.2466	0.0003	2.451
UNFIRM2	0.3428	0.1815	0.059	1.409
UNFIRM3	0.5135	0.1629	0.0016	1.671
UNGOVT	0.2654	0.1858	0.1531	1.304
TEN1	-0.6382	0.1021	0.0001	0.528
TEN2	-0.119	0.1256	0.3433	0.888
TEN3	0.3742	0.0804	0.0001	1.454
TEN4	0.6282	0.0937	0.0001	1.874
TEN5	0.8095	0.1388	0.0001	2.247
IND1	-0.1593	0.4543	0.7258	0.853
IND2	-0.2069	0.3309	0.5317	0.813
IND3	0.4419	0.1457	0.0024	1.556
IND4	0.2934	0.2643	0.267	1.341
IND5	0.2346	0.2513	0.3506	1.264
IND6	0.4582	0.2487	0.0654	1.581
IND7	1.198	0.4943	0.0154	3.314
IND8	-0.2804	0.1223	0.0219	0.756
IND9	0.3799	0.1396	0.0065	1.462
IND10	-0.339	0.1152	0.0033	0.713
IND11	-0.0507	0.2054	0.8052	0.951
IND12	0.3116	0.1674	0.0627	1.366
OCC1	0.3416	0.0965	0.0004	1.407
OCC2	0.1587	0.1515	0.2948	1.172
OCC3	0.2133	0.1577	0.1761	1.238
OCC4	-0.448	0.1273	0.0004	0.639
OCC5	-0.3033	0.2412	0.2087	0.738
OCC6	-0.3459	0.1206	0.0041	0.708
OCC7	-0.5692	0.1144	0.0001	0.566
OCC8	-0.1288	0.5592	0.8178	0.879
OCC9	-1.0987	0.2471	0.0001	0.333
OCC10	2.0008	1.0379	0.0539	7.395
OCC11	-0.4733	0.1945	0.0149	0.623
OCC12	-0.9807	0.8706	0.26	0.375
OCC13	-1.0009	0.3648	0.0061	0.368
OCC14	-0.1981	0.312	0.5254	0.82
OCC15	0.1773	0.3941	0.6528	1.194

Table 7 (Continued)

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
Personal Characteristics				
AGE1	-0.1466	0.1216	0.228	0.864
AGE2	0.0415	0.078	0.595	1.042
AGE3	-0.212	0.0857	0.0134	0.809
AGE4	-0.3753	0.1385	0.0067	0.687
EDU1	-0.3291	0.1836	0.073	0.72
EDU2	-0.23	0.1096	0.0359	0.795
EDU3	-0.1754	0.0812	0.0307	0.839
EDU4	0.1455	0.1133	0.199	1.157
EDU5	0.138	0.0946	0.1444	1.148
SINGLE	0.0831	0.1383	0.5478	1.087
OTHER	0.0745	0.1343	0.579	1.077
NOCHILD	0.1805	0.0786	0.0216	1.198
SINGNOCH	0.113	0.1669	0.4985	1.12
OTHNOCH	-0.00196	0.2054	0.9924	0.998
NWFLD	0.6981	0.2671	0.009	2.01
PEI	0.5943	0.4825	0.2181	1.812
NOVASC	0.4835	0.1755	0.0059	1.622
NEWBRUN	0.2685	0.1994	0.178	1.308
QUEBEC	0.087	0.0779	0.264	1.091
ALBERTA	-0.0613	0.1052	0.5601	0.941
MANITOBA	0.1255	0.1601	0.4329	1.134
SASK	-0.9202	0.1695	0.0001	0.398
BC	-0.0264	0.0937	0.7781	0.974
Wages				
WAGE1	0.8404	0.1043	0.0001	2.317
WAGE2	1.3923	0.1103	0.0001	4.024
WAGE3	1.6017	0.1283	0.0001	4.961
WAGE4	1.5548	0.1448	0.0001	4.734
WAGE5	1.0787	0.1057	0.0001	2.941

Appendix A.9

Table 8: Results of Males' Dental Coverage Logistic Regression Model

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
INTERCPT	0.8345	0.2362	0.0004	2.304
Job Related Characteristics				
PARTTIME	-1.4597	0.1784	0.0001	0.232
LONGTIME	0.0222	0.0852	0.7944	1.022
TEMPJOB	-1.4216	0.1148	0.0001	0.241
UNION1	0.7567	0.1162	0.0001	2.131
FIRM1	-2.4145	0.1043	0.0001	0.089
FIRM2	-0.9324	0.1031	0.0001	0.394
FIRM3	-0.6972	0.1121	0.0001	0.498
GOVTEMP	-0.0720	0.1976	0.7154	0.931
UNFIRM1	1.2795	0.2095	0.0001	3.595
UNFIRM2	0.2133	0.1708	0.2115	1.238
UNFIRM3	0.1593	0.1619	0.3250	1.173
UNGOVT	-0.1281	0.1969	0.5154	0.880
TEN1	-1.0379	0.1011	0.0001	0.354
TEN2	-0.4615	0.1094	0.0001	0.630
TEN3	0.1525	0.0849	0.0724	1.165
TEN4	0.4658	0.0928	0.0001	1.593
TEN5	0.3861	0.1180	0.0011	1.471
IND1	0.1790	0.3568	0.6159	1.196
IND2	0.6252	0.2448	0.0106	1.869
IND3	0.7097	0.1457	0.0001	2.033
IND4	0.0728	0.1950	0.7089	1.076
IND5	0.4717	0.1858	0.0111	1.603
IND6	0.1597	0.2144	0.4565	1.173
IND7	0.0548	0.2552	0.8300	1.056
IND8	0.2878	0.1509	0.0566	1.333
IND9	0.6248	0.1947	0.0013	1.868
IND10	0.1521	0.1494	0.3087	1.164
IND11	0.3181	0.2357	0.1771	1.375
IND12	0.1597	0.1774	0.3679	1.173
OCC1	-0.0284	0.1458	0.8453	0.972
OCC2	0.1467	0.1692	0.3860	1.158
OCC3	-0.8750	0.2261	0.0001	0.417
OCC4	-0.1862	0.2479	0.4527	0.830
OCC5	-0.4328	0.2546	0.0891	0.649
OCC6	-0.2975	0.1629	0.0679	0.743
OCC7	-0.4511	0.1577	0.0042	0.637
OCC8	-0.5500	0.2697	0.0414	0.577
OCC9	-0.4256	0.1884	0.0239	0.653
OCC10	-0.4469	0.2041	0.0285	0.640
OCC11	-0.5136	0.1473	0.0005	0.598
OCC12	-0.2856	0.1879	0.1286	0.752
OCC13	-0.5517	0.1763	0.0018	0.576
OCC14	-0.5061	0.1935	0.0089	0.603
OCC15	-0.2056	0.2568	0.4234	0.814

Table 8 (Continued)

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
Personal Characteristics				
AGE1	-0.1331	0.1303	0.3071	0.875
AGE2	0.0206	0.0777	0.7912	1.021
AGE3	-0.1345	0.0891	0.1310	0.874
AGE4	-0.0627	0.1240	0.6131	0.939
EDU1	-0.6937	0.1409	0.0001	0.500
EDU2	-0.3667	0.0929	0.0001	0.693
EDU3	-0.0145	0.0826	0.8604	0.986
EDU4	-0.1262	0.1161	0.2769	0.881
EDU5	0.1972	0.0982	0.0446	1.218
SINGLE	-0.4774	0.1522	0.0017	0.620
OTHER	-0.4692	0.2549	0.0657	0.626
NOCHILD	-0.0119	0.0782	0.8791	0.988
SINGNOCH	0.4814	0.1705	0.0047	1.618
OTHNOCH	0.3590	0.2937	0.2216	1.432
NWFLD	-0.3170	0.2459	0.1973	0.728
PEI	-0.0895	0.4712	0.8493	0.914
NOVASC	-0.2526	0.1730	0.1444	0.777
NEWBRUN	-0.2242	0.1965	0.2538	0.799
QUEBEC	-1.6542	0.0764	0.0001	0.191
ALBERTA	0.000353	0.1048	0.9973	1
MANITOBA	0.1041	0.1633	0.5238	1.110
SASK	0.0131	0.1865	0.9440	1.013
BC	-0.0752	0.0991	0.4479	0.928
Wages				
WAGE1	0.5366	0.1346	0.0001	1.710
WAGE2	1.0118	0.1306	0.0001	2.751
WAGE3	1.4081	0.1384	0.0001	4.088
WAGE4	1.7568	0.1471	0.0001	5.794
WAGE5	1.0305	0.1261	0.0001	2.803

Appendix A.9 (Continued)

Table 9: Results of Females' Dental Coverage Logistic Regression Model

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
INTERCPT	0.1845	0.173	0.286	1.203
Job Related Characteristics				
PARTTIME	-1.3640	0.0777	0.0001	0.256
LONGTIME	0.0258	0.1317	0.8448	1.026
TEMPJOB	-1.7789	0.1120	0.0001	0.169
UNION1	0.5845	0.1137	0.0001	1.794
FIRM1	-2.1493	0.0984	0.0001	0.117
FIRM2	-0.9406	0.1049	0.0001	0.390
FIRM3	-0.4211	0.1087	0.0001	0.656
GOVTEMP	-0.6826	0.1652	0.0001	0.505
UNFIRM1	1.4834	0.2513	0.0001	4.408
UNFIRM2	0.5472	0.1773	0.0020	1.728
UNFIRM3	0.1641	0.1522	0.2808	1.178
UNGOVT	0.0869	0.1792	0.628	1.091
TEN1	-0.6798	0.1053	0.0001	0.507
TEN2	-0.4752	0.1293	0.0002	0.622
TEN3	0.2797	0.0805	0.0005	1.323
TEN4	0.4444	0.0915	0.0001	1.560
TEN5	0.1055	0.1216	0.3858	1.111
IND1	0.1291	0.4390	0.7687	1.138
IND2	-0.1783	0.3222	0.5799	0.837
IND3	0.3873	0.1418	0.0063	1.473
IND4	0.1972	0.2716	0.4677	1.218
IND5	0.3859	0.2526	0.1265	1.471
IND6	0.3478	0.2315	0.1330	1.416
IND7	1.1739	0.4413	0.0078	3.235
IND8	-0.1521	0.1217	0.2113	0.859
IND9	0.5772	0.1380	0.0001	1.781
IND10	-0.4203	0.1146	0.0002	0.657
IND11	-0.3824	0.2118	0.0709	0.682
IND12	0.4093	0.1547	0.0081	1.506
OCC1	0.2252	0.0939	0.0165	1.253
OCC2	0.0798	0.1450	0.5820	1.083
OCC3	-0.1718	0.1484	0.2471	0.842
OCC4	-0.3510	0.1232	0.0044	0.704
OCC5	-0.3607	0.2359	0.1262	0.697
OCC6	-0.4023	0.1216	0.0009	0.669
OCC7	-0.6358	0.1157	0.0001	0.530
OCC8	-0.8704	0.5535	0.1159	0.419
OCC9	-0.9610	0.2482	0.0001	0.383
OCC10	1.5803	0.9055	0.0810	4.856
OCC11	-0.7613	0.1931	0.0001	0.467
OCC12	-1.2781	0.8875	0.1498	0.279
OCC13	-1.2862	0.3668	0.0005	0.276
OCC14	-0.4893	0.3117	0.1164	0.613
OCC15	-0.4112	0.3814	0.2810	0.663

Table 9 (Continued)

Variable	Coefficient	Standard Error	Significance Level	Odds Ratio
Personal Characteristics				
AGE1	-0.1813	0.1237	0.1427	0.834
AGE2	0.0447	0.0770	0.5618	1.046
AGE3	-0.1984	0.0826	0.0163	0.820
AGE4	-0.5883	0.1320	0.0001	0.555
EDU1	-0.3892	0.1917	0.0423	0.678
EDU2	-0.1280	0.1092	0.2413	0.880
EDU3	-0.1658	0.0800	0.0381	0.847
EDU4	0.1004	0.1112	0.3667	1.106
EDU5	0.1305	0.0912	0.1523	1.139
SINGLE	0.1542	0.1405	0.2725	1.167
OTHER	0.1821	0.1294	0.1593	1.200
NOCHILD	0.1749	0.0765	0.0222	1.191
SINGNOCH	0.1403	0.1675	0.4023	1.151
OTHNOCH	-0.4266	0.1932	0.0273	0.653
NWFLD	0.2553	0.2550	0.3167	1.291
PEI	0.0946	0.4586	0.8366	1.099
NOVASC	-0.1601	0.1709	0.3488	0.852
NEWBRUN	0.1527	0.1956	0.4350	1.165
QUEBEC	-1.0354	0.0757	0.0001	0.355
ALBERTA	0.1607	0.1047	0.1249	1.174
MANITOBA	0.0818	0.1588	0.6066	1.085
SASK	0.4779	0.1776	0.0071	1.613
BC	0.2022	0.0938	0.0311	1.224
Wages				
WAGE1	1.0179	0.1088	0.0001	2.767
WAGE2	1.5810	0.1137	0.0001	4.860
WAGE3	1.8495	0.1287	0.0001	6.356
WAGE4	1.8864	0.1438	0.0001	6.596
WAGE5	1.3070	0.1102	0.0001	3.695

Bibliography

Canadian Press, *Royal Extends Work Benefits to Part-Timers*, Ottawa Citizen, April 4, 1996.

Hipple, Steven and Jay Stewart, *Earnings and Benefits of Contingent and Noncontingent Workers*, The Monthly Labour Review, October, 1996. Washington: Bureau of Labour Statistics pp. 46-54.

Hosmer, David and Stanley Lemeshow, *Applied Logistic Regression*, John Wiley and Sons, New York, 1989.

Johnson, Richard E., *Flexible Benefits: A How-to Guide*, International Foundation of Employee Benefit Plans, 1996.

Krahn, Harvey, *Quality of Work in the Service Sector,* General Social Survey Analysis Series, Catalogue 11-612E, No. 6, March 1992. Ottawa: Statistics Canada.

Lipsett, Brenda, Alex Harris and Mark Reesor, *The Provision of Employer Sponsored Benefits*. Applied Research Branch, Human Resources Development Canada, unpublished analytical note, 1997.

Lipsett, Brenda and Mark Reesor, *Flexible Work Arrangements: Evidence from the 1991 and 1995 Survey of Work Arrangements*. Applied Research Branch, Human Resources Development Canada, Research Paper R-97-10E, June 1997.

Lipsett, Brenda and Mark Reesor, *Employer-Sponsored Pension Plans — Who Benefits?* Applied Research Branch, Human Resources Development Canada, Working Paper W-97-2E.

Morissette, Rene, *Are Jobs in Large Firms Better Jobs?* Perspectives on Labour and Income, Quarterly, Catalogue 75-001E, Autumn 1991. Ottawa: Statistics Canada, pp.40-50.

Picot, Garnett and Richard Dupuy, *Job Creation by Company Size Class: Concentration and Persistence of Job Gain and Losses in Canadian Companies*, Research Paper #93, Analytical Studies Branch, Statistics Canada, Ottawa, April 1996.

Polivka, Anne E., *Contingent and Alternative Work Arrangements, Defined*, The Monthly Labour Review, October, 1996. Washington: Bureau of Labour Statistics, pp. 3-9.

Reesor, Mark and Brenda Lipsett, *Families and Non-Wage Benefits*. Applied Research Branch, Human Resources Development Canada, unpublished analytical note, 1997.

Scofea, Laura A., *The Development and Growth of Employer-provided Health Insurance*, The Monthly Labour Review, March, 1994. Washington: Bureau of Labour Statistics.

The Labour Secretariat of the Commission for Labour Cooperation, *North American Labour Markets: A Comparative Profile*, 1984-1995 Preliminary Findings, Bulletin of the Commission for Labour Cooperation, Special Edition, Volume 1 Number 2, August 1996.

Wiatrowski, William J., *Family Related Benefits in the Workplace*, The Monthly Labour Review, March, 1990. Washington: Bureau of Labour Statistics.