Are estimates of a public-sector wage premium reliable?*

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Section 1: Introduction

The journal literature on Canadian public-private sector wage differentials is remarkably consistent. The typical paper begins with a hypothesis about why the public sector would pay a wage premium -- for example, because the public sector is not subject to the same competitive pressures as the private sector. The paper then presents precise point estimates for such a wage premium in the year covered by the data, with the premium for women being larger than the premium for men. The paper concludes by briefly discussing the implications of the precise point estimates for public policy, with some authors emphasizing the potential for governments to squeeze the wages of public sector workers without reducing public services, and other authors adding that policies to squeeze public sector wages would raise equity issues. Qualifications are kept to a minimum.

This paper was motivated by our suspicion that the journal literature on Canadian public-private sector wage differentials could be seriously misleading for policy-making today, for two major reasons.

First, the datasets employed in the two most recently-published journal articles on Canadian public sector wage-differences have 1990 as their most recent reference year, meaning that their empirical results are more than a decade out of date. We update the literature by deriving empirical estimates from the recently-released data from the Survey of Labour Income and Dynamics (SLID) that has 2000 as the reference year. Such an update was advocated in Mueller (2000: 398), which noted that "[m]ore recent waves of [the SLID] will be useful in ascertaining whether the public-sector wage premium continued into the 1990s."

An update seems particularly warranted because of the well-known efforts of Canadian governments to reduce public sector payrolls during the 1990s. And readily-available data series on Canadian wages and employment suggest that such efforts had consequences.

Figure 1 shows a series from the Survey of Employment, Payroll, and Hours on average private-sector wages expressed as a percentage of average public-sector wages in

Canada. The series shows average private-sector wages increasing from 88 percent of average public-sector wages in 1991 to over 99 percent of public-sector wages in 2002.

Figure 2 shows the share of public sector employment in total employment for the period 1981-2002. For our purposes, it is relevant that the share has fallen from 24 percent in 1992 to about 18 percent in 2002.

Our second reason for suspecting that the journal literature on Canadian public-private sector wage differentials could be seriously misleading is that estimates of wage premiums have been stated with greater force than is warranted estimation techniques, the data and economic theory. We therefore present a discussion, rooted in our own empirical testing and in the broader literature on estimating wage differentials, of why empirical results of the type presented in this paper should be interpreted with greater caution than one finds in the existing journal literature on Canadian public-private sector wage differentials.

In section 2 we provide background information. Section 3 describes our data set, explains our estimation techniques, and presents our empirical results. Reasons for interpreting such empirical results with caution are presented in Section 4. Section 5 is a summary.

Section 2: Background

As background to our empirical analysis, we will briefly discuss (1) the most relevant journal literature, (2) the alternative datasets available for such an analysis, and (3) alternative definitions of the public sector.

The four major journal articles on Canadian public-private sector wage differentials are listed in Table 1 in chronological order by date of publication. The table row for each article provides the author(s), the total (or unadjusted) public-private sector wage differential and the estimated "wage premium" for men, and then the total (or unadjusted) public-private sector wage differential and the estimated "wage premium" for women.

The total differential columns show the percentage by which the average hourly wage in the public sector exceeds the average hourly wage in the private sector. Two consistent patterns are that (1) the average public sector wages rose relative to private

sector wages over the 1970-1990 period and (2) the public-private total differential for women exceeds the public-private differential for men by a considerable margin.

Our main concern, however, is not with the public-private total differentials but with the estimated public-private wage premiums. The seminal article is Gunderson (1979: 240), which applied the Blinder-Oaxaca decomposition technique[1] to 1971 Canadian Census data, and concluded that "the economic rent or pure wage advantage associated with public sector employment was 6.2 per cent for men and 8.6 per cent for women."

A decade later Shapiro and Stelcner (1989) updated Gunderson's analysis of Canadian public-private sector wage differentials using 1981 Census data and the same estimation technique. The paper (Shapiro and Stelcner, 1989:77) concluded that between 1970 and 1980 "the pure public sector wage advantage (rent) as a per cent of private sector wages fell from 6.2 per cent to 4.2 per cent for the men, but rose from 8.6 per cent to 12.2 per cent for the women."

A decade after the publication of the Shapiro and Stelcner paper, a paper by Prescott and Wandschneider (1999) sought to update the earlier two papers for yet another ten-year interval, but derived empirical results from the Survey of Consumer Finance rather than from the Census. Although differing from the earlier papers in terms of data source and the definition of public and private sector workers, and although employing a different estimation technique (the Blinder-Oaxaca technique but with estimates corrected for sample selection bias concerning the choice between full-time and part-time work in the public and private sectors), Prescott and Wandschneider(1999: 730) declared that: "Our estimates for the men are that the public sector wage premia in 1980 and 1990 were 15.1% and 14.3%, respectively. Thus we do not detect any substantial change in this measure over the decade of the 1980s. However, in the case of the women we find a very substantial increase in the public sector wage premia from 15.7% in 1980 to 25% in 1990. These estimates are in turn much larger than those reported by Gunderson who used 1970 census data. Thus while acknowledging that our data source and hence our definition of public and private sector workers is different from that used

[1] For a textbook discussion of the technique, see Benjamin, Gunderson, and Riddell (2002: 357-361).

by Gunderson, the results do point to increasing public sector wage premia in Canada over the 20 years from 1970 to 1990."

The fourth journal article, Mueller (2000), was apparently written without knowledge of Prescott and Wandschneider (1999), and so it, too, was presented as an extension of Gunderson (1979) and Shapiro and Stelcner (1989). For purposes of comparison with the earlier two papers, Mueller (2000: 387-388) emphasizes empirical results from regressions in which a narrow definition of the public sector is employed and union status is endogenized. The "rent differential" for public-sector workers is 4.5 percent for men and 16.3 percent for women. Mueller (2000: 389) states that: "These results are not inconsistent with those of Gunderson (1979) and Shapiro and Stelcner (1989). For the men, the current rent estimates are consistent with these two earlier studies, whereas for the women, the rent premia tend to be slightly higher in the present work."

In short, the journal literature on Canadian public-private sector wage differentials consists of a seminal article presenting point estimates of the "economic rent or pure wage advantage associated with public sector employment," with the rent being larger for women than for men, and three follow-up articles stressing the conformity of their empirical results with those of the seminal article, but also suggesting that the "economic rent" paid to women in the public sector has risen over time.

The columns of Table 2 are headed by five datasets that have been used to estimate Canadian public-private sector wage differentials.[2] The rows are headed by selected data set characteristics -- type of data (cross section or panel), number of individual observations, and indicators of compensation (annual employment income, hourly wages, or both), public sector (industry-based, employer-based, or both), education (years of education, highest level of schooling, or both), and union/collective agreement indicators (union status, collective agreement coverage, or both).

[2] The Labour Force Survey has not been employed in any journal articles on Canadian public-private sector wage differentials but it is employed in Gunderson, Hyatt, and Riddell (2000), a detailed report prepared for the Canadian Policy Research Network which analyzes both data from the Labour Force Survey for 1997 and from the Census (for the reference years 1970, 1980, 1990, and 1995). Although the Gunderson-Hyatt-Riddell report is an important contribution, we have not made it a focus of our discussion on the grounds that it is not a journal article whereas the object of our critique is the journal literature. Furthermore, it does not lend itself to a ready comparison with the journal literature because it does not employ the Blinder-Oaxaca decomposition analysis common to the four journal articles we discuss.

This paper seeks to demonstrate the imprecision of even the best possible estimates of the public sector "wage premium" for a year as close to the present as possible. For our purposes, the SLID constitutes the most suitable of the five alternative datasets.[3]

As a final issue of background information, we should mention complications that arise in defining the public and private sectors. There are two general approaches to defining the public sector in Statistics Canada publications.

One is industry-based. The public sector by the industry-based definition typically consists of employment in public administration, education, and health and social services.[4] Individual researchers can choose a narrower industry-based definition in which the public sector is defined as public administration. For example, the studies by Gunderson (1979) and Shapiro and Stelcner (1989), while employing the terminology of "public-private" sector, actually compared wages in public administration as representing public sector wages with wages in manufacturing as representing private sector wages.

The other general definition of the public sector is employer-based. The Statistics Canada interviewer asks the survey respondent to name his or her employer, and then Statistics Canada applies an algorithm to classify the respondent as a public sector worker depending upon who the employer is.

One strength of the SLID, as noted in Table 2, is that it allows for both employer-based and industry-based definitions of the public sector.

It should be noted that although there is a dictionary definition of a non-profit sector distinct from the public and private sectors, the Canadian journal literature and the relevant Statistics Canada publication divide employment between the public and private sectors, not among the public, private, and non-profit sectors.

It should also be noted that both general definitions of the public sector – industry-based and employer-based – relate to civilian employment. Military employees are employed by the federal government but because they are excluded from official

[3] This paper is based upon the SLID public-use microdata file, which is not as detailed as the restricted-access version of the SLID. We intend to utilize the restricted-access version of the SLID in a follow-up paper.

[4] Some Statistics Canada series include employment in government enterprises in public sector employment.

definitions of the labour force they are also excluded, rightly or wrongly, from studies of public-private sector wage differentials.

Section 3: Estimation techniques, data description and regression results

In this section, we explore the size of the public-sector "wage premium," which could in theory be negative, by estimating OLS log-wage equations. Related to our suspicion that empirical results reported in the journal literature are expressed with greater precision than is warranted, we are concerned to explore the robustness of our results. More exactly, to examine how sensitive estimation results are to the estimation technique and to different sets of variables, we estimate three different models for each of two estimation techniques and for each of two definitions of the public sector. We start by describing the two estimation techniques, then we describe the dataset, and finally we present the regression results.

3.1 Estimation techniques

The simpler of our two estimation techniques is employed in some of the literature (such as Gunderson, Hyatt, and Riddell 2000), and it involves running a regression of the wage rate upon the characteristics of all workers in both sectors with a separate dummy variable that identifies the employment sector (public sector or private sector). The log-wage equation takes the form

$$\ln \hat{W} = \hat{\beta}_1 X_1 + \hat{\beta}_2 PUBLIC \qquad (1)$$

where $\ln \hat{W}$ is the predicted logarithm of the hourly wage rate, X is a vector of personal and job-related characteristics, $\hat{\beta}_1$ is a vector of estimated coefficients, PUBLIC is a dummy variable taking the value of 1 if the worker is a public sector employee and 0 if the worker is a private sector employee, and $\hat{\beta}_2$ is the public sector premium. The vector of characteristics controls for marital status, region, part-time status, firm size, union membership, collective agreement status, job tenure, labour-market experience, education and occupation. Throughout the analysis, men and women are treated separately.

Different specifications of the log-wage equation are estimated in order to examine two issues discussed in the literature. The first issue relates to the importance of union status on estimates of the public-private sector wage differential. The empirical results reported by Gunderson (1979), Shapiro and Stelcner (1989), and Prescott and Wandschneider (1999) are all derived from datasets lacking any union status information. But Robinson (1995), Robinson and Tomes (1984) and Simpson (1985) argue that the public sector wage premium may be overstated if union status is not controlled for in the wage equations.[5]

Second, Mueller (2000) suggests that his results may be different from earlier studies because education in his model is measured by highest level of education completed rather than years of schooling. It can be argued that level of education may be a superior variable because it captures the differential market effects between obtaining and not obtaining a degree. Some research indicates that additional years of schooling can actually reduce earnings if they fail to lead to a degree.

We address these two issues in our analysis by estimating three different models of the log-wage equation. In our first model, the log-wage equation is estimated with education measured in years of schooling (YRSCHL) and without controlling for union status:

$$\ln \hat{W} = \hat{\beta}_1 X_1 + \hat{\beta}_2 PUBLIC + \hat{\beta}_3 YRSCHL \tag{2}$$

In the second model, education is measured in years of schooling but union status is included in the log-wage equation in the form of a dummy variable:

$$\ln \hat{W} = \hat{\beta}_1 X_1 + \hat{\beta}_2 PUBLIC + \hat{\beta}_3 YRSCHL + \hat{\beta}_4 UNION \tag{3}$$

In the third model, union status is included in the log-wage equation but education is now measured by highest level of education completed:

$$\ln \hat{W} = \hat{\beta}_1 X_1 + \hat{\beta}_2 PUBLIC + \hat{\beta}_3 HLOS + \hat{\beta}_4 UNION \tag{4}$$

[5] However, Muller (2000) finds that estimates of the premium actually increased when union status is endogenized in the model.

The combined public-private sector approach described above constrains the values of the coefficients of the variables, other than PUBLIC, to be the same for public and private sector workers. The estimation of this equation is bound to yield biased results to the extent that sector specific wage equations are significantly different from one another, though the approach is often employed anyhow on the grounds that employing a more sophisticated estimation technique does not lead to significantly different results.

To deal with this potential misspecification, and to see whether the more sophisticated technique does yield significantly different results with our dataset, we use the Blinder-Oaxaca decomposition technique to obtain estimates of the public-private wage differential, following the four journal articles discussed in section 2 above.

The decomposition method consists of running wage regressions separately on public and private sector workers and comparing the two outcomes using the now familiar equation

$$\ln \overline{W}_u - \ln \overline{W}_r = \sum \left(\overline{X}_u - \overline{X}_r\right)\hat{\beta}_r + \sum \left(\hat{\beta}_u - \hat{\beta}_r\right)\overline{X}_u \qquad (5)$$

where *u* denotes the public sector and *r* denotes the private sector. The difference in the average logarithm of the wage differential is decomposed into a portion that is attributable to differences in average characteristics evaluated at the private-sector pay structure, and a portion that is "unexplained" and attributable to differences in labour market compensation for each characteristic evaluated at the public sector average characteristics. The unexplained portion provides the measure of the public sector wage premium. In the regression results subsection below, each of the models estimated by the combined public-private sector technique is also estimated by the decomposition technique.

Finally, most studies of the public-private wage differential have used the industry- based definition to identify public and private sector workers. But the SLID allows us to estimate the public-private sector wage differential with both an industry-based definition and an employer-based one, and to determine whether the difference between the two definitions matters. The public sector according to the industry-based

definition contains workers in public administration, education, and health care and social assistance. The remaining workers are included in the private sector.

3.2 Data description

The data for this analysis are drawn from the cross-sectional public-use microdata files for the 2000 Survey of Labour and Income Dynamics (SLID). Our sample consists of paid workers, 18 to 64 years of age, who are not full-time students. Self-employed workers and individuals with missing data for the variables of interest are excluded. A total of 10,720 men, of whom 2,095 work in the public sector, and 10,562 women, of whom 3,273 work in the public sector, satisfy the sample selection criteria.

Table 3 presents the sample means by gender and sector for all the variables used in the analysis.[6] Within our sample, the average wages are considerably higher in the public sector than in the private sector. In terms of mean-log wages, the wage differential is 0.28 for men and 0.46 for women.[7]

However, workers in the public sector have accumulated more seniority, more general skills, and more job-related skills than workers in the private sector. For example, men and women in the public sector have at least 3 more years of experience, on average, than their counterparts in the private sector, and job tenure is at least one year longer in the public sector.

Workers in the public sector also have more education. In this sample, 23 percent of the men and 18 percent of the women in the public sector have a level of schooling of high school or less, compared to 40 percent of the men and 35 percent of the women in the private sector. Moreover, more than 30 percent of the workers in the public sector have a university degree compared to 10 percent of workers in the private sector.

Public sector workers are more likely to be found in larger firms that pay more than smaller firms. Less than 7 percent of men and 8 percent of women in the public

[6] The means in Table 3 are the means of the variables used in the regression analysis. These are unweighted means and they do not represent estimates of the population means. Sampling weights would have to be used to make inferences about the entire population.

[7] Although data on all jobs held during the year by each worker are collected by the SLID, the public-use microdata file contains data for the worker's main job only. Therefore, the wage rate refers to a worker's implicit hourly wage including bonuses, commissions and tips for the worker's main job.

sector work for firms with fewer than 20 employees compared to 25 percent of the men and 32 percent of the women in the private sector. For firms with more than 1000 employees, the difference is at least 15 percentage points higher in the public sector for both sexes.

Union membership and coverage by a collective agreement are more likely in the public sector. Almost three quarters of the men in the public sector are members of a union or at least covered by a collective agreement while only 30 percent of the men in the private sector are in the same situation. The difference is even larger for the women for whom the proportions are 80 percent and 18 percent, respectively.

Public sector workers are more concentrated in the teaching and health occupations. In the private sector, men are more concentrated in the trades and manufacturing occupations while women are more likely to be found in the service occupations.

Moving from an employer-based definition of the public sector to an industry-based definition changes the number of workers in each sector. In the case of the men, the number of workers in the public sector falls from 2,095 to 1,748. For women in the public sector, moving from an employer-based definition to an industry-based definition increases the number of workers in that sector from 3,273 to 4,113. The descriptive statistics of workers in each sector remain relatively unchanged except for the following notable differences.

In terms of mean-log wages, moving from an employer-based definition to an industry-based definition of the public sector reduces the public-private wage differential for both men and women. For men, the differential is reduced from 0.28 to 0.27 and for women it is reduced from 0.46 to 0.39.

Moving from an employer-based definition to an industry-based definition of the public sector reduces differences in unionization rates across the public and private sectors for both men and women, primarily because the unionization rate for public-sector men falls by about 5 percentage points and the unionization rate for public-sector women falls by about 12 percentage points.

Finally, moving from an employer-based definition to an industry-based definition of the public sector causes the percentage of women working in firms with

1000 or more employees to decrease from 45 percent to 35 percent in the public sector, and to increase from 32 percent to 37 percent in the private sector.

3.3 Regression results

Our estimation of three different models for each of two estimation techniques and for each of two definitions of the public sector requires four wage equations with the simpler combined public-private estimation technique and twelve wage equations with the more sophisticated Blinder-Oaxaca technique. First we present results for all equations dealing with the employer-based definition of the public sector. These results are then compared to those obtained using industry-based definitions.

Results for employer-based definition of public sector

Tables 4 (for men) and 5 (for women) present regression results for each of the three models estimated according to the combined public-private sector technique with an employer-based definition of the public sector. The coefficients generally accord with a priori expectations (and, as we will see, many but not all of them agree with those estimated by the Blinder-Oaxaca decomposition analysis).

Being married increases the wage rate of both men and women, although the increase is 13 percent for men and only 2 percent for women. Experience has the usual quadratic effect, and the wage rate increases with job tenure. Firm size has a positive impact on the wage rate but the impact is almost twice as large for men as it is for women, given any firm size.

The coefficients on the regional variables indicate that relative to Ontario, wages are lower in the Maritime provinces, followed by the Prairies and then Quebec. Moreover, the relative wage differentials observed across these regions are comparable across gender (20 percent for the Maritimes, 12 percent for the Prairies and 6 percent for Quebec). The relative wage rate of workers in the West is 2.6 percent higher for men but it is not significantly different for women.

There is no statistical difference in the wage rate of women who work full time compared with those who work part time. However, the wage rate of men who are part-

time workers is approximately 19 percent lower than the wage rate of men who are full-time workers.

The wage rates of men are highest in management, followed by those in the sciences, teaching, the arts, and the trades. The wage rates of women are highest in science, followed by management, teaching, health, the arts, clerical and trades.

Being a member of a union or part of a collective agreement has a positive impact on the wage rate of workers, although the increase is slightly higher for women.

The coefficients on the public sector dummy variables provide a measure of the wage premium associated with the public sector and summary Table 6 shows how the estimated premium varies across the three models. The results indicate that the men and women in the public sector do receive a wage premium compared to their private sector counterparts. In fact, the difference in the average log-wage is 4.5 percent for the men and 14 percent for the women. Using different definitions of education has no noticeable effect on our estimates of the public sector wage premium. However, including union status in the log-wage equations reduces the premium by 3 percentage points for the men and 4 percentage points for women.

What is the wage premium and how does it vary across the three specifications of the log-wage equation when we apply the more sophisticated Blinder-Oaxaca decomposition analysis, still with the employer-based definition of the public sector? Table 7 presents the estimated log-wage equations used in the decomposition analysis for Model 3.[8] Again, the coefficients generally agree with a priori expectations, but now the estimation technique allows for different coefficients between the public and private sectors, and for two of the variables the public-sector coefficients are noticeably different than the private-sector ones. First, the wage differential across the provinces is smaller in the public sector than in the private sector for both men and women. Second, union status has a positive effect on the wages of men in the private sector but a negative effect in the

[8] The regression results for Models 1 and 2 are available from the authors upon request. In all cases presented in the paper, Chow tests allowed us to reject the null hypothesis that the coefficients in the log-wage equations were the same for the public and private sectors.

public sector. In the case of women, union status has a positive effect in both the public and private sectors, although the effect is smaller in the public sector.[9]

Summary Table 8 also relates to the decomposition analysis, and it shows for men how the estimated unexplained differential varies across the three models. Using Model 1, the unexplained log-wage differential is 11 percent for men. Including union status in the log-wage equation reduces the unexplained differential to 7 percent, and using the level of education further reduces the premium to 5 percent. This estimate of the public sector premium is identical to the premium estimated earlier using the combined public-private sector estimation technique for the same employer-based definition of the public sector.

Summary Table 9 provides the same results as Table 8, but for women. For women, the estimated log-wage differential is 17 percent when the log-wage equation of Model 1 is estimated. Including union status reduces the unexplained differential to 11 percent and using the level of education reduces it to 10 percent. This estimate is lower than the 14 percent estimate of the public sector premium obtained earlier using the combined public-private sector approach for an employer-based definition of the public sector.

Results for industry-based definition of public sector

How do the estimates of the public-private wage premium vary when the industry-based definition of the public sector is used? Table 10 presents the estimated log-wage equations used in the decomposition analysis for Model 3.[10] Summary Table 11 shows the estimated premiums for men and women obtained for the three models using the combined public-private sector technique and summary Tables 12 (men) and 13 (women) show the estimated premiums for the decomposition technique. Using different definitions of the public sector has no noticeable impact on the estimated public-private

[9] Although the numbers are not presented here, most of explained public-private wage differential for the men result from differences in experience, job tenure, firms with more than 1000 employees and union status. The differences in returns are mostly the result from education. In the case of the women, the explained differential is mostly the result of differences in union status, tenure, experience and education. The differences in returns are mostly the result of education.

[10] The regression results for Models 1 and 2 are available from the authors upon request. Chow tests allowed us to reject the null hypothesis that the coefficients in the log-wage equations were the same for the public and private sectors.

wage premium for the men. Compared to the estimates obtained using the employer-based definition of the public sector, those obtained using the industry-based definition are almost identical across the different models and techniques, varying by 1 percentage point at the most. In the case of the women, however, the estimates of the public-private sector wage premium are reduced by a constant amount of 6 percentage points across the models when using the combined public-private sector approach, and by 5 percentage points when using the decomposition analysis.

Using Model 3 and the decomposition technique, which probably gives the "best" estimates from the standpoint of economic reasoning, the estimated public-private wage differential is 4 percent for men and 5 percent for women with an industry-based definition of the public sector.

To summarize, we find that for estimating the public sector wage premium the choice of estimation technique is of some significance but it matters much less than whether or not we control for union status and on which definition of the public sector we utilize. We are struck by the range of estimates one can generate, by the large impact of the definition of the public-sector on the public sector wage premium for women, and by how low the estimate for the public sector wage premium accruing to women can be.

Section 4: Policy implications

The previous section presented our best estimates of the "unexplained differential" between public and private sector pay in Canada. Our estimates are more current by ten years than those in the journal literature and we believe that they are considerably more reliable than the results from Gunderson (1979), Shapiro and Stelcner (1989), and Prescott and Wandschneider (1999). Nevertheless, we believe it is time to break with the tradition whereby authors emphasize the conformity of their results with the results of previous results, highlight one estimate of the public sector "rent" accruing to men and one for women, suggest that these precise estimates (percents given to one decimal point) have important implications for public policy, and give little space to qualifications. Instead, we would like to emphasize that the empirical results on Canadian public-private sector wage differentials should be interpreted with greater caution than one finds in the existing journal literature.

The reasons for greater caution can be grouped into three broad categories. These are limitations of (1) Blinder-Oaxaca decomposition analysis in general, (2) SLID as a dataset, and (3) economic theory.

4.1 Limitations of Blinder-Oaxaca decomposition analysis

None of the four journal articles on Canadian public-private wage differentials stresses qualifications that are common to applications of Blinder-Oaxaca decomposition analysis. But three of these qualifications are worth mentioning here.

First, it is useful to keep in mind that although some authors interpret the "unexplained" wage differentials in favour of public sector workers as evidence of "rents" exceeding the marginal products of public sector workers, the Blinder-Oaxaca decomposition analysis does not investigate links between wages and direct measures of productivity. It only speaks directly to the question of whether observationally equivalent workers – workers with the same observable pay-determining characteristics – receive the same average pay in the public sector as in the private sector. It is silent, for example, on the question of whether a public sector wage premium for women indicates that the women the public sector are "overpaid" or whether women in the private sector are "underpaid," say, due to discrimination.[11]

Second, it is common for applications of Blinder-Oaxaca decomposition analysis (and wage determination equations in general) to have R-squared statistics of 50 percent or even much less. In the journal literature on Blinder-Oaxaca decomposition analysis R-squared statistics are either not reported (Gunderson 1979 and Mueller 2000) or they are reported but not discussed (Shapiro and Stelcner 1989 and Prescott and Wandschneider 1999). In Shapiro and Stelcner (1989: 79-80) the R-squared statistics range from 0.12 for the private sector earnings equation of women to 0.27 for the public sector earnings equation of men while in Prescott and Wandschneider (1999: 729) the R-squared statistics range from 0.27 for the women's private sector earnings equation to 0.37 for the public sector men's earnings equation. Low R-squared statistics tell us one thing for

[11] This point is partially recognized in Prescott and Wandschneider (1999: 724), which states: "As noted above, it is widely accepted that women earn more in the public sector than in the private sector. For this reason, it seems inappropriate to us to attribute all of the private/public wage differential for women to rent."

certain – most of the variation in the data is unaccounted for by our control variables. And they suggest that omitted variables could be a problem.

Third, that omitted variables could be a problem is further suggested by the fact that estimation with richer datasets often reduces the "unexplained" differential considerably. For example, we have seen in our analysis that inclusion of a union status control variable – a variable that is available in neither the Census nor the Survey of Consumer Finances – reduces the "unexplained" differential considerably.[12]

4.2 Limitations of SLID as a dataset

Overall, the SLID is the best dataset for examining Canadian public-private sector wage differentials. It is, however, far from perfect.[13]

For our purposes, the SLID is clearly superior to the Census, primarily because it has much better hourly wage data and union control status variables. But the Census has data on some potential control variables that are absent from the SLID. For example, the Census has detailed information on language ability. An aspect of language ability that could be rather important is that workers who cannot speak either of Canada's official languages experience a very large negative "wage premium." One hypothesis would be that private-sector employers are able to "exploit" these workers but public-sector employers are not. If so, part of our "unexplained" differential between public and private sector workers could arise from an omitted language-ability variable.

In addition to variables found in the other datasets but not in the SLID, one can imagine other variables that an ideal dataset might include. Aptitude test scores, for example, have proven important in some U.S. studies of wage equations. Alternatively, not just the level of degree obtained but also grade-point average might be expected to predict earnings. For university graduates, the ranking of the university and/or the program might help to predict earnings. If these variables do help to predict earnings in general and if the public sector tends more than the private sector to employ aptitude tests

[12] To give another example, Drolet (2001) finds that the unexplained portion of the male-female wage gap in Canada drops considerably when a variable for actual years of labour market experience is employed in place of one for potential labour market experience, and when level of education is supplemented with field of study.

[13] To be more exact, as noted in footnote 3, the SLID comes in two versions – the public use microdata file that this paper utilizes, and the restricted access file, which contains additional information.

in hiring decisions and to attach importance to grades and school and/or program rankings, then wage equations estimated without such variables will overestimate the public sector "wage premium."

One final point about the SLID is that the dataset could be subject to some coding or other errors due to the dataset provider. The SLID for reference year 2000 was originally posted by Statistics Canada in the summer of 2003 and then withdrawn when errors were recognized. Our results are based upon the corrected version of the SLID for reference year 2000 released in the late summer/early fall of 2003, but it is still possible that the dataset contains errors which have not yet been recognized.

4.3 Limitations of economic theory

We have already referred indirectly to one way in which economic theory is deficient. In general, wage determination equations, including the ones underlying Blinder-Oaxaca decompositions, tend to result in low R-squared statistics, which suggest that the economic theory underpinning the wage equations – typically a version of human capital theory – leaves unexplained much of the variation in wages across individuals.

But the economic theory underpinning wage determination equations is actually well-developed in comparison with the economic theory used to support the view that the public and private sectors should be expected to pay the same wages to observationally equivalent workers were it not for the public sector being somewhat removed from the competitive pressures faced by the private sector.

In the first place, the literature on inter-industry wage differentials suggests that important segments of the private sector in Canada and elsewhere do pay large "wage premiums" or "economic rents" compared to other segments of the private sector.[14] If employment in the sectors paying "wage premiums" is significant, then it is misleading to portray the private sector as constituting an employment zone where "wage premiums" are quickly eliminated by competitive forces.

Moreover, economic theory has long recognized that in monopsony labour markets, workers will tend to be "underpaid" -- that is, to experience a negative wage

[14] Theory and evidence related to “pure” interindustry wage differentials are reviewed in Benjamin, Gunderson, and Riddell (2002: 296-302).

premium -- and it may well be that public sector employers are more apt to find themselves as labour-market monopsonists than private-sector employers. For example, provincial governments may be monopsonists for the purchase of nursing services.

Finally, developments in economics over the past two decades or so have undermined the view that observationally equivalent workers in different sectors would necessarily receive the same pay if not for some market imperfection. There has been growing recognition that worker performance is not always easily monitored and controlled by employers, with the result that efficiency-oriented employers will design pay schemes to motivate workers on the job, not just to recruit them.[15]

More precisely, if worker performance is difficult to monitor, it may be efficient for employers to pay a "wage premium" to motivate workers. If the public sector contains a higher proportion than the private sector of difficult-to-monitor jobs, and public sector employers respond by being more inclined to pay "efficiency wages", a Blinder-Oaxaca wage decomposition would find an "unexplained differential" or "wage premium" in favour of public sector workers, all else equal. But the proper interpretation of the "wage premium" would be much different than "rents" which could be eliminated without any reduction in government services.[16]

The economics literature on pay and performance also recognizes that firms will sometimes make efforts to reduce pay dispersion as a means of accommodating employee notions of fairness and thereby improving employee morale and boosting firm output. If the public sector in Canada, which exhibits less dispersion of pay than the private sector,

[15] For a systematic exposition of "efficiency wage theory," see, e.g., Romer (1996: 441-461). For an introductory survey of a wide range of theories dealing with pay and performance, see Chapter 13 of Benjamin, Gunderson, and Riddell (2002). Note that Gunderson (1980), published a year after Gunderson's seminal article on public-private sector wage differentials, is the first edition of Benjamin-Gunderson-Riddell textbook, and it reflects the state of economics at the time in having no chapter on pay and performance corresponding to Chapter 13 of the fifth edition, no index entry for "efficiency wages," and so on. That Gunderson's seminal article makes no reference to the pay- and-performance literature in the course of interpreting the public-sector "wage premium" is therefore easily explained. It is less easy to explain why consideration of the pay- and-performance literature remains absent from more recent discussions of the public-sector "wage premium."

[16] Note that both public-sector wage "rents" and a public-sector efficiency-wage premium would tend be associated with queuing for public sector jobs.

keeps pay compressed for morale reasons, then it might be required to pay higher average wages, all else equal, in order to recruit employees for its top-paying positions.[17]

In short, our reading of the literature is that economic theory neither provides us with strong reasons to expect a public sector wage premium nor does it rule out that such a wage premium might be efficiency-enhancing.

5. Conclusion

This paper was motivated by our suspicion that the journal literature on Canadian public-private sector wage differentials could be seriously misleading for policy-making today. The datasets employed in the two most recently-published journal articles on Canadian public sector wage-differences have 1990 as their most recent reference year, making them seriously out of date. In this paper we have presented empirical results for the reference year 2000 using the Survey of Labour Income and Dynamics.

Not only is the journal literature on Canadian public-private sector wage differentials dated but it presents empirical results with greater confidence than is warranted. We have therefore highlighted limitations of the estimation techniques, the best available data, and economic theory with respect to public-private sector wage differentials.

We answer "No" to the question posed in the title of this paper -- "Are estimates of a public sector wage premium reliable?" We do believe, however, that it is possible to get a better handle on public-private sector wage differentials through further research.

Our next steps will be to compare results from the SLID for different reference years to see how results change from one year to the next, and to explore the consequences of different econometric specifications, such as endogenizing union status and part-time or full-time status. A further step, which will require a trip to a Statistics Canada Research Data Centre, will be to analyze the panel aspect of the SLID for 1998-2000 for comparison with the analysis of the LMAS for 1988-1990 in Mueller (2000). And, by some time in 2004, it should be possible for us to conduct an analysis using the Census, the Labour Force Survey, and the SLID, all for the common year of 2000.

[17] The implications of pay compression in the public sector for filling top-paying public-sector positions is discussed in Borjas (2003).

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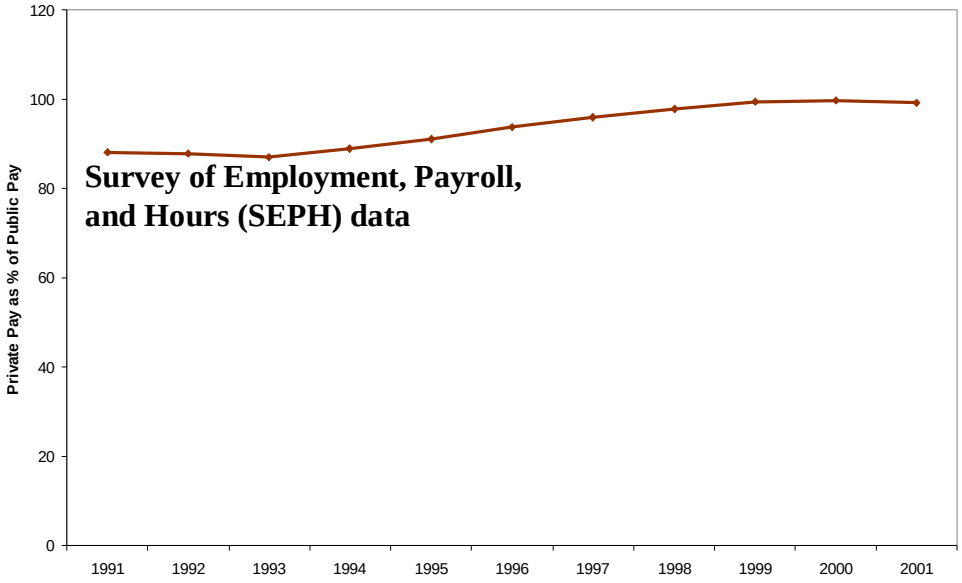
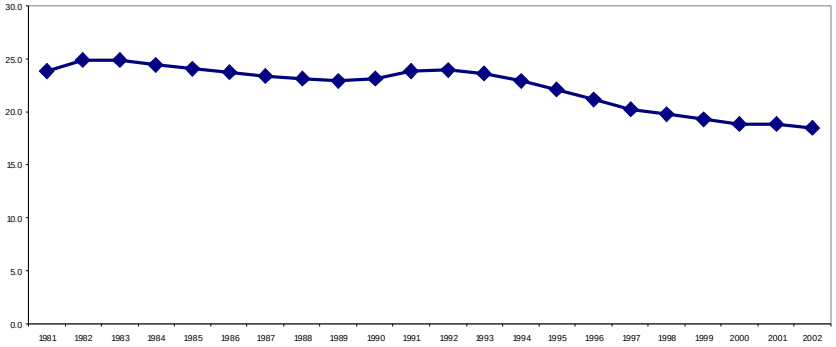
Figures and tables

Figure 1: Private sector pay as percentage of public sector pay, Canada, 1991-2001



Source: Statistics Canada, CANSIM II, Table 281-0039

Figure 2: Share of public sector employment in total employment, Canada, 1981-2002



Source: Statistics Canada, CANSIM II, Table 282-0071

Table 1 - Total or "raw" differentials in published papers

Year	Authors	Chief Data Source	Differentials for Men		Differentials for Women	
			Total	Unexplained	Total	Unexplained
1979	Gunderson	Census (1971)	9.3%	6.2%	22.3%	8.6%
1989	Shapiro & Stelener	Census (1981)	19.1%	4.2%	27.2%	12.2%
1999	Prescott & Wandschneider	Survey of Consumer Finances (1981)	19.8%	15.1%	27.3%	15.7%
		Survey of Consumer Finances (1991)	25.0%	14.3%	42.9%	25.0%
2000	Mueller	LMAS (1988-1990)	27.9%	4.5%	48.2%	16.3%

Table 2 - Datasets used for estimating public-private sector wage differentials in Canada

Features of Data Set	Census	SCF	LFS	LMAS	SLID
Most recent year covered	**1995 (2000 data available in 2004)**	**1997 (survey discontinued)**	**2002**	**1990 (survey discontinued)**	**2000**
Type of Data	**Cross section**	**Cross section**	**Cross section**	**Panel**	**Panel**
# of Individual Observations	**792,448**	**89,734**	**1,248,727**	**63,018**	**57,441**
Compensation Data	**Annual Employment Income(AEI)**	**Hourly wages + AEI**	**Hourly wages + AEI**	**Hourly wages + AEI**	**Hourly wages + AEI**
Definition of public sector	**Industry-based**	**Self-reported + industry-based**	**Self-reported + industry-based**	**Self-reported + industry**	**Self-reported + industry -based**
Nature of Education Data	**Years of schooling + highest level**	**Highest level completed**	**Highest level completed**	**Highest level**	**Years + highest level**
Union Status?	**No**	**No**	**Yes + collective agreement**	**Yes + collective agreement**	**Yes + collective agreement**
***Note*: All features, except for the panel nature of the SLID, relate to the public use microdata files.**					

Table 3 - Descriptive statistics,
by sector and sex, employer-based definition of public sector

Variables	Men			Women			
	Total	Public	Private	Total	Public	Private	Description
Number of observations	10720	2095	8625	10562	3273	7289	
Wage							
ln(Wage)	2.846	3.075	2.791	2.605	2.922	2.463	Log of calculated hourly wage rate
Marital Status							
MARRIED	0.701	0.789	0.679	0.705	0.742	0.689	Married or common law
SINGLE*	0.221	0.139	0.242	0.172	0.128	0.191	Never married
OTHER_MS	0.078	0.072	0.079	0.123	0.130	0.120	Separated, Divorced or Widower
Region							
MARITIME	0.196	0.217	0.191	0.207	0.218	0.202	
QUEBEC	0.210	0.210	0.210	0.188	0.181	0.191	
ONTARIO*	0.305	0.279	0.312	0.305	0.266	0.323	
PRAIRIE	0.129	0.159	0.122	0.139	0.170	0.124	Manitoba and Saskatchewan
WEST	0.159	0.135	0.165	0.162	0.165	0.160	Alberta and British Columbia
WORK STATUS							
FULL *	0.967	0.965	0.968	0.789	0.800	0.784	Full time job
PART	0.033	0.035	0.032	0.211	0.200	0.216	Part time job
UNION STATUS							
UNION	0.361	0.700	0.278	0.353	0.770	0.166	Member of union
COLAGREE	0.023	0.040	0.019	0.018	0.030	0.013	Covered by collective agreement but not a union member
NO_UNION*	0.616	0.261	0.702	0.628	0.200	0.821	Not a member of a union nor covered by collective agreement
Firm Size							Number of employees at all locations in Canada
FSLESS20*	0.211	0.066	0.247	0.166	0.080	0.318	Less than 20
FS2099	0.184	0.128	0.198	0.148	0.152	0.172	20 to 99
FS100499	0.147	0.150	0.146	0.077	0.191	0.128	100 to 499
FS500999	0.072	0.103	0.064	0.365	0.129	0.054	500 to 999
FS1000UP	0.386	0.553	0.346	0.367	0.448	0.327	1000 and over
TENUREYR	2.17	3.23	1.92	1.81	2.56	1.47	Duration of job in years
EXPER	18.10	20.90	17.42	13.68	15.78	12.74	Years of work experience

Table 3 – continued, Descriptive statistics,
by sector and sex, employer-based definition of public sector

Variables	Men			Women			Description
	Total	Public	Private	Total	Public	Private	
Education							
YRSCHL	13.347	14.729	13.011	13.686	14.889	13.147	Total years of schooling
Highest Level of Schooling							
LESS_HS	0.047	0.023	0.053	0.028	0.009	0.036	Less than high school
SOME_HS	0.130	0.061	0.147	0.091	0.044	0.111	High school without graduation
HS*	0.191	0.139	0.206	0.188	0.126	0.220	High school graduate
SOME_PS	0.126	0.091	0.135	0.121	0.072	0.142	Post secondary without certificate
PS	0.360	0.380	0.355	0.104	0.429	0.392	Post secondary with certificate
UNIV	0.144	0.306	0.105	0.167	0.320	0.098	Bachelor's degree or higher
Occupations							
MANAG	0.094	0.087	0.096	0.055	0.043	0.061	Senior and other management
SCIENCE	0.099	0.138	0.089	0.024	0.022	0.025	Natural and applied Sciences
HEALTH	0.012	0.042	0.005	0.115	0.223	0.066	Health
TEACH	0.048	0.192	0.013	0.105	0.255	0.038	Teaching and social sciences
ART	0.011	0.014	0.019	0.019	0.026	0.016	Art, culture, recreation
SERVICE	0.170	0.199	0.163	0.300	0.141	0.372	Sales and services
CLERICAL	0.087	0.111	0.081	0.300	0.279	0.309	Business, finance, secretarial and administrative
TRADES*	0.288	0.190	0.304	0.015	0.006	0.019	Trade, transport, and equipment
PRIMARY	0.053	0.015	0.062	0.012	0.002	0.016	Primary
MANUF	0.138	0.011	0.168	0.055	0.002	0.079	Processing, manufacturing and utilities

* Indicates the omitted condition in estimates of the wage equations.

Table 4 – Combined public-private regression results: men, employer-based definition of public sector

Variable	Model 1	Model 2	Model 3
INTERCEPT	1.90720 (0.02127)	1.89600 (0.02121)	2.3970 (0.01528)
MARRIED	0.13116 (0.00966)	0.12932 (0.00963)	0.11933 (0.00960)
OTHER_MS	0.09378 (0.01515)	0.09173 (0.01509)	0.08737 (0.01500)
MARITIME	-0.19984 (0.01008)	-0.19636 (0.01004)	-0.21540 (0.00993)
QUEBEC	-0.06023 (0.00976)	-0.06925 (0.00976)	-0.07714 (0.00970)
PRAIRIE	-0.11454 (0.01143)	-0.11363 (0.01138)	-0.12330 (0.01129)
WEST	0.24521 (0.01061)	0.02675 (0.01057)	0.01663* (0.01050)
PART	-0.17733 (0.01975)	-0.17538 (0.01966)	-0.17406 (0.01954)
FS2099	0.11550 (0.01102)	0.10455 (0.01102)	0.10447 (0.01095)
FS100499	0.16025 (0.01193)	0.14045 (0.01204)	0.14204 (0.01197)
FS500999	0.21333 (0.01517)	0.18753 (0.01532)	0.18745 (0.01521)
FS1000UP	0.24168 (0.00999)	0.21264 (0.01036)	0.21469 (0.01029)
TENUREYR	0.03217 (0.00196)	0.02915 (0.00198)	0.03004 (0.00197)
EXPER	0.02117 (0.00116)	0.02081 (0.00115)	0.02734 (0.00115)
EXPER2	-0.00038 (0.00003)	-0.00037 (0.00003)	-0.00038 (0.00003)
MANAG	0.17075 (0.01323)	0.20577 (0.01366)	0.18434 (0.01374)
SCIENCE	0.16700 (0.01327)	0.18631 (0.01335)	0.16952 (0.01334)
HEALTH	-0.09521 (0.03236)	-0.09496 (0.03222)	-0.08742 (0.03198)

Variable	Model 1	Model 2	Model 3
TEACH	0.04246 (0.01890)	0.04321 (0.01180)	-0.00779* (0.01933)
ART	-0.00064* (0.03271)	0.01030* (0.03258)	-0.00640* (0.03241)
SERVICE	-0.20903 (0.01069)	-0.19293 (0.01077)	-0.19146 (0.01075)
CLERICAL	-0.07174 (0.01356)	-0.05329 (0.01364)	-0.06034 (0.01362)
PRIMARY	-0.06772 (0.01625)	-0.05678 (0.01622)	-0.05921 (0.01615)
MANUF	-0.04250 (0.01153)	-0.04668 (0.01148)	-0.05036 (0.01142)
YRSSCHL18	0.03581 (0.01280)	0.03609 (0.00128)	
PUBLIC	0.08385 (0.00995)	0.05411 (0.01035)	0.04513 (0.01030)
UNION		0.08587 (0.00880)	0.09242 (0.00875)
COLAGREE		0.08799 (0.02305)	0.09762 (0.02290)
LESS_HS			-0.12687 (0.01790)
SOME_HS			-0.06623 (0.01224)
SOME_PS			0.02416 (0.01230)
PS			0.09759 (0.09715)
UNIV			0.33334 (0.01332)
Unweighted N	10,720	10,720	10,720
$\overline{R}^2$	.4531	.4581	.4654
Number in parentheses are standard errors. * Insignificant at the 5% level.			

Table 5 – Combined public-private regression results: women, employer-based definition of public sector

Variable	Model 1	Model 2	Model 3
NTERCEPT	1.70110 (0.03391)	1.70100 (0.03374)	2.1370 (0.03000)
MARRIED	0.02880 (0.00933)	0.02878 (0.00928)	0.02088 (0.00924)
OTHER_MS	0.00206* (0.01279)	0.00433* (0.01273)	-0.00249* (0.01267)
MARITIME	-0.20030 (0.00952)	-0.19922 (0.00947)	-0.21646 (0.00941)
QUEBEC	-0.05421 (0.00973)	-0.06286 (0.00972)	-0.06364 (0.00972)
PRAIRIE	-0.10166 (0.01082)	-0.10673 (0.01078)	-0.11976 (0.01072)
WEST	-0.00912* (0.01023)	-0.01135* (0.01018)	-0.02061 (0.01014)
PART	-0.01154* (0.00874)	-0.01079* (0.00841)	-.001181* (0.00838)
FS2099	0.05626 (0.01072)	0.04525 (0.01072)	0.04745 (0.01069)
FS100499	0.10105 (0.01139)	0.07958 (0.01153)	0.07933 (0.01149)
FS500999	0.10943 (0.01418)	0.08844 (0.01426)	0.09421 (0.01421)
FS1000UP	0.12664 (0.009132)	0.10449 (0.00934)	0.10741 (0..00931)
TENUREYR	0.04097 (0.00214)	0.03764 (0.00216)	0.03782 (0.00215)
EXPER	0.01692 (0.00114)	0.01654 (0.00113)	0.01668 (0.00113)
EXPER2	-0.00034 (0.00003)	-0.00033 (0.00003)	-0.00034 (0.00003)
MANAG	0.28969 (0.03075)	0.30846 (0.03066)	0.30823 (0.03058)
SCIENCE	0.39207 (0.03477)	0.39993 (0.03461)	0.40528 (0.03446)
HEALTH	0.27124 (0.02922)	0.25861 (0.02910)	0.27335 (0.02903)

Variable	Model 1	Model 2	Model 3
TEACH	0.27431 (0.02983)	0.26425 (0.02970)	0.22451 (0.02985)
ART	0.20275 (0.03653)	0.20885 (0.03635)	0.21249 (0.03621)
SERVICE	-0.12611 (0.02781)	-0.12251 (0.02767)	-0.11596 (0.02759)
CLERICAL	0.13148 (0.02789)	0.14026 (0.02776)	0.15127 (0.02771)
PRIMARY	-0.04001* (0.04067)	-0.03350* (0.04047)	-0.03034* (0.04035)
MANUF	0.02726* (0.03056)	0.01678* (0.03043)	0.01403* (0.03035)
YRSSCHL18	0.03771 (0.00133)	0.03781 (0.00132)	
PUBLIC	0.18295 (0.00855)	0.13749 (0.00958)	0.13502 (0.00956)
UNION		0.09501 (0.00938)	0.09396 (0.00935)
COLAGREE		0.11186 (0.02489)	0.11959 (0.02482)
LESS_HS			-0.08557 (0.02137)
SOME_HS			-0.06346 (0.01338)
SOME_PS			0.05931 (0.01212)
PS			0.09679 (0.00935)
UNIV			0.32387 (0.01252)
Unweighted N	10,562	10,562	10,562
$\overline{R}^2$	0.5272	0.5290	0.5320

Table 6 - Public-private wage differential, combined public-private regression, employer-based definition of public sector

	Men	Women
Model 1 (YRSCHL)	0.084	0.18
Model 2 (UNION and YRSCHL)	0.054	0.14
Model 3 (UNION and HLOS)	0.045	0.14

Table 7 – Estimated earnings functions by sector and sex, model 3, employer-based definition of public sector

Variable	Men		Women	
	Public	Private	Public	Private
MARRIED	0.12018 (0.02105)	0.11446 (0.01068)	0.00038* (0.01622)	0.02166 (0.01109)
OTHER_MS	0.11047 (0.03151)	0.07802 (0.01680)	-0.02660* (0.02099)	0.00448* (0.01557)
MARITIME	-0.19395 (0.01884)	-0.21565 (0.01138)	-0.15370 (0.01509)	-0.23980 (0.01168)
QUEBEC	-0.02494* (0.01907)	-0.08737 (0.01103)	0.01197* (0.01602)	-0.09535 (0.01192)
PRAIRIE	-0.08479 (0.02061)	-0.12515 (0.01311)	-0.10507 (0.01628)	-0.12549 (0.01369)
WEST	0.00324* (0.02180)	0.02471 (0.01178)	-0.01696* (0.01637)	-0.02172* (0.01254)
UNION	-0.03366 (0.01631)	0.12351 (0.01021)	0.03847 (0.01415)	0.12849 (0.01216)
COLAGREE	0.05275* (0.03542)	0.08393 (0.02839)	0.05797 (0.03226)	0.16176 (0.03591)
PART	-0.03805* (0.03626)	-0.21039 (0.02252)	0.03080 (0.01371)	-0.03806 (0.01032)
FS2099	0.11718 (0.03176)	0.09827 (0.01180)	0.05357 (0.02312)	0.04305 (0.01240)
FS100499	0.13936 (0.03106)	0.13336 (0.01318)	0.11831 (0.02264)	0.04849 (0.01413)
FS500999	0.14894 (0.03335)	0.18227 (0.01763)	0.10829 (0.02420)	0.09071 (0.01932)
FS1000UP	0.18611 (0.02773)	0.20955 (0.01140)	0.14779 (0.02082)	0.08496 (0.01077)
TENUREYR	0.03103 (0.00364)	0.02937 (0.00229)	0.01771 (0.00310)	0.05269 (0.00289)
EXPER	0.01455 (0.00251)	0.02144 (0.00128)	0.01659 (0.00190)	0.01617 (0.00138)
EXPER2	-0.00028 (0.00006)	-0.00039 (0.00003)	-0.00032 (0.00005)	-0.00033 (0.00004)
MANAG	0.22905 (0.03019)	0.17643 (0.01529)	0.37867 (0.07023)	0.29437 (0.03444)
SCIENCE	0.12754* (0.02416)	0.20053 (0.01570)	0.31900 (0.07442)	0.45194 (0.03977)
HEALTH	-0.03185 (0.03599)	-0.10939 (0.05562)	0.31298 (0.06644)	0.24992 (0.03404)
TEACH	0.09948 (0.02553)	-0.11701 (0.03558)	0.26499 (0.06702)	0.24874 (0.03690)
ART	0.05623* (0.05813)	-0.02180* (0.03774)	0.19330 (0.07330)	0.25359 (0.04424)
SERVICE	-0.05803 (0.02146)	-0.22050 (0.01225)	-0.02103* (0.06648)	-0.11589 (0.03068)
CLERICAL	-0.01723* (0.02585)	-0.06566 (0.01572)	0.11822* (0.06604)	0.17561 (0.03094)
PRIMARY	-0.18471 (0.05543)	-0.05599 (0.01713)	0.00462* (0.12390)	-0.01738* (0.04387)
MANUF	-0.00863* (0.06326)	-0.06230 (0.01200)	0.39391 (0.13810)	0.01131* (0.03318)
LESS_HS	-0.27361 (0.04809)	-0.11448 (0.01935)	-0.15714 (0.05665)	-0.07737 (0.02350)
SOME_HS	-0.09441 (0.03212)	-0.06330 (0.01326)	-0.11546 (0.02921)	-0.05504 (0.01514)
SOME_PS	0.08119 (0.02803)	0.01589* (0.01356)	0.03405* (0.02438)	0.06859 (0.01395)
PS	0.11701 (0.02081)	0.09299 (0.01085)	0.08083 (0.01720)	0.09407 (0.01105)
UNIV	0.29297 (0.02434)	0.34381 (0.01584)	0.26494 (0.01992)	0.35856 (0.01640)
CONSTANT	2.47910 (0.04261)	2.33180 (0.01674)	2.31930 (0.07151)	2.12960 (0.03358)
Observations	2,095	8,625	3,273	7,289
$\overline{R}^2$	0.4097	0.4504	0.3991	0.4498

Number in parentheses are standard errors
* Insignificant at the 5% level

Table 8 - Decomposition of differential, men, employer-based definition of public sector

	Unexplained	Explained (Endowments)
Model 1 (YRSCHL)	0.11	0.17
Model 2 (UNION and YRSCHL)	0.07	0.22
Model 3 (UNION and HLOS)	0.05	0.23
Total Differential = 0.284 (in logarithmic terms)		

Table 9 - Decomposition of differential, women, employer-based definition of public sector

	Unexplained	Explained (Endowments)
Model 1 (YRSCHL)	0.17	0.29
Model 2 (UNION and YRSCHL)	0.11	0.35
Model 3 (UNION and HLOS)	0.10	0.36
Total Differential = 0.459 (in logarithmic terms)		

Table 10 - Estimated earnings functions by sector and sex, model 3, industry-based definition of public sector

Variable	Males		Females				Males		Females	
	Public	Private	Public	Private			Public	Private	Public	Private
MARRIED	0.10115 (0.02271)	0.11579 (0.01051)	-0.0019* (0.01518)	0.03093 (0.01172)		SCIENCE	0.16965 (0.03156)	0.19284 (0.01487)	0.26899 (0.09974)	0.44592 (0.03831)
OTHER_MS	0.07676 (0.03516)	0.08344 (0.01641)	-0.04535 (0.02003)	0.02587* (0.01645)		HEALTH	-0.0214* (0.03661)	0.02965* (0.09184)	0.22553 (0.09047)	0.27008 (0.04615)
MARITIME	-0.1977 (0.02114)	-0.21413 (0.01104)	-0.18422 (0.01468)	-0.22166 (0.01225)		TEACH	0.12288 (0.03023)	-0.10078 (0.04127)	0.19560 (0.09099)	0.27318 (0.04425)
QUEBEC	-0.0402 (0.02095)	-0.08190 (0.01078)	-0.0121* (0.01521)	-0.09724 (0.01265)		ART	0.12207* (0.06930)	-0.01964* (0.03616)	0.16182* (0.09717)	0.25383 (0.04291)
PRAIRIE	-0.1022 (0.02375)	-0.11957 (0.01259)	-0.11386 (0.01599)	-0.11106 (0.01444)		SERVICE	-0.0139* (0.02723)	-0.21321 (0.01198)	-0.0833* (0.09052)	-0.13148 (0.02977)
WEST	-0.0089* (0.02373)	0.02442 (0.01155)	-0.0233* (0.01580)	-0.0117* (0.01321)		CLERICAL	0.02528* (0.03305)	-0.06313 (0.01503)	0.10031* (0.09059)	0.16608 (0.02994)
UNION	-0.0434 (0.01754)	0.12589 (0.0098)	0.09587 (0.01304)	0.14844 (0.01285)		PRIMARY	-0.1004* (0.06476)	-0.05690 (0.01684)	0.05220* (0.18480)	-0.0269* (0.04266)
COLAGREE	0.05255* (0.04194)	0.09534 (0.02642)	0.09773 (0.03279)	0.18382 (0.03742)		MANUF	-0.0463* (0.11020)	-0.06124 (0.01168)	0.01092* (0.24650)	-0.0047* (0.03216)
PART	-0.0156* (0.03652)	-0.22054 (0.02247)	0.02506 (0.01274)	-0.04360 (0.01112)		LESS_HS	-0.1808 (0.05769)	-0.12471 (0.01891)	-0.13595 (-0.13595)	-0.0835 (0.02450
FS2099	0.15921 (0.03255)	0.09710 (0.01168)	0.09339 (0.01800)	0.03662 (0.01362)		SOME_HS	-0.1165 (0.03920)	-0.06414 (0.01169)	-0.12078 (-0.12078)	-0.05071 (0.01543)
FS100499	0.18277 (0.03222)	0.13300 (0.01301)	0.13829 (0.01847)	0.06089 (0.01538)		SOME_PS	0.08119 (0.02803)	0.01589* (0.01356)	0.02865* (0.0306)	0.06928 (0.01442)
FS500999	0.21028 (0.03501)	0.18202 (0.01719)	0.15959 (0.02125)	0.10346 (0.02010)		PS	0.11701 (0.02081)	0.09299 (0.01085)	0.09978 (0.01673)	0.08803 (0.01150)
FS1000UP	0.23439 (0.02898)	0.20765 (0.01118)	0.18204 (0.01710)	0.09906 (0.01131)		UNIV	0.29297 (0.02434)	0.34381 (0.01584)	0.32963 (0.01939	0.33464 0.01758)
TENUREYR	0.03018 (0.00412)	0.02986 (0.00202)	0.02657 (0.00309)	0.05128 (0.00302)		CONSTANT	2.47910 (0.04261)	2.33180 (0.01674)	2.23810 (0.09358)	2.1248 (0.3316)
EXPER	0.01772 (0.00279)	0.02077 (0.00125)	0.01581 (0.00182)	0.01615 (0.00146)		Observations	1748	8972	4113	6449
EXPER2	-0.0004 (0.00006)	-0.0004 (0.00003)	-0.0003 (0.00005)	-0.00033 (0.00004)		$\overline{R}^2$	0.4164	0.4554	0.4422	0.4584
MANAG	0.26170 (0.03543)	0.18045 (0.01499)	0.31454 (0.09340)	0.28953 (0.03384)						

Number in parentheses are standard errors
* Insignificant at the 5% level

Table 11 - Public-private wage differential, combined public-private regression, industry-based definition of public sector

	Men	Women
Model 1 (YRSCHL)	0.08	0.13
Model 2 (UNION and YRSCHL)	0.05	0.08
Model 3 (UNION and HLOS)	0.04	0.08

Table 12 - Decomposition of differential, men, industry-based definition of public sector

	Unexplained	Explained (Endowments)
Model 1 (YRSCHL)	0.10	0.16
Model 2 (UNION and YRSCHL)	0.06	0.20
Model 3 (UNION and HLOS)	0.04	0.23
Total Differential = 0.266 (in logarithmic terms)		

Table 13 - Decomposition of differential, women, industry-based definition of public sector

	Unexplained	Explained (Endowments)
Model 1 (YRSCHL)	0.12	0.27
Model 2 (UNION and YRSCHL)	0.05	0.33
Model 3 (UNION and HLOS)	0.05	0.34
Total Differential = 0.386 (in logarithmic terms)		