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# Public–private sector wage differentials in Canada: evidence from quantile regressions

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**Abstract**

Quantile regressions are used to estimate the size of the public sector wage premium in Canada. We find that public sector rent payments tend to be highest for federal government employees, females, and individuals at the lower tail of the wage distribution. 

*Keywords:* Public sector; Wage differentials

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## 1. Introduction

Throughout the 1990s Canadian governments have been pressured to reduce large budget deficits. This has been in response to political pressures from taxpayers and fears that bond holders would no longer be willing to hold Canadian debt if fiscal measures were not improved. Sensing that Canadians would not tolerate tax increases, governments acted by reducing expenditures, including cuts in government payrolls. Government employees are considered to be overpaid and thus they have received little public sympathy as they weather these cutbacks. At the same time there is concern that talented senior mangers are leaving for the more generous compensation of the private sector.

Is the elimination of government jobs justified by the relatively high pay of the bureaucrats in these positions? Or do they simply have the misfortune of being on the front lines as elected officials pander to the discontentment of taxpayers and bond holders? Similarly, is the reason for the exodus of senior managers the result of uncompetitive wages in the public sector? To answer these questions we must understand how government employees are compensated relative to their private sector counterparts.

## 2. Theoretical considerations and previous research

There are a number of reasons that earnings differentials between the private and public sector exist. This sector may be able to pay more since wages are only subjected to a price floor because of

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private sector competition. Second, unions are more pervasive in the public sector, and this could put upward pressure on wages. Finally, the fact that government services are usually considered essential implies that demand for these services will be inelastic. Thus, the derived demand for labor will also be inelastic and wage increases can be passed onto consumers (i.e., taxpayers).

Other factors may lead to lower public sector wages. First, although profit maximization does not drive the wage-determination process, this sector is subjected to consumer (i.e., taxpayer) scrutiny. Provincial and local public sector employees, in particular, may see their wages examined more closely as taxpayers may have better information about these levels of government than about the centralized federal government. Second, non-wage advantages, such as generous pension plans, may compensate for lower wages in the public sector. Third, if the public sector has monopsony power wages may be lower. This could be relevant in small labor markets or in certain professions, such as post-secondary education, where provincial governments are the only employers.

Previous empirical evidence suggests that the inflationary forces on public sector wages prevail. The U.S. literature is rich with public–private sector wage comparisons. Smith (1976), (1977a), (1977b), (1981), Quinn (1979), and Bellante and Long (1981), to name a few, have studied public sector wage premia using various public sector and compensation definitions. More recently, Poterba and Rueben (1994) showed that the wage distribution was wider in the private sector and that state and local government workers enjoyed a wage premium at the lower tail of the distribution, but a wage penalty at the upper tail.

Such wage comparisons using Canadian data are not as voluminous. Gunderson (1979) used 1971 data to measure the public–private sector earnings differential. He found that significant rents were enjoyed by public sector workers vis-à-vis their private sector counterparts. Shapiro and Stelcner (1989) replicated this exercise using 1981 data and concluded that these rent payments persisted over the 10-year period.

These studies, however, utilized census data that did not allow the researchers to control for union status. Given the high rates of public sector unionization, this is potentially a serious shortcoming since union differentials could be mistakenly interpreted as wage differentials. Robinson and Tomes (1984) allowed for the endogeneity of union status in their model and found that this reduced total public sector wage differentials. Simpson (1985) too discovered that higher public sector earnings appeared to be due to the higher incidence of public sector unionization. Robinson (1995) found that any public sector wage differential was dependent on empirical model specification.

Data limitations also prevented the earlier Canadian literature from addressing the wage premia of local, provincial and federal levels of government. Furthermore, this literature lacks any discussion of the differences in the wage distribution between the two sectors. Use of the Labour Market Activity Survey (LMAS), combined with the use of quantile regressions, allows a more detailed look at the public sector wage premium across the wage distribution.

## 3. Methodology and data

One of the most common methodologies for determining wage differentials was independently developed by Blinder (1973) and Oaxaca (1973). Although it provides us with a simple method to answer the hypothetical question: ‘‘What if public sector workers were paid the same rate of

compensation as their private sector counterparts?'', it says little about the underlying wage distribution. Such decomposition may show that the *average* public sector worker is paid economic rents, when in fact rents may be larger at the bottom of the wage distribution than at the top of the same distribution. This could occur if the wage distribution in the private sector is wider than that in the public sector.

We use quantile regression analysis to estimate the following:

$$\ln w_i = X_i\beta + P_i\delta + \varepsilon_i, \tag{1}$$

where $\ln w_i$ is the natural logarithm of the hourly wage of the $i$th individual, $X_i$ is a vector of individual characteristics, $\beta$ is the rate of return to these characteristics, $P_i$ is a dichotomous dummy variable that equals one if the individual is in the public sector, $\delta$ is the payment (or penalty) for being a member of the public sector, and $\varepsilon_i$ is the error term.

The limitation of this technique is that it does not permit us to determine the part of the total wage differential that is due to sectoral differences in labor market attributes, and the part due to different rates of return to these attributes. Obviously, inclusion of a public sector dummy variable into Eq. (1) constrains the returns to all other labor-market characteristics to be equal in both sectors. We can, however, combine the decomposition technique with quantile regressions to determine the rent component at various points in the wage distribution.

The difference in the log wage between the public and private sectors is:

$$\ln w_{\mathrm{g}}^{j} - \ln w_{\mathrm{p}}^{j} = \sum b_{\mathrm{p}}^{j}(\overline{X}_{\mathrm{g}} - \overline{X}_{\mathrm{p}}) + \sum (b_{\mathrm{g}}^{j} - b_{\mathrm{p}}^{j})\overline{X}_{\mathrm{g}}, \tag{2}$$

where $\ln w_k^j$ is the natural logarithm of the wage in industry $k$ evaluated at quantile $j$, $b_k^j$ is a vector of estimated coefficients for industry $k$ evaluated at quantile $j$, $\overline{X}_k$ is a vector of average characteristics of workers in industry $k$, and $k = \mathrm{g,p}$ denotes the public (or government) and private sectors, respectively. Finally, $j = 0.10$, 0.25, 0.50, 0.75, and 0.90. The first term on the right-hand side is the component of the log wage differential due to differences in endowments between public and private sector employees, and is referred to as the justifiable earnings or characteristics differential. The second term shows the component due to sectoral differences in returns to these endowments, and is called the surplus or rent payment.

The data are from the 1990 LMAS that was administered to a random sample of Canadians living throughout the country (exclusive of the two territories). The sample is restricted to include those between 16 and 64 years of age who held a job for at least four weeks, were paid the equivalent of at least US$1.00 per hour, were not self-employed and did not work in agriculture. A total of 20,086 males and 18,274 females satisfy these criteria. The sample is further disaggregated into those who worked for the private sector (16,247 males and 11,708 females), the public sector (1810 males and 1367 females) and the public sector plus (3659 males and 6566 females) which also includes health and education workers.[1]

[1]Since health and education workers are not involved in public administration, results will be analyzed by both including and excluding this group. The definition of the public sector includes only those involved in 'public administration,' and does not include government workers more closely related to other industries. Our public sector plus definition includes roughly 71% of those that Statistics Canada deems to be employed in the public sector. See Statistics Canada (1995) for a reconciliation statement.

## 4. Results

Table 1 shows the results from estimation of Eq. (1) using quantile regressions and standard OLS. For the public sector plus, the OLS estimate reveal a statistically insignificant −0.9% wage premium for male workers. This premium, however, varies from 2.1% at $q=0.10$, to −3.4% for workers at $q=0.90$. For the public sector, the OLS estimate of the male public sector wage premium is 2.4%. Again, however, the wage premium is highly dependent on the choice of quantile, generally decreasing and becoming insignificantly different from zero at $q=0.90$.

The public sector dummy is separated into dummies for each level of government. Estimates are shown in the final three rows of the upper panel. The results reveal that federal and local public sector workers enjoy a wage premium at all quantile levels, although these are only significant in all cases for the former group. For federal workers, this premium ranges from 3.4% at $q=0.75$ to 5.6% at $q=0.25$. Provincial government workers face a significant wage penalty at quantiles at and above $q=0.50$.

The lower panel of Table 1 displays the same general wage trends for female public sector workers. Female public sector wage premia are universally higher, but display the same downward trend as the quantile level increases. In the federal public sector, for example, OLS estimates indicate a wage

Table 1
Public sector wage premia using OLS and quantile regressions (standard errors are in parentheses)

| | OLS | $q=0.10$ | $q=0.25$ | $q=0.50$ | $q=0.75$ | $q=0.90$ |
|---|---|---|---|---|---|---|
| *Males* | | | | | | |
| Public sector plus | −0.009 | 0.021 | −0.013 | −0.024 | −0.028 | −0.034 |
| | (0.008) | (0.014) | (0.011) | (0.009) | (0.009) | (0.011) |
| Public sector | 0.024 | 0.036 | 0.010 | 0.009 | 0.040 | −0.004 |
| | (0.010) | (0.015) | (0.012) | (0.010) | (0.010) | (0.015) |
| Federal | 0.054 | 0.053 | 0.056 | 0.036 | 0.034 | 0.048 |
| | (0.016) | (0.026) | (0.022) | (0.016) | (0.017) | (0.024) |
| Provincial | −0.027 | 0.011 | −0.033 | −0.048 | −0.068 | −0.061 |
| | (0.016) | (0.026) | (0.022) | (0.016) | (0.017) | (0.023) |
| Local | 0.038 | 0.047 | 0.025 | 0.023 | 0.035 | 0.018 |
| | (0.015) | (0.024) | (0.020) | (0.015) | (0.015) | (0.021) |
| *Females* | | | | | | |
| Public sector plus | 0.071 | 0.118 | 0.094 | 0.081 | 0.061 | 0.024 |
| | (0.007) | (0.011) | (0.007) | (0.008) | (0.009) | (0.015) |
| Public sector | 0.081 | 0.162 | 0.112 | 0.072 | 0.059 | 0.034 |
| | (0.011) | (0.017) | (0.012) | (0.012) | (0.013) | (0.020) |
| Federal | 0.107 | 0.207 | 0.132 | 0.084 | 0.079 | 0.049 |
| | (0.017) | (0.024) | (0.018) | (0.018) | (0.021) | (0.030) |
| Provincial | 0.076 | 0.182 | 0.118 | 0.066 | 0.037 | −0.021 |
| | (0.019) | (0.022) | (0.017) | (0.017) | (0.020) | (0.029) |
| Local | 0.058 | 0.074 | 0.065 | 0.062 | 0.076 | 0.053 |
| | (0.019) | (0.025) | (0.019) | (0.019) | (0.023) | (0.032) |

Note: controls for the following were included in each regression: level of education, province of residence, marital status, age group, mother tongue, household head, disability, visible minority, immigrant, occupation, number of employees, job tenure, union status, part-time status, and job-related pension.

premium of 10.7%. At $q=0.10$ the premium is 20.7% but declines to only 4.9% at $q=0.90$. Unlike male provincial workers who generally faced a wage penalty, female provincial workers earned a positive wage premia at all quantiles, with the exception of $q=0.90$.

The quantile regressions reveal dispersion in the public sector wage premium that cannot be captured using OLS. Poterba and Rueben (1994) show a similar declining public sector wage premium as quantiles increase for both male and female U.S. state and local government workers. In both the Canadian and U.S. cases, therefore, the public sector wage premium is conditional on the choice of quantile.

The major limitation of the preceding analysis is that it constrains the coefficient estimates to be the same in both sectors, potentially introducing bias into our estimates of the public sector wage premium. Thus, we combine the familiar decomposition technique with quantile regressions to determine the rent component at selected points in the wage distribution. We do this by estimating separate equations for each definition of the public sector at each quantile level, and matching these to equivalent estimates for the private sector. Finally, using Eq. (2), total log wage differentials are broken down into rent and characteristic differentials. These results, along with OLS estimates, are presented in Table 2. The top figure in each cell is the differential due to higher payments to various characteristics in the public sector (i.e., the rent component) whereas the figure below in parentheses is the total sectoral log wage differential.

The wage premia patterns are generally consistent with those found in Table 1. The OLS estimates of Eq. (2) are almost identical to those found in the previous table. Similarly, the estimates obtained

Table 2
Public sector log wage rent premia using OLS and quantile regressions (total log wage differentials are italicized)

| | OLS | $q=0.10$ | $q=0.25$ | $q=0.50$ | $q=0.75$ | $q=0.90$ |
|---|---|---|---|---|---|---|
| *Males* | | | | | | |
| Public sector plus | 0.002 | 0.098 | 0.012 | −0.003 | −0.014 | −0.050 |
| | *0.246* | *0.273* | *0.259* | *0.245* | *0.236* | *0.223* |
| Public sector | 0.027 | 0.099 | 0.046 | 0.019 | 0.004 | −0.014 |
| | *0.247* | *0.300* | *0.269* | *0.244* | *0.231* | *0.203* |
| Federal | 0.059 | 0.053 | 0.090 | 0.065 | 0.042 | 0.023 |
| | *0.320* | *0.288* | *0.352* | *0.333* | *0.312* | *0.285* |
| Provincial | −0.026 | 0.068 | −0.013 | −0.036 | −0.086 | −0.074 |
| | *0.260* | *0.305* | *0.270* | *0.262* | *0.223* | *0.222* |
| Local | 0.044 | 0.123 | 0.059 | 0.036 | 0.010 | 0.000 |
| | *0.170* | *0.262* | *0.194* | *0.157* | *0.128* | *0.109* |
| *Females* | | | | | | |
| Public sector plus | 0.071 | 0.221 | 0.120 | 0.090 | 0.036 | −0.070 |
| | *0.430* | *0.445* | *0.447* | *0.455* | *0.442* | *0.408* |
| Public sector | 0.080 | 0.220 | 0.134 | 0.075 | 0.039 | −0.025 |
| | *0.394* | *0.433* | *0.428* | *0.420* | *0.394* | *0.323* |
| Federal | 0.106 | 0.319 | 0.167 | 0.083 | 0.033 | −0.008 |
| | *0.469* | *0.571* | *0.503* | *0.483* | *0.442* | *0.386* |
| Provincial | 0.073 | 0.235 | 0.146 | 0.081 | 0.016 | −0.079 |
| | *0.450* | *0.489* | *0.499* | *0.495* | *0.443* | *0.343* |
| Local | 0.056 | 0.137 | 0.080 | 0.052 | 0.040 | −0.010 |
| | *0.207* | *0.235* | *0.223* | *0.219* | *0.212* | *0.166* |

by decomposing the quantile regression results show a similar pattern to those obtained above: the public sector wage premium tends to decline as the quantile increases. The main difference is that we generally observe greater dispersion between quantiles, with higher rent premia estimates at lower quantiles and lower estimates at higher quantiles. The results for males in the public sector, for example, show a public sector rent premium of 9.9% at $q=0.10$, and a wage penalty of 1.4% at $q=0.90$. The comparable results from Table 1 are 3.6 and 0.0%, respectively. The relatively greater dispersion occurs regardless of gender or public sector definition.

## 5. Conclusions and policy implications

OLS results suggest that public sector employees tend to be paid a wage premium on average compared to their observationally-equivalent counterparts in the private sector. This premium is highest for federal government employees. Only in the case of male provincial employees is this premium negative. The premium is also uniformly higher for females. The use of quantile regressions indicate that premia tend to be higher for those at the lower end of the wage distribution. Upon decomposing these wage differences, we find the dispersion in the rent component to be greater compared to when we simply use a public sector dummy variable to explain wage differences. The pattern of the results, however, is similar in both cases: females, federal workers, and those at the lower tail of the distribution receive rent payments.

These estimates are consistent with the public perception of overpaid bureaucrats. The wage penalty at the upper end of the public sector pay scale is also useful in explaining the exodus of senior managers to the private sector. The results have important policy implications and are useful in determining where cuts in the public sector payroll could be made. Any discussion of decreasing government payrolls is always done within the context of the loss of government services. Elimination of rents, by definition, will not lead to any movement of labor between sectors, thus preserving existing levels of services.

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