

PUBLIC SECTOR WAGES IN ALBERTA: HOW DO THESE COMPARE TO OTHER PROVINCES AND TO THE PRIVATE SECTOR?

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SUMMARY

Short of imposing a sales tax, and hampered by low energy revenues, the Alberta government has few options for reducing expenditures and making a dent in the province's \$8.8-billion deficit. The most obvious area for the new government to cut would therefore be the \$21.6 billion allocated in 2018 to public sector salaries, wages and benefits. That figure amounts to 38.4 per cent of the total expenditures of \$56.2 billion, and translates to 210,104 full-time equivalent employees being paid approximately \$102,773 each in annual salary.

Any cuts must be made judiciously, taking into account the fact that services must be maintained at certain levels. Also, wage rollbacks and hiring freezes could create a sudden flight of talented people out of the public service and into the private sector, as happened during similar cuts in the 1990s. However, when compensation levels are too high, Albertans end up paying more for services, so a careful balance must be achieved. Finding that balance is extremely important for policy purposes and involves detailed comparisons with private sector remuneration.

This paper examines wage premiums – the difference in this case in wages between public and private sector employees – in administrative and non-administrative jobs at different levels of the public sector and various sectors of private industry. The comparisons can then be used to determine how potential

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savings could be realized through cuts to public sector compensation. The public sector generally pays better than the private sector in Alberta, although the high-paying oil and gas industry in the province means the wage gap is not radically large and is even negative in some cases.

Ideally, a 3.7-per-cent decrease across-the-board in total public sector compensation would be possible without jeopardizing the delivery of government services or risking a public service brain drain. The Alberta government would then save \$799.2 million, or approximately 9.1 per cent of the projected \$8.8-billion deficit.

However, the reality clashes with the ideal. A 3.7-per-cent cut across-the-board would lead to overpayment of those at the bottom of the pay scale and impose a heavy wage penalty on those employees at the top, who would see their salaries reduced by a proportionately larger amount. This would further encourage the exodus of talented, skilled, well-paid people from the public service and compromise the integrity of services provided to Albertans.

Moreover, the ripple effects of any cuts must be taken into careful consideration. These include political implications, macroeconomic impacts and effects on the private sector labour market. Cuts to the public sector never occur in a vacuum and their effects on the general provincial economy, overall employment picture, tax revenues and economic growth are just some of the metrics which must be factored into any policy decision.

I. INTRODUCTION

With the general distaste in Alberta for budget deficits, coupled with current low energy revenues and the political improbability of introducing a sales tax as a steady and predictable revenue stream, the province is left with few options to reduce the budgetary shortfall and to keep the debt-to-GDP ratio from increasing. If revenues cannot be enhanced, then expenditures must be controlled to reduce any budgetary shortfall. The fact that public sector earnings comprise such a large expenditure item means that this compensation is an obvious target for any expenditure reduction exercise. The fact that so many Albertans have recently lost lucrative employment in the private sector, while the public sector has remained largely unscathed, has left public sector workers as obvious targets in any cost-cutting exercise.

Cutting public sector compensation is not always a straightforward exercise. Reducing the amount of any excess compensation (or economic rents) is the goal. If these are correctly reduced, current employment levels – and hence services – can be maintained while reducing expenditures on compensation. If compensation is cut too much, public servants will begin to look elsewhere for employment – likely starting with some of the most talented/productive individuals who have options outside of the public sector or in the public sector in another jurisdiction. Furthermore, exactly where in the earnings distribution any premiums are earned is important. For example, cutting the compensation of high-earning individuals could result in the exodus of talent to the private sector, to better opportunities in the public sector outside of the province or even abroad (recall the brain drain of the 1990s).

This paper models public-private sector wage differentials as a standard human-capital model (Mincer 1974), controlling for all available factors that could result in earnings differentials between the two sectors. Quantile regression and standard decomposition techniques are also used to determine where in the earnings distribution any differentials exist (e.g., an earnings penalty to those in the upper tail). Cross-provincial comparisons will also be made. We use the master files from each monthly release of the Labour Force Survey (LFS) between 2006 and 2017 to allow us sufficient sample sizes for the analysis (especially at the provincial level) and to allow us to capture any changes in the earnings differential over the business cycle.¹ These files are necessary to obtain disaggregated data for the North American Industrial Classification System (NAICS) 2012, which allows us to identify those involved in public employment and those in administration at the three major levels of government: federal, provincial and local.²

The contribution of this paper is to offer an updated and a more in-depth look at public sector wage differentials with the emphasis on the province of Alberta. The existing literature tends to be dated, uses an aggregated definition of the public sector or does not address differentials at the provincial level.

¹ The master files of the LFS were accessed at the University of Lethbridge Research Data Centre (RDC).

² The NAICS also allows us to identify those involved in Indigenous and international public administration, but there are few observations in each of these groups and so they are not discussed. Furthermore, both of these groups are outside of the purview of the provincial government, whereas provincial and local public employees may be directly affected by changes in provincial spending allocations.

Using standard human capital models, we find that there generally are public sector wage premiums in Canada, and that these tend to be highest for federal, provincial and local government employees and lower for those employed in the public sector but not involved in administration. Since this latter group is spread across all industries (with the exception of the public administration industry) there are also private employees who work in these same industries. As such, comparisons of wages between private and public employees are relatively easy to interpret. By contrast, those in public administration at each of the three levels are exclusively in the public administration industry where, by definition, there are no private employees, so comparisons are more difficult and any wage differential is dependent on the choice of industry comparator. When compared to a low-wage industry (such as agriculture, forestry, fishing and hunting), public administration employee wage premiums are positive and substantial; when compared to a high-wage industry (such as mining, quarrying and oil and gas extraction – an important industry in Alberta), a wage penalty exists. Using standard Blinder-Oaxaca decomposition techniques does little to change the pattern of these results.

We do find some evidence that the public sector wage premium in Alberta is counter-cyclical, being positively related to the provincial unemployment rate and negatively related to the provincial employment rate, but this evidence is weak.

Unconditional quantile regression estimates of the human capital model show that the public sector premium is largest in the middle of the distribution, and somewhat higher (or less negative) in Alberta for provincial and local employees. Again, the results are sensitive to the choice of industry comparator for those in public administration. Decomposing the conditional quantile regression results, we find that for both Canada and Alberta, the public sector wage premium tends to diminish as we move up the wage distribution, and is negative and statistically significant at the upper tail of the distribution.

This paper is organized in the usual way. The next section provides a brief review of the Canadian literature on public-private sector wage differentials and discusses some of the limitations of this literature. Section III presents the econometric models to be estimated. Section IV discusses the labour force data used in estimating the econometric models as well as presenting summary statistics. Section V discusses the results from the model estimations. The final section concludes and discusses some policy implications.

II. PREVIOUS LITERATURE

There is a substantial literature on private-public sector wages differentials in Canada that has amassed over the past 40 years.³ In his pioneering work for Canada, Gunderson (1979) examined the 1971 census and decomposed the public-private sector wage gap, concluding that public sector workers enjoyed significant rents – 8.6 per cent for men and 6.2 per cent for women. Shapiro and Stelcner (1989) updated this work using the 1981 census and showed the rent component of the total differential decreased to 4.2 per cent for men and increased to 12.2 per cent for women.

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A chronological ordering of selected publications is contained in the Appendix, Table A1.

Robinson and Tomes (1984) argued that these previous studies did not (in fact, could not, because of data limitations) control for union status and, given the high rates of public sector unionization, the public sector premium may be a unionization premium. They introduce union status endogenously into their model and find that the public sector premium wage was reduced. Similarly, Simpson (1985) estimated that higher public sector earnings appeared to be completely due to unionization. Robinson (1995) concluded that if the private sector had union coverage as high as in the public sector, the wage differential would completely disappear.

Prescott and Wandschneider (1999) followed up on the previous work by Gunderson (1979) and Shapiro and Stelcner (1989) using the 1982 and 1991 Survey of Consumer Finances. They found similar results to those of Shapiro and Stelcner for the early 1980s, but also that this premium increased for women, but not men, over the 1980s – arguably the result of changes in pay equity legislation over this period in the public sector.

Using the Labour Market Activity Survey (LMAS) from 1990, Mueller (1998) broke down the public sector into different levels of government (federal, provincial and local) and uses two definitions of the public sector (one for only those involved in public administration and the other including health and education employees). Using quantile regressions and decomposition techniques, he found that rents are common in the public sector, and that these are highest for federal government employees, females and those at the lower tail of the wage distribution. The exception was among male provincial employees where rents were negative, especially at the median or above. Also using the LMAS, but pooled for each of the three years between 1988 and 1990, Mueller (2000) looked at individuals who move between the public and private sectors and estimated a fixed-effect model to control for unobserved heterogeneity. He concluded that females who move from the private to public sectors do experience wage increases and these are about the same magnitude as the wage decreases experienced by those who move in the opposite direction. The results for males were generally not statistically significant.

Fuller (2005) cited a study by Gunderson et al. (2000) that used LFS data for 1997 and found a public sector premium that was higher for women than men, especially at the lower tail of the earnings distribution, but that this advantage did not extend to the local and provincial governments where the male advantage was larger (although, compared to the private sector, both sexes are paid more). Men in the health sector earned 14.2 per cent less than those in the private sector while women earned 4.9 per cent more. Fuller (2005) used the LFS from May and November 2002 and also found that women in the public sector in British Columbia had an earnings premium and, since they are more likely to be employed in this sector than men, would be negatively impacted disproportionately if employment in the public sector were cut. This would have implications for the overall gender wage gap.

More recent studies have continued to show a public sector premium for females. Tiagi (2010) uses the September 2008 LFS and finds that males (females) earn about 31.0 (51.0) per cent more in the public sector without controlling for any covariates, but the premium is still 5.4 (20.0) per cent for males (females) after controlling for various factors and self-selection into the public sector, with most of this gap accounted for by observable characteristics such as education. Hou and Coulombe (2010) use 2006

census data and find different wage premiums by sex and visible minority groups in the public and private sectors. Nadeau (2010) uses census data over the 1970-2000 period, extending the analysis to include differences in the public sector premium for anglophones and francophones. He finds that Quebec has the only public sector where francophones have a wage premium and that this is completely explained by the mother-tongue effect. These results do suggest that there are important differences in public sector pay across provinces.

Using the 2006 census, Nadeau (2013) shows that immigrants earn 3.0-3.5 per cent less than Canadian-born workers in Canada, despite having more years of education on average. He finds that the main reason for this is that immigrants' education and work experience tend to be discounted, but that the overall earnings penalty is limited to the private sector; he finds no public sector wage penalty for immigrants. Zheng (2017) uses the 2011 National Household Survey and compares public sector and private sector workers, finding a public sector wage premium in the Canadian labour market for both immigrants and those born in Canada, although the premium is larger for immigrants – likely the result of lower private sector wages for both sexes.

Palacios et al. (2016) use the LFS Public Use Microdata File (PUMF) data from 2013 and aggregate monthly data from January through December in that year. They find that the overall public sector wage premium is 9.7 per cent when controlling for the usual correlates of wages, but that this reduces to 6.2 per cent when union status is added to their estimates. Thus, union status accounts for about 35 per cent of the overall differential. Lammam et al. (2016) update these estimates using the same methodology and data from 2015 and find that the public sector premium increases to 10.6 per cent when not controlling for union status and to 7.2 per cent when union status is controlled. However, both of these cases use the broad definition of the public sector contained in the LFS PUMF, which defines the public sector to be public administration, a government service or agency, Crown corporations, liquor boards, hospitals, schools, universities, etc. Basically, any enterprise funded by government is included in this definition. Unfortunately, the use of this broad variable does not allow the researchers to determine if wage differentials change by level of government. Palacios et al. (2016) also find heterogeneity in the public sector wage premium when analyzing six of the 18 broad industries where at least five per cent of all workers are in the public or private sectors. Lammam et al. (2017) narrow this analysis to Alberta, using January-December 2015 aggregated LFS PUMF data and find the public sector premium 7.9 per cent or 5.4 per cent, the latter figure when controlling for union status. Palacios et al. (2018) replicate this analysis using 2017 LFS PUMF and find these figures increase somewhat to 9.6 per cent and 6.1 per cent, respectively.

It should be noted that the preceding analyses are limited in that a limitation of any unexplained portion of wage differentials is just that – unexplained. While a positive unexplained wage differential for public sector workers is often interpreted as rent, any unobservable characteristic can result in omitted variable bias. For example, language is not controlled in the above estimates and yet this is shown to be an important determinant of wages (e.g., Ferrer et al. 2006; Warman et al. 2015). This may be important, especially at the federal level of public administration where bilingualism is rewarded. Furthermore, the above analysis does not account for the depth of skills.

Mueller et al. (2018) have shown that higher literacy, numeracy and basic technology skills, for example, result in a wage premium. Thus, insofar as the public sector is able to screen for these abilities (say with public service entrance examinations), we would expect a higher public sector wage premium. Other reasons for the premium might include a compensating differential for working in the public sector (assuming it is a disamenity) or that the public sector pays efficiency wages which results in a queue of workers with superior characteristics that do not appear in data sets.

Conversely, the monopsony power of governments could result in an underpayment to public sector workers, especially when the private labour markets for the same talent are very thin. Public sector workers may also have their compensation open to greater scrutiny than those in the private sector, putting further downward pressure on public sector wages.

We now turn our attention to the development of the empirical models and their estimation.

III. METHODOLOGY

We begin by using a standard Mincer (1974) human capital model:

$$\ln w_i = X_i\beta + PE_i\delta_1 + FED_i\delta_2 + PROV_i\delta_3 + LOCAL_i\delta_4 + \varepsilon_i \quad (1)$$

where $\ln w_i$ is the natural logarithm of the real hourly wage of the i^{th} individual, X_i is a vector of individual and job-related characteristics, β is the rate of return to these characteristics, PE_i , FED_i , $PROV_i$ and $LOCAL_i$ are mutually exclusive dummy variables and denote employment as a public employee not in administration, employees in federal, provincial and local administrations, respectively. δ_1 - δ_4 are the premiums for being employed in these disaggregated government sectors and ε_i is the usual error term. In several of the models below, we control for industry. Since all federal, provincial and local administration employees are employed in the same industry (i.e., public administration) while all public employees not in administration are employed in one of the other two-digit industries, we must be careful with the interpretation of the δ s. In this case, δ_1 is the weighted average premium for being a public employee not in administration relative to others in the same industry who are in the private sector. By contrast, δ_2 through δ_4 are the premiums for being in federal, provincial or local administration, respectively, relative to the omitted industry category. As will be seen below, any premiums for the three groups of public administration employees are sensitive to the choice of omitted industry group.

This model's limitation is that it does not permit us to determine the part of the total wage differential that is due to sectoral differences in labour market attributes (i.e., the explained portion of the differential), and the part due to different rates of return to these attributes (i.e., the unexplained portion). Obviously, inclusion of public sector dummy variables into Eq. (1) constrains the returns to all other labour market characteristics to be equal for all individuals, regardless of sector of employment. Using the familiar decomposition technique credited to Blinder (1973) and Oaxaca (1973) allows us to overcome this limitation.

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

$$\overline{\ln w_g} - \overline{\ln w_p} = \sum b_p(\overline{X_g} - \overline{X_p}) + \sum (b_g - b_p)\overline{X_g} \quad (2)$$

where $\overline{\ln w_j}$ is the mean of the natural logarithm of the real wage in sector j , b_j is a vector of estimated coefficients for sector j , $\overline{X_j}$ is a vector of average worker characteristics in sector j and $j = g, p$ denotes the public (i.e., government) and private sectors, respectively. The first term on the right-hand side is the component of real wages that is due to differences in mean endowments between the two sectors, and the second term shows the component due to differences in the way that these characteristics are rewarded in both sectors. The former is often referred to as the justifiable or the explained wage differential and the latter the rent or surplus payment or unexplained part of the differential.

This model will be estimated again when the public sector is disaggregated into its components, *PE*, *FED*, *PROV* and *LOCAL*. In all cases, the private sector remains the same so that comparisons can be made between this sector and each of the four definitions of the public sector. However, only in the case of public employees not in administration (i.e., the *PE* group) can we control for industry. In the other three cases, this is not possible since there is no overlap of public and private employees in public administration (recall, there are - by definition - no private employees in public administration). In Eq. (2), the public sector mean characteristics and the private sector coefficient estimates are used as the reference points. Switching the subscripts above would result in private sector mean characteristics and the public sector coefficient estimates used as the reference points. The two estimates together provide upper and lower bounds of the public sector wage differentials that are explained and unexplained. Weighting the estimates by the relative size of each group gives estimates between these two bounds. These are the preferred estimates that will be discussed below.

The limitation of the above methodology is that we are only able to evaluate public sector premiums at the mean wages of the two sectors. Previous literature has shown that the public sector premium differs at different points of the wage distribution. As such, we employ the unconditional quantile method proposed in Firpo et al. (2009, 2010) to look at changes in coefficients on our public sector variables at the 10th, 25th, 50th, 75th and 90th quantiles of log real hourly wages. This method is chosen over the conditional quantile regression proposed by Koenker and Bassett (1978), because this method cannot be used to estimate the impact of a change in an explanatory variable on the quantile of the unconditional distribution of the outcome variable (see Firpo et al. 2009, 2010). We estimate the RIF-OLS regression model:

$$\ln w_i^q = X_i\beta + PE_i\delta_1 + FED_i\delta_2 + PROV_i\delta_3 + LOCAL_i\delta_4 + \varepsilon_i. \quad (3)$$

where $\ln w_i^q$ is now the re-centred influence function of the q^{th} quantile. The δ coefficient estimates can be interpreted as the public sector real wage premium at the unconditional q^{th} quantile of the wage distribution. As above, public employees are disaggregated into *PE*, *FED*, *PROV* and *LOCAL* and the estimates of δ_2 through δ_4 are the wage premiums (for federal, provincial or local administration, respectively), relative to the omitted industry category.

Finally, the unconditional quantile estimation in Eq. (3) suffers similar limitations to those in Eq. (1): all coefficient estimates at each quantile level are constrained to be equal between the sectors and any wage differential is only due to the treatment effect of being in the public sector. We now combine the unconditional quantile regression results, obtained by estimating Eq. (3) without the government sector dummy variables, one for the entire private sector and then four separate times for each of the public employee definitions. These results are then decomposed using the familiar Oaxaca-Blinder method as follows:

$$\overline{\ln w_g^q} - \overline{\ln w_p^q} = \sum b_p^q (\overline{X_g} - \overline{X_p}) + \sum (b_p^q - b_g^q) \overline{X_g} \quad (4)$$

where q is the quantile. As with the estimation of Eq. (2), Eq. (4) will be estimated using each of our four definitions of the public sector, at the 10th, 25th, 50th, 75th and 90th quantiles, and using the three weighting schemes discussed above.

IV. DATA AND SUMMARY STATISTICS

The data are from the master files of the LFS from 2006 through 2017. The LFS is a compulsory monthly survey administered by Statistics Canada. We limit the sample to include only those who are paid employees since unpaid employees working in the family business and the self-employed do not have their earnings recorded in the LFS. We also limit the sample to those between the ages of 25 and 64 and eliminate those who were full-time students during the reference week.

All hourly wage and earnings data are in 2002 dollars after having been adjusted using the CPI for each month and year. We drop those with real wages of less than \$5 per hour as well as those who worked fewer than five hours or more than 100 hours in the reference week.⁴

We also include the LFS variable for landed immigrants, but this variable excludes those born abroad who are not landed immigrants (i.e., permanent residents) and thus eliminates temporary foreign workers, those on student visas, refugee claimants, those born abroad to Canadian parents, etc.⁵

Two variables in the LFS allow the identification and disaggregation of public sector into public sector employees not involved in public administration and those involved in public administration at the federal, provincial and local levels of government. The “COWMAIN” variable allows the identification of public employees and private employees. Each of these is based on the ownership of the organization where the individual is employed. Thus, for example, university employees are considered to be public employees because universities are provincially owned. Using the variable “SIC5”, which is the North American

⁴ These two restrictions result in fewer than one per cent of the observations being dropped from the sample.

⁵ In an earlier version of this paper, an alternative variable for immigrants was derived from the country of birth variable in the LFS and includes all those born abroad and those in Canada temporarily (i.e., non-landed immigrants) as well as those born abroad to Canadian parents. This did not markedly change any of the results.

Industrial Classification System (NAICS) from 2012, public employees can be further disaggregated into six mutually exclusive categories as follows: federal government public administration (NAICS 9110), which includes those in NAICS 9111 (defence services); provincial public administration (NAICS 9120); local, municipal and regional public administration (NAICS 9130); Indigenous public administration (NAICS 9140); international and other extra-territorial public administration (NAICS 9190); and public employees not involved in public administration (all NAICS codes exclusive of those listed above).⁶ Generally, public employees involved in administration are those who work for provincial and federal government departments and local governments. Public employees not in administration would include those who work for hospitals, schools, universities, colleges, government social service agencies and Crown corporations.

The final sample contains 6,118,733 individual observations over the 12-year period of analysis.

Table 1 presents the summary statistics for both the entire sample across Canada and for the subsample of those in Alberta. In both Canada and Alberta, public employees are paid more on average compared to private employees. While Canada-wide the mean hourly wage gap is \$5.59 per hour, in Alberta it is only \$4.06 per hour, at least in part because private employees in Alberta earn more than \$3 per hour compared to the national average. Public employees who are not involved in administration earn slightly less than the public employee average both nationally and in Alberta. At the national level, federal government employees tend to earn slightly above \$1 more than those at the provincial and local levels of public administration. In Alberta the situation is reversed, with federal employees earning about \$3 less per hour. In fact, local and provincial employees in Alberta are the highest paid on average among all groups outlined here (recall, Indigenous and international groups will not be discussed).

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The Indigenous and international public administration sample sizes are small and not the focus of this research, so these two categories will not be discussed, although they are included as controls in many of the multivariate regressions that follow.

**TABLE 1 SUMMARY STATISTICS, CANADA, PRIVATE AND PUBLIC EMPLOYEES
(STANDARD DEVIATIONS FOR CONTINUOUS VARIABLES ARE IN
PARENTHESES)**

	Canada		Alberta	
	Public Employee	Private Employee	Public Employee	Private Employee
<i>Real wage (2002\$)</i>				
All	25.18 (9.81)	19.59 (10.11)	26.90 (10.54)	22.84 (11.73)
Public employee, not administration	24.59 (9.68)	N/A	26.37 (10.49)	N/A
Federal administration	27.59 (9.88)	N/A	26.19 (9.35)	N/A
Provincial administration	26.46 (10.20)	N/A	29.45 (11.23)	N/A
Local administration	26.21 (9.82)	N/A	29.08 (10.42)	N/A
<i>Proportion of total employment</i>	0.263	0.737	0.235	0.765
<i>Type of public sector employee</i>				
Public employee, not administration	0.730	N/A	0.750	N/A
Federal government public administration	0.103	N/A	0.061	N/A
Provincial public administration	0.079	N/A	0.083	N/A
Local, municipal and regional public administration	0.084	N/A	0.105	N/A
Aboriginal public administration	0.002	N/A	0.002	N/A
International public administration	0.001	N/A	0.000	N/A
<i>Highest level of education</i>				
Grade 8 or less	0.004	0.022	0.003	0.015
Grade 9-10	0.011	0.044	0.012	0.038
Grade 11-13, non-graduate	0.010	0.033	0.014	0.042
Grade 11-13, graduate	0.110	0.216	0.128	0.236
Some PSE	0.037	0.057	0.038	0.058
Trades certificate/diploma	0.079	0.132	0.087	0.171
Community college, CEGEP, etc.	0.264	0.234	0.231	0.191
University certificate below bachelor's	0.036	0.026	0.034	0.024
Bachelor's degree	0.290	0.173	0.316	0.171
Above bachelor's degree	0.159	0.064	0.137	0.055
<i>Demographic variables</i>				
Age	43.94 (10.29)	42.43 (10.72)	43.81 (10.58)	41.25 (10.71)
Landed immigrant	0.160	0.249	0.173	0.219
<i>Sex</i>				
Male	0.372	0.551	0.345	0.585

	Canada		Alberta	
	Public Employee	Private Employee	Public Employee	Private Employee
Female	0.629	0.449	0.655	0.415
Marital Status				
Married	0.577	0.535	0.649	0.564
Common-law	0.159	0.162	0.092	0.122
Widow or widower	0.010	0.010	0.011	0.009
Separated	0.032	0.033	0.026	0.029
Divorced	0.060	0.052	0.068	0.058
Single, never married	0.162	0.208	0.155	0.217
Economic family type				
Unattached individual	0.148	0.168	0.157	0.202
Husband-wife, dual-earner couple, no children or none under 25	0.216	0.213	0.245	0.223
Husband-wife, dual-earner couple, youngest child 0 to 17	0.328	0.278	0.316	0.262
Husband-wife, dual-earner couple, youngest child 18 to 24	0.073	0.063	0.066	0.049
Husband-wife, single-earner couple, husband employed, no children or none under 25	0.023	0.038	0.023	0.035
Husband-wife, single-earner couple, husband employed, youngest child 0 to 17	0.023	0.049	0.028	0.064
Husband-wife, single-earner couple, husband employed, youngest child 18 to 24	0.006	0.009	0.004	0.008
Husband-wife, single-earner couple, wife employed, no children or none under 25	0.037	0.029	0.030	0.018
Husband-wife, single-earner couple, wife employed, youngest child 0 to 17	0.016	0.013	0.012	0.009
Husband-wife, single-earner couple, wife employed, youngest child 18 to 24	0.008	0.005	0.005	0.003
Husband-wife, non-earner couple, no children or none under 25	X	X	X	X
Husband-wife, non-earner couple, youngest child 0 to 17	X	X	X	X
Husband-wife, non-earner couple, youngest child 18 to 24	X	X	X	X
Single-parent family, parent employed, youngest child 0 to 17	0.048	0.042	0.044	0.041
Single-parent family, parent employed, youngest child 18 to 24	0.018	0.014	0.016	0.012
Single-parent family, parent not employed, youngest child 0 to 17	0.001	0.001	0.001	0.001
Single-parent family, parent not employed, youngest child 18 to 24	0.000	0.001	0.000	0.001
Other families	0.047	0.068	0.049	0.067
Province				
NL	0.019	0.013	N/A	N/A
PEI	0.006	0.003	N/A	N/A
NS	0.032	0.025	N/A	N/A
NB	0.025	0.021	N/A	N/A
QC	0.244	0.233	N/A	N/A

	Canada		Alberta	
	Public Employee	Private Employee	Public Employee	Private Employee
ON	0.364	0.399	N/A	N/A
MB	0.046	0.032	N/A	N/A
SK	0.038	0.026	N/A	N/A
AB	0.106	0.124	1.000	1.000
BC	0.120	0.126	N/A	N/A
<i>Urban status</i>				
CMA/CA urban core	X	X	X	X
CMA/CA urban fringe	X	X	X	X
CMA/CA rural	X	X	X	X
Non-CA urban	X	X	X	X
Non-CA rural	X	X	X	X
CMA-CA secondary urban core	X	X	X	X
<i>Survey year</i>				
2006	0.077	0.079	0.075	0.071
2007	0.079	0.080	0.077	0.076
2008	0.081	0.081	0.077	0.078
2009	0.081	0.079	0.081	0.077
2010	0.083	0.081	0.083	0.077
2011	0.083	0.083	0.078	0.083
2012	0.084	0.084	0.082	0.087
2013	0.085	0.085	0.083	0.089
2014	0.085	0.086	0.082	0.092
2015	0.086	0.086	0.090	0.092
2016	0.087	0.087	0.094	0.089
2017	0.089	0.089	0.098	0.090
<i>Job characteristics</i>				
Multiple job holder				
Single job holder, not a job changer	0.941	0.955	0.927	0.949
Single job holder, job changer	0.000	0.001	0.000	0.001
Multiple job holder	0.059	0.045	0.073	0.051
Permanent or temporary job status				
Permanent	0.876	0.919	0.884	0.930
Not permanent, seasonal job	0.009	0.023	0.010	0.016
Not permanent, temporary, term or contract job	0.086	0.043	0.077	0.041
Not permanent, casual job or work done through a temporary help agency *	0.028	0.014	0.028	0.012
Not permanent, other	0.002	0.001	0.002	0.001
Work schedule				
Full-time (30+ hours/week)	0.878	0.895	0.860	0.909
Part-time work (<30 hours/week)	0.123	0.105	0.140	0.091

	Canada		Alberta	
	Public Employee	Private Employee	Public Employee	Private Employee
<i>Firm size</i>				
<20 employees	0.035	0.225	0.036	0.211
20-99 employees	0.068	0.192	0.076	0.178
100-500 employees	0.128	0.157	0.118	0.152
>500 employees	0.769	0.427	0.770	0.460
<i>Tenure at current job (months)</i>	142.28	95.62	129.46	75.86
	(115.96)	(102.00)	(115.00)	(88.98)
<i>Union status</i>				
Union member	0.744	0.174	0.679	0.114
Not a union member but covered by a CA	0.034	0.017	0.042	0.013
Not a union member and not covered by a CA	0.222	0.810	0.279	0.873
<i>Occupation (2-digit NOC)</i>				
Legislators and senior management	0.0052	0.0046	0.0050	0.0034
Specialized middle manager occupations (1)	0.0121	0.0232	0.0114	0.0165
Specialized middle manager occupations (2)	0.0046	0.0076	0.0045	0.0071
Specialized middle manager occupations (3)	0.0056	0.0013	0.0069	0.0009
Specialized middle manager occupations (4)	0.0255	0.0032	0.0275	0.0028
Specialized middle manager occupations (5)	0.0013	0.0010	0.0012	0.0006
Middle management occupations in wholesale and retail trade and customer service	0.0021	0.0287	0.0017	0.0277
Middle management occupations in trades, transportation, production and utilities (1)	0.0036	0.0087	0.0039	0.0125
Middle management occupations in trades, transportation, production and utilities (2)	0.0001	0.0020	X	0.0059
Middle management occupations in trades, transportation, production and utilities (3)	0.0017	0.0069	0.0025	0.0047
Professional occupations in business and finance	0.0330	0.0403	0.0294	0.0376
Administrative and financial supervisors and administrative occupations	0.0767	0.0531	0.0654	0.0549
Finance, insurance and related business administrative occupations	0.0048	0.0133	0.0055	0.0159
Office support occupations	0.0696	0.0514	0.0813	0.0503
Distribution, tracking and scheduling co-ordination occupations	0.0245	0.0220	0.0266	0.0220
Professional occupations in natural and applied sciences	0.0394	0.0508	0.0349	0.0544
Technical occupations related to natural and applied sciences	0.0347	0.0396	0.0315	0.0481
Professional occupations in nursing	0.0747	0.0046	0.0878	0.0031
Professional occupations in health (except nursing)	0.0221	0.0054	0.0291	0.0049
Technical occupations in health	0.0406	0.0134	0.0428	0.0123
Assisting occupations in support of health services	0.0341	0.0167	0.0347	0.0120
Professional occupations in education services	0.1769	0.0053	0.1710	0.0041
Professional occupations in law and social, community and government services	0.0574	0.0167	0.0530	0.0161

	Canada		Alberta	
	Public Employee	Private Employee	Public Employee	Private Employee
Paraprofessional occupations in law and social, community and government services	0.0235	0.0210	0.0139	0.0172
Occupations in front-line public protection services	0.0316	0.0002	0.0316	0.0003
Care providers in education, legal and public protection support occupations	0.0375	0.0079	0.0487	0.0082
Professional occupations in art and culture	0.0071	0.0057	0.0062	0.0033
Technical occupations in art and culture	0.0088	0.0122	0.0091	0.0087
Retail sales supervisors and specialized sales occupations	0.0018	0.0403	0.0020	0.0407
Service supervisors and specialized service occupations	0.0103	0.0386	0.0087	0.0381
Sales representatives and sales persons - wholesale and retail trade	0.0027	0.0524	0.0009	0.0500
Service representatives and other customer and personal services occupations	0.0160	0.0538	0.0091	0.0456
Sales support occupations	0.0028	0.0274	0.0010	0.0261
Service support and other occupations, not elsewhere classified	0.0400	0.0404	0.0348	0.0399
Industrial, electrical and construction trades	0.0129	0.0631	0.0118	0.0853
Maintenance and equipment operation trades	0.0113	0.0435	0.0120	0.0516
Other installers, repairers and services and material handlers	0.0028	0.0202	0.0031	0.0180
Transport and heavy equipment operation and related maintenance occupations	0.0222	0.0430	0.0286	0.0488
Trades helpers, construction labourers and related occupations	0.0060	0.0094	0.0054	0.0115
Supervisors and technical occupations in natural resources, agriculture and related production	0.0008	0.0086	0.0010	0.0233
Workers in natural resources, agriculture and related production	0.0005	0.0073	0.0005	0.0113
Harvesting, landscaping and natural resources labourers	0.0024	0.0048	0.0039	0.0055
Processing, manufacturing and utilities supervisors and central control operations	0.0083	0.0144	0.0096	0.0168
Processing and manufacturing machine operators and related production workers	0.0002	0.0329	0.0001	0.0169
Assemblers in manufacturing	0.0002	0.0184	X	0.0076
Labourers in processing, manufacturing and utilities	0.0002	0.0145	0.0001	0.0071
<i>Industry (2-digit NAICS)</i>				
Agriculture, forestry, fishing and hunting	0.0024	0.0130	0.0022	0.0099
Mining, quarrying, and oil and gas extraction	0.0008	0.0251	0.0018	0.1090
Utilities	0.0341	0.0025	0.0329	0.0057
Construction	0.0055	0.0818	0.0095	0.1159
Manufacturing	0.0009	0.1757	0.0006	0.1017
Wholesale trade	0.0003	0.0550	0.0004	0.0602
Retail trade	0.0057	0.1329	0.0007	0.1237
Transportation and warehousing	0.0499	0.0550	0.0450	0.0646
Information and cultural industries	0.0098	0.0303	0.0085	0.0195
Finance and insurance	0.0118	0.0681	0.0105	0.0448

	Canada		Alberta	
	Public Employee	Private Employee	Public Employee	Private Employee
Real estate and rental and leasing	0.0032	0.0165	0.0017	0.0178
Professional, scientific and technical services	0.0025	0.0833	0.0008	0.0863
Administrative and support, waste management and remediation services & management of companies and enterprises*	0.0026	0.0473	0.0004	0.0375
Educational services	0.2958	0.0082	0.3129	0.0050
Health care and social assistance	0.2878	0.0814	0.3071	0.0649
Arts, entertainment and recreation	0.0156	0.0135	0.0105	0.0147
Accommodation and food services & other services (except public administration)*	0.0017	0.1103	0.0004	0.1188
Public administration	0.2697	0.0000	0.2504	0.0000
Weighted N	444,958,642	1,248,452,210	47,316,184	154,331,610
Unweighted N	1,785,470	4,333,263	155,698	522,865

Notes: X denotes that the data cannot be reported as per Statistics Canada's data release guidelines; N/A = not applicable; * means that the two categories were combined to satisfy Statistics Canada's data release guidelines. These are disaggregated in all the multiple regression results below.

This could be the result of the generally higher private employee wages in Alberta which could put upward pressure on provincial and local employees' wages compared to federal employees where pay scales are set nationally.

Within the group of public employees, about three-quarters are not involved in public administration in Alberta, slightly lower than the 73 per cent at the national level. The proportion of federal government employees is smaller in Alberta (6.1 per cent versus 10.3 per cent) while the proportion at the provincial level is similar at about eight per cent. Local administration employees in Alberta comprise 10.5 per cent of all public employees compared to 8.4 per cent nationwide.

Part of the wage gap is likely due to the higher levels of education among public employees: in both Canada and Alberta about 45 per cent of public employees have a bachelor's degree or higher, about double the same figure among private employees.

In terms of demographic variables, public employees tend to be slightly older on average compared to their private employee counterparts in both Canada and in Alberta. Also, public sector employment is dominated by females who account for close to two-thirds of total employment in both geographical areas. By contrast, males outnumber females among private employees, but by a wider margin in Alberta. Public employees are more likely to be married, especially in Alberta, and less likely to be never married. As a result, it is not surprising that unattached individuals are more common among the group of private employees.

Public employees exhibit more concentration in the Atlantic Provinces, Quebec, Manitoba and Saskatchewan. Collectively, these seven provinces account for about 41 per cent of the total number of public employees but only 35 per cent of private employees. By contrast, there is more concentration of private employees in Ontario, Alberta and British

Columbia, where these figures are the obverse of the above, with 59 per cent of all public employees and 65 per cent of all private employees.

An examination of the summary job characteristics yields some interesting results. Private employees are more likely to hold a single job compared to public employees in Canada and Alberta. Rather unexpected is that public employees in either jurisdiction are about 4.5 percentage points less likely to have held a permanent job in the reference week. Full-time employment is more common with private employees, especially in Alberta.

Not surprisingly, public employees are much more likely to work for larger firms, and also to have longer job tenure periods compared to private employees – up to 54 months (or 4.5 additional years) in the case of Alberta.

As is well known, public employees have higher proportions of union members and/or those covered by a collective agreement. In these data there are large differences, with over four times as many public employees covered by a union agreement relative to private employees in Canada (i.e., 77.8 per cent versus 19.1 per cent) increasing to almost six times in Alberta (i.e., 72.1 per cent versus 12.7 per cent).

Finally, we summarize the occupational distribution by two-digit National Occupational Classification (NOC) and the industry distribution by two-digit North American Industry Classification System (NAICS).⁷ Occupations in health care, education and protective services are more common in the public sector. Conversely, occupations in sales, the trades, processing and manufacturing occupations, etc. are more common in the private sector. Similarly, private employees are much more likely to be involved in industries such as construction, manufacturing, retail and wholesale trade, and other services. In the cases of both occupation and industry, there is significant overlap between the sectors in many cases. The exception is in the public administration industry, which is comprised exclusively of public employees.

In sum, many of the differences in characteristics between public and private employees may offer explanations for the larger real hourly wage differences observed in these data. The next section will shed more light on these factors.

V. MULTIVARIATE RESULTS

In this section we begin by employing OLS to estimate log real hourly wage equations for our entire sample, as well as by province to determine if and where any wage premium might exist.

Estimating the Basic OLS Models for Canada

Table 2 estimates Eq. (1). We begin with a parsimonious inclusion of variables and build up the models in a stepwise fashion until we have estimates from a fully saturated model, including all the variables outlined in the previous section. In all cases, the models are

⁷ See Statistics Canada (2018) for details on these 46 two-digit occupations and Statistics Canada (2012) for details on the 20 two-digit industries.

estimated with robust standard errors.

The estimates in column 1 – where no controls are included – show that public employees are paid handsomely compared to their private employee counterparts, ranging from a low of 26.7 per cent for public employees not in administration to a high of 39.2 per cent for those in federal administration.⁸ Adding controls for the highest level of educational attainment reduces this wage advantage by about eight percentage points in the first three cases and by about 3.5 percentage points for local administration employees. Adding demographic and other variables in columns 3 through 5 does little to change this result. However, adding firm size, tenure and union status – all of which differ markedly between the two sectors – in a stepwise fashion (columns 6-8) reduces the coefficient value by two to five percentage points in each case. Adding in the categorical occupational variable in column 9 results in the coefficient value dropping from seven to nine percentage points compared to column 8, indicating that differences in occupational composition between the sectors are driving a large portion of the overall differential. Adding in the categorical variable for industry in column 10 results in little change among public employees not involved in administration, but still shows a 5.9-per-cent wage premium for this group of public employees relative to their private sector counterparts. This could be considered the pure public sector wage premium in these estimates since both private and public employees work in each of the industries.

⁸

Technically, coefficient estimates are only approximations of the differences in log real wages and become less accurate the larger the absolute value of the coefficient. However, as is common in these types of regressions, we will report the estimates of log changes in real wages as percentages, knowing that these are only an approximation.

TABLE 2 PUBLIC SECTOR REAL WAGE PREMIUMS BY PUBLIC SECTOR JOB TYPE, CANADA (STANDARD ERRORS ARE IN PARENTHESES)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Public employee, not administration	0.267 *** (.0000)	0.187 *** (.0000)	0.200 *** (.0000)	0.209 *** (.0000)	0.220 *** (.0000)	0.177 *** (.0000)	0.150 *** (.0000)	0.131 *** (.0000)	0.056 *** (.0000)	0.059 *** (.0000)	0.059 *** (.0000)
Federal administration	0.392 *** (.0001)	0.307 *** (.0001)	0.285 *** (.0001)	0.297 *** (.0001)	0.283 *** (.0001)	0.235 *** (.0001)	0.213 *** (.0001)	0.194 *** (.0001)	0.104 *** (.0001)	0.209 *** (.0001)	-0.114 *** (.0001)
Provincial administration	0.344 *** (.0001)	0.261 *** (.0001)	0.243 *** (.0001)	0.259 *** (.0001)	0.248 *** (.0001)	0.206 *** (.0001)	0.182 *** (.0001)	0.164 *** (.0001)	0.081 *** (.0001)	0.183 *** (.0001)	-0.140 *** (.0001)
Local administration	0.334 *** (.0001)	0.298 *** (.0001)	0.248 *** (.0001)	0.240 *** (.0006)	0.235 *** (.0001)	0.206 *** (.0001)	0.178 *** (.0001)	0.162 *** (.0001)	0.095 *** (.0001)	0.200 *** (.0001)	-0.123 *** (.0001)
Highest level of education	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Demographic variables	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Province, urban status, year and month	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Multiple job holder, part-time job and job type	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Firm size	N	N	N	N	N	Y	Y	Y	Y	Y	Y
Job tenure	N	N	N	N	N	N	Y	Y	Y	Y	Y
Union status	N	N	N	N	N	N	N	Y	Y	Y	Y
Occupation	N	N	N	N	N	N	N	N	Y	Y	Y
Industry (agriculture, forestry, etc. omitted)	N	N	N	N	N	N	N	N	N	Y	N
Industry (mining, quarrying, oil & gas omitted)	N	N	N	N	N	N	N	N	N	N	Y
R ²	0.0771	0.1614	0.2508	0.2799	0.3053	0.3200	0.3416	0.3425	0.5056	0.5278	0.5278
Sample size	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733

Notes: The demographic variables include age and its square, landed immigrant, sex, marital status, and economic family type. A month variable is included to account for seasonal variation. All other controls are as listed in Table 1. The coefficient estimates for Indigenous and international public administration employees are not included here since there are few observations and the estimates are not reliable. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. In column (10), agriculture, forestry, fishing, and hunting is the omitted category. In column (11), mining, quarrying, and oil and gas extraction is the omitted industry.

The results for federal, provincial and local administration employees must be interpreted with some caution, however, owing to the fact that these employees are all involved in public administration and there are no private employees working in this industry. As such, comparisons here are relative to the omitted industry category and, as evidenced by the figures in columns 10 and 11, any premium is sensitive to the omitted industry category. In column 10, the coefficient estimates for the various levels of government administration (i.e., federal, provincial and local administration) reflect the differences in wages relative to the omitted industry which is agriculture, forestry, fishing and hunting, and the estimates show that federal government workers are paid about 20.9 per cent more, all else equal, with the premium for provincial and local government workers slightly less.

Column 11 repeats the exercise in the previous column but with the mining, quarrying, and oil and gas extraction as the omitted industry variable. The coefficient estimate for public employees not in administration does not change since it is invariant to the choice of omitted industry. However, now the coefficients on the various levels of public administration are negative owing to the comparison now being made with an industry with high wages, all else equal, whereas in column 10 the comparator industry of agriculture, forestry, etc. is an industry with among the lowest overall wages.

The Basic OLS Models by Province

Table 3a shows results by province, using the equivalent of the fully specified model in column 10 Table 2.⁹ The results for Canada are in the first column, are identical to those presented in the previous table and are included for comparison purposes. The estimates show variation between the provinces, but the premium between types of public employees differs. As seen previously in Table 2 (and repeated here in the left-hand column), for all of Canada, those public employees who are not in administration earn an average of 5.9 per cent more compared to those working in the same industries but who are private employees. Those in federal government administration earn almost 21 per cent more than those in agriculture, forestry, fishing and hunting (the omitted industry category), while those in provincial and local government administration have marginally lower premiums compared to those in the omitted category (18.3 per cent and 20.0 per cent, respectively).

This pattern is generally replicated for each province, with some exceptions. For those not in public administration, the wage premium ranges from lows of less than five per cent in Quebec and all four Western provinces to highs of greater than nine per cent in Ontario and Prince Edward Island. In Prince Edward Island, federal workers earn 24.0 per

⁹

It can be argued that the appropriate comparator group for public employees in Alberta (or any province) would be public employees from other provinces. This argument is not without merit and certainly worthy of investigating further, but beyond the scope of this paper. We have decided to analyze public-private sector comparisons within each province since there can be market imperfections (e.g., occupation or union restrictions and regulations) which make it difficult for those involved in non-administration employment in particular to obtain employment outside of their current province of residence. Furthermore, the rates of interprovincial migration have been falling in Canada for years. Thus, we think that comparing public employee wages within provinces is appropriate in this case since movement within the province but between the two sectors is more likely than movement between provinces for many public employees.

cent more than the omitted category, whereas the premium for federal workers is only 10.7 per cent in British Columbia. For those in provincial administration, the premium is highest in Alberta at 26.6 per cent and lowest in British Columbia at 9.4 per cent. For local governments, public employee premiums range from a low of 6.8 per cent in Prince Edward Island to highs of about 27 per cent in Ontario and Alberta.

As in Table 2, some of these estimates are sensitive to the choice of comparator. As we saw in column 11 of Table 2, the premiums for public employees in public administration were negative when mining, quarrying, and oil and gas extraction was used as the comparator. We replicate these results for the provinces in Table 3b and the results in column 1 are duplicated from column 11 in Table 2 for comparison purposes.

Again, the coefficient estimates for public employees not in administration are identical to those in Table 3a since this premium estimate is not sensitive to the choice of omitted industry. For those involved in public administration, however, the coefficient estimates are scaled down in each case from a minimum of 0.178 log points in the case of Prince Edward Island to maximums of 0.366 in Alberta and 0.369 in Newfoundland and Labrador, with Saskatchewan not far behind at 0.355.¹⁰ Not coincidentally, these latter three provinces are where the oil and gas extraction industries are concentrated and where wages are the highest in the country. Now, with the exception of public employees in federal administration in Prince Edward Island, the coefficient estimates are negative for all employees in federal, provincial and local administration. Thus, as in Table 2, we see the importance of choosing the comparator industry in estimating any public administration employee wage premium.

Is there evidence of wage competition between the public and private sectors?

To further investigate wage differentials between the sectors, we limit the sample to include only public employees not involved in administration. As previously noted, by definition those involved in public administration are exclusively in the public administration industry, an industry with no private employees. By contrast, the other 19 industries under consideration all have both public and private employees to a greater or lesser degree (see Table 1). In our data, some 73 per cent of Canadian public employees are not involved in administration, whereas the comparable figure for Alberta is 75 per cent (Table 1) and thus competition between the sectors could result in a lower overall wage differential. Table 4 presents estimates using only the sample of individuals not involved in public administration in the top panel. Here, the estimates are almost identical to those in Tables 3a and 3b, indicating that any competition between the sectors only has a minimal impact on reducing the overall wage premium for public employees.

The bottom panel interacts the public employee variable with the 19 industry variables along with all other control variables as in the previous results. Here, the public employee wage premium for Canada ranges from highs of about 16.9 per cent and 17.8 per cent for those in accommodation and food services and retail trade, respectively, to a low (i.e., a wage penalty) of -8.5 per cent for those public employees in the construction

¹⁰

These are calculated by subtracting the coefficient estimates in Table 3b from those in Table 3a.

industry. For Alberta, public employees in agriculture, forestry, fishing and hunting, accommodation and food services, and other services all have wage premiums of 15 per cent or higher, with those in professional, scientific and technical services having a wage penalty of 3.4 per cent.

In sum, limiting the sample to compare only those public employees not in public administration (i.e., an apples-to-apples comparison) we find only a slight decrease in the overall public employee premium but considerable heterogeneity by industry, although there are very few cases when the estimated premium is negative.

**TABLE 3A PUBLIC SECTOR REAL WAGE PREMIUMS BY PUBLIC SECTOR JOB TYPE, CANADA AND BY PROVINCE
(STANDARD ERRORS ARE IN PARENTHESES)**

	Canada	NL	PEI	NS	NB	QC	ON	MB	SK	AB	BC
Public employee, not administration	0.059 *** (.0000)	0.071 *** (.0003)	0.099 *** (.0005)	0.051 *** (.0002)	0.051 *** (.0002)	0.043 *** (.0001)	0.093 *** (.0001)	0.041 *** (.0002)	0.034 *** (.0002)	0.042 *** (.0001)	0.033 *** (.0001)
Federal administration	0.209 *** (.0001)	0.205 *** (.0009)	0.240 *** (.0011)	0.219 *** (.0006)	0.170 *** (.0006)	0.217 *** (.0002)	0.247 *** (.0003)	0.240 *** (.0007)	0.211 *** (.0006)	0.190 *** (.0004)	0.107 *** (.0003)
Provincial administration	0.183 *** (.0001)	0.215 *** (.0008)	0.143 *** (.0011)	0.188 *** (.0007)	0.124 *** (.0005)	0.117 *** (.0003)	0.274 *** (.0003)	0.218 *** (.0007)	0.207 *** (.0006)	0.266 *** (.0004)	0.094 *** (.0003)
Local administration	0.200 *** (.0001)	0.135 *** (.0009)	0.068 *** (.0014)	0.127 *** (.0007)	0.086 *** (.0007)	0.163 *** (.0003)	0.272 *** (.0003)	0.177 *** (.0007)	0.139 *** (.0006)	0.269 *** (.0004)	0.134 *** (.0003)
R ²	0.5278	0.5955	0.5841	0.5444	0.5646	0.5292	0.5358	0.5301	0.5387	0.5164	0.4895
Sample size	6,118,733	210,225	155,349	308,476	307,003	1,056,475	1,754,783	537,101	433,097	678,563	677,661

Notes: See notes for Table 2.

**TABLE 3B PUBLIC SECTOR REAL WAGE PREMIUMS BY PUBLIC SECTOR JOB TYPE, CANADA AND BY PROVINCE
(STANDARD ERRORS ARE IN PARENTHESES)**

	Canada	NL	PEI	NS	NB	QC	ON	MB	SK	AB	BC
Public employee, not administration	0.059 *** (.0000)	0.071 *** (.0003)	0.099 *** (.0005)	0.051 *** (.0002)	0.051 *** (.0002)	0.043 *** (.0001)	0.093 *** (.0001)	0.041 *** (.0002)	0.034 *** (.0002)	0.042 *** (.0001)	0.033 *** (.0001)
Federal administration	-0.114 *** (.0001)	-0.164 *** (.0005)	0.062 *** (.0021)	-0.036 *** (.0007)	-0.025 *** (.0005)	-0.058 *** (.0003)	-0.050 *** (.0002)	-0.075 *** (.0005)	-0.124 *** (.0004)	-0.176 *** (.0002)	-0.119 *** (.0000)
Provincial administration	-0.140 *** (.0001)	-0.154 *** (.0005)	-0.035 *** (.0021)	-0.068 *** (.0007)	-0.071 *** (.0005)	-0.159 *** (.0003)	-0.023 *** (.0002)	-0.097 *** (.0005)	-0.128 *** (.0004)	-0.100 *** (.0002)	-0.132 *** (.0003)
Local administration	-0.123 *** (.0001)	-0.234 *** (.0007)	-0.110 *** (.0023)	-0.129 *** (.0008)	-0.109 *** (.0006)	-0.113 *** (.0003)	-0.025 *** (.0002)	-0.138 *** (.0006)	-0.196 *** (.0004)	-0.097 *** (.0002)	-0.093 *** (.0003)
R ²	0.5278	0.5955	0.5481	0.5444	0.5646	0.5292	0.5358	0.5301	0.5387	0.5164	0.4895
Sample size	6,118,733	210,225	155,349	308,476	307,003	1,056,475	1,754,783	537,101	433,097	678,563	677,661

Notes: See notes for Table 2.

TABLE 4 PUBLIC SECTOR REAL WAGE PREMIUMS BY INDUSTRY, PUBLIC ADMINISTRATION EMPLOYEES EXCLUDED, CANADA AND ALBERTA (STANDARD ERRORS ARE IN PARENTHESES)

Overall	Canada		Alberta	
Public employee	0.056	***	0.037	***
	(.0000)		(.0001)	
R ²	0.5216		0.5155	
By industry	Canada		Alberta	
Agriculture, forestry, fishing and hunting	0.081	***	0.154	***
	(.0003)		(.0009)	
Mining, quarrying, and oil and gas extraction	0.056	***	0.015	***
	(.0006)		(.0013)	
Utilities	0.025	***	0.006	***
	(.0002)		(.0004)	
Construction	-0.085	***	-0.028	***
	(.0002)		(.0003)	
Manufacturing	0.082	***	0.081	***
	(.0005)		(.0022)	
Wholesale trade	0.059	***	0.040	***
	(.0009)		(.0018)	
Retail trade	0.178	***	0.078	***
	(.0001)		(.0020)	
Transportation and warehousing	0.082	***	0.017	***
	(.0001)		(.0002)	
Information and cultural industries	-0.013	***	-0.013	***
	(.0002)		(.0006)	
Finance and insurance	0.046	***	0.062	***
	(.0001)		(.0005)	
Real estate and rental and leasing	0.084	***	0.067	***
	(.0003)		(.0011)	
Professional, scientific and technical services	0.038	***	-0.034	***
	(.0003)		(.0023)	
Management of companies and enterprises	0.046	***	0.103	***
	(.0024)		(.0044)	
Administrative and support, waste management and remediation services	0.145	***	0.115	***
	(.0003)		(.0064)	
Educational services	0.072	***	0.073	***
	(.0001)		(.0004)	
Health care and social assistance	0.042	***	0.036	***
	(.0000)		(.0001)	
Arts, entertainment and recreation	0.121	***	0.138	***
	(.0001)		(.0005)	
Accommodation and food services	0.169	***	0.157	***
	(.0003)		(.0053)	
Other services (except public administration)	0.074	***	0.184	***
	(.0010)		(.0021)	
R ²	0.5220		0.5157	
Sample size	5,645,786		641,363	

Note: Other regressors are the same as those in Tables 3a and 3b. See notes for Table 2.

Does the Alberta public sector wage premium change over the business cycle?

Over the 2006-2017 period, Alberta suffered two recessions: the first following the global financial crisis in 2008, when real GDP fell by 5.3 per cent in 2009, and then again following the plummeting of oil prices when real GDP fell by 3.9 per cent and 3.6 per cent in 2015 and 2016, respectively. Following both recessions, the Alberta economy rebounded strongly, posting real GDP increases of 5.1 per cent and 4.9 per cent in 2010 and 2017, respectively.¹¹ We would expect the public sector premium, especially (arguably) for provincial and local government employees, to increase during these recessionary periods, largely as the result of layoffs and wage concessions in the private sector which put downward pressure on wages. Table 5 presents data on the public sector premium, disaggregated by year, over the 2006 to 2017 period. The left-hand column again provides the aggregate results from Table 3a for comparison purposes.

The expected pattern of a higher premium during recessionary periods does not seem to materialize as expected. Public employees not in administration show their highest wage premiums in 2006, 2012, 2014 and 2017, all years when the Alberta economy was performing reasonably well. Similar results hold for the three levels of public administration. Thus, our public sector wage premiums are showing more pro-cyclical rather than counter-cyclical trends.

¹¹

Figures are from Statistics Canada, Table 36-10-0402-01, Gross domestic product (GDP) at basic prices, by industry, provinces and territories. Available at <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3610040201>. Accessed Oct. 10, 2018.

TABLE 5 OLS ESTIMATES OF REAL WAGE PREMIUMS BY PUBLIC SECTOR JOB TYPE AND YEAR, INCLUDING OCCUPATION AND INDUSTRY CONTROLS, ALBERTA

	All years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Public employee, not admin	0.042 *** (.0001)	0.068 *** (.0004)	0.019 *** (.0004)	0.009 *** (.0004)	0.028 *** (.0004)	0.032 *** (.0037)	0.049 *** (.0004)	0.066 *** (.0004)	0.020 *** (.0004)	0.065 *** (.0004)	0.042 *** (.0003)	0.037 *** (.0003)	0.060 *** (.0003)
Federal administration	0.190 *** (.0004)	0.146 *** (.0014)	0.183 *** (.0013)	0.164 *** (.0014)	0.173 *** (.0016)	0.124 *** (.0013)	0.187 *** (.0014)	0.259 *** (.0014)	0.306 *** (.0012)	0.264 *** (.0013)	0.217 *** (.0014)	0.133 *** (.0012)	0.057 *** (.0011)
Provincial administration	0.266 *** (.0004)	0.178 *** (.0014)	0.209 *** (.0013)	0.177 *** (.0013)	0.275 *** (.0015)	0.232 *** (.0013)	0.310 *** (.0013)	0.316 *** (.0013)	0.445 *** (.0014)	0.401 *** (.0012)	0.258 *** (.0014)	0.206 *** (.0011)	0.129 *** (.0011)
Local administration	0.269 *** (.0004)	0.157 *** (.0014)	0.225 *** (.0012)	0.183 *** (.0013)	0.210 *** (.0015)	0.167 *** (.0013)	0.303 *** (.0014)	0.311 *** (.0013)	0.450 *** (.0014)	0.386 *** (.0012)	0.288 *** (.0014)	0.256 *** (.0011)	0.184 *** (.0010)
R ²	0.5164	0.4944	0.4890	0.4982	0.5113	0.5214	0.5255	0.5265	0.5250	0.5214	0.5196	0.5464	0.5421
Sample size	678,563	55,071	56,071	56,170	55,896	56,292	56,527	57,791	56,883	57,474	57,471	55,174	57,753

Note: See notes for Table 2.

Table 6 addresses the potential cyclicity of public sector wage premiums by using the public sector coefficient estimates from Table 5, and calculating correlation coefficients between these and the Alberta unemployment and employment rates using their contemporaneous values, as well as their values lagged one year. Conducting this exercise may give us some insights into the movements of the public sector premium over the business cycle, considering that wage adjustments may not be immediate.

TABLE 6 CORRELATION COEFFICIENTS, ALBERTA, PUBLIC SECTOR WAGE PREMIUMS AND UNEMPLOYMENT AND EMPLOYMENT RATES (CURRENT AND ONE YEAR)

	Unemployment Rate		Employment Rate	
	Current	One-year lag	Current	One-year lag
Public employee, not administration	0.108	0.408	-0.304	-0.576
Federal	-0.501	-0.458	0.394	0.382
Provincial	-0.223	-0.179	0.108	0.193
Local	-0.138	-0.057	-0.017	-0.027

Notes: Public sector premiums are from the coefficients in Table 5. Unemployment and employment rates are from Statistics Canada (2019).

The results show a weak positive correlation with the unemployment rate and a stronger negative correlation with the employment rate – as reflected in the wage premium for public employees who are not in administration (by far the largest subgroup). This is as expected. For the other groups, the correlations coefficients have signs the opposite of expectations and/or the correlations are weak.

In sum, it is only public employees not in administration who exhibit the expected counter- cyclicity of wages. The apparent lack of response of the wage differential over the business cycle could be due to multi-year public sector union agreements not tied to the state of the Alberta economy at the time.

Oaxaca-Blinder Decompositions of Public Sector Wage Premium

In the preceding analysis, it was implicitly assumed that the rates of return to various individual and job attributes were identical for both private and public employees. As a result, any wage premium was simply the result of being employed in the public sector. However, this is a strong assumption and these rates of return may differ between sectors. Furthermore, as shown in Table 1, individual and job attributes of employees do differ between the two sectors and this will have an impact on pay differences. For example, in both Canada and Alberta, public employees have higher levels of education, work for larger firms, have longer job tenure and are more likely to be unionized, all of which are associated with higher wages. Conversely, public employees are also more likely to live in smaller communities and be female, factors normally associated with lower wages.

To account for these compositional effects as well as the possibility of different rates of return to individual and job attributes, we employ the popular method developed by Blinder (1973) and Oaxaca (1973) as outlined in Eq. (2). This allows us to show

which part of the mean wage differential is due to composition effects (the explained component) and which is due to differences in the rates of return to these attributes (the unexplained component).

Table 7 presents these results for Canada and Alberta, and for all of the definitions of public employees. For simplicity, only the unexplained part of any wage differential is included since this is what reflects any wage premium in these estimates. The decomposition itself can use the coefficient estimates for public employees as the reference group (in which case, these are weighted as one, or $W=1$), or the coefficient estimates for private employees ($W=0$). The use of these provides upper and lower bounds on the unexplained portion of any wage differential. Finally, we use the weight of the public sector, which differs depending on the public employee definition used and provides estimates between the upper and lower bounds. These are the estimates that will mainly be discussed below and are highlighted in Table 7.

**TABLE 7 DECOMPOSITIONS OF PUBLIC SECTOR WAGE DIFFERENTIALS,
BY PUBLIC SECTOR JOB TYPE, CANADA AND ALBERTA
(STANDARD ERRORS ARE IN PARENTHESES)**

	(1)		(2)		(3)		(4)		(5)	
	Public, not admin (w/o ind)		Public, not admin (w/ ind)		Federal		Provincial		Local	
Canada										
Total log differentials	0.267	***	0.267	***	0.392	***	0.344	***	0.334	***
	(.0000)		(.0000)		(.0001)		(.0001)		(.0001)	
Unexplained (W=1)	0.089	***	0.095	***	0.158	***	0.169	***	0.169	***
	(.0001)		(.0001)		(.0003)		(.0003)		(.0002)	
% unexplained	33.42		35.50		40.33		49.09		50.60	
Unexplained (W=0)	0.051	***	0.051	***	0.096	***	0.075	***	0.089	***
	(.0000)		(.0001)		(.0001)		(.0001)		(.0002)	
% unexplained	19.02		19.05		24.37		21.91		26.59	
Unexplained (W=sample weight)	0.060	***	0.061	***	0.098	***	0.079	***	0.091	***
	(.0000)		(.0001)		(.0001)		(.0001)		(.0002)	
% unexplained	22.36		22.84		25.04		22.82		27.28	
Public sector sample weight	0.2325		0.2325		0.0416		0.0331		0.0292	
Sample size	5,645,780		5,645,780		4,521,490		4,481,820		4,463,640	
Private sector	4,333,260		4,333,260		4,333,260		4,333,260		4,333,260	
Public sector	1,312,520		1,312,520		188,230		148,560		130,380	
Alberta										
Total log differentials	0.181	***	0.181	***	0.191	***	0.300	***	0.293	***
	(.0001)		(.0001)		(.0002)		(.0002)		(.0002)	
Unexplained (W=1)	0.033	***	0.059	***	0.022	***	0.136	***	0.150	***
	(.0002)		(.0006)		(.0007)		(.0006)		(.0009)	
% unexplained	18.32		32.45		11.31		45.37		50.97	
Unexplained (W=0)	0.039	***	0.054	***	0.007	***	0.093	***	0.072	***
	(.0001)		(.0002)		(.0003)		(.0002)		(.0004)	
% unexplained	21.47		29.91		3.46		31.10		24.51	
Unexplained (W=sample weight)	0.038	***	0.055	***	0.007	***	0.094	***	0.074	***
	(.0001)		(.0002)		(.0003)		(.0002)		(.0004)	
% unexplained	20.92		30.40		3.60		31.40		25.26	
Public sector sample weight	0.1846		0.1848		0.0175		0.0216		0.0295	
Sample size	641,270		641,370		532,160		534,400		538,740	
Private sector	522,870		522,870		522,870		522,870		522,870	
Public sector	118,400		118,500		9,290		11,530		15,870	

Note: Sample sizes are rounded slightly to satisfy Statistics Canada vetting requirements.

For Canada, the top panel shows the total log real wage differential, reflecting the pattern in raw real wage differentials presented in Table 1. The unexplained decomposition results (when weighted at the public sector sample weight), show that about one-quarter of the total wage differential is unexplained for each of the public employee definitions for all of Canada. The group of public employees not in administration are paid about a 6.0-per-cent premium regardless of whether we control for industry (columns 1 and 2). This premium is about 9.8 per cent for federal administration employees, falling to 7.9 per cent and 9.1 per cent for provincial and local administration employees, respectively.¹²

For Alberta, the total wage differentials show a similar pattern, with between about three and 31 per cent of the total wage premium left unexplained. Public employees in Alberta do tend to have higher mean wages compared to all of Canada, but private employees in Alberta have an even larger relative wage gap (see Table 1), both of which account for the overall lower wage differential between the sectors in the province. Alberta public employees not in administration are paid a 3.8- to 5.5-per-cent premium, depending on whether the industry is controlled. Federal administration employees in Alberta are paid relatively poorly compared to others at this level across Canada, with an unexplained premium of 0.7 per cent. Provincial and local administration employees have premiums closer to the national average at 9.4 per cent and 7.4 per cent, respectively.

To summarize, the decompositions show that the public employee wage premium is generally lower in Alberta, with the exception of employees in provincial administration where the 9.4-per-cent premium exceeds the national average of 7.9 per cent. Curiously, federal administration workers throughout the country have the highest premium of 9.8 per cent while those in Alberta have essentially no premium.

Do public sector wage differentials change across the wage distribution?

The analysis above shows the public sector wage differential for different types of public employees in Canada and Alberta, and what proportion of this differential remains unexplained when controlling for the different compositions of public and private employees. In all cases, differences in mean wages are addressed, but this obviously says nothing about if and where in the wage distribution these differences may be larger or smaller. For example, the public sector is generally considered to have a more compressed wage distribution and, as a result, at the lower tail of the distribution the wage premium may be higher, while at the upper tail it may be smaller or even negative. Both of these would be hidden in the mean results presented above.

Table 8a runs our model for both Canada and Alberta again, but this time using unconditional quantile regressions (i.e., Eq. (3) in the methodology section). This technique allows for the easy interpretation of coefficient estimates; unlike conditional quantile regressions, this method can be used to estimate the impact of a change in an explanatory variable on the quantile of the unconditional distribution of the outcome

¹²

Since these types of decompositions can be sensitive to the omitted categorical variables, we performed robustness checks leaving out a different province, industry and occupation in selected regressions. This did not change the results presented here.

variable (see above). OLS results from Table 3a are in the left column and are included for comparison purposes. Again, results for Canada are in the top panel and those for Alberta in the lower panel.

In each case, there is a great deal of heterogeneity in estimates as we move up the wage distribution. For public employees for all of Canada, for example, the OLS estimate of 5.9 per cent masks the median wage premium of 9.5 per cent as well as the premium of 3.4 per cent at the 10th quantile and the premiums of 1.8 per cent and 2.5 per cent at the 75th and 90th quantiles, respectively. The estimates for the three levels of public administration show a similar pattern: the highest premiums are generally in the middle of the distribution, and the lowest are in the lower and upper tails. However, these premiums are higher in all cases compared to employees not working in administration. Again, the omitted industry category is agriculture, forestry, fishing and hunting – a low-paying industry – which is impacting these premiums.

TABLE 8A PUBLIC SECTOR REAL WAGE PREMIUMS BY PUBLIC SECTOR JOB TYPE, CANADA AND ALBERTA, UNCONDITIONAL QUANTILE REGRESSIONS, NO DECOMPOSITION (STANDARD ERRORS ARE IN PARENTHESES)

	Canada					
	OLS	q=0.10	q=0.25	q=0.50	q=0.75	q=.90
Public employee, not admin	0.059 *** (.0000)	0.034 *** (.0001)	0.126 *** (.0001)	0.095 *** (.0001)	0.018 *** (.0001)	0.025 *** (.0001)
Federal administration	0.209 *** (.0001)	0.158 *** (.0002)	0.222 *** (.0002)	0.313 *** (.0002)	0.223 *** (.0002)	0.142 *** (.0002)
Provincial administration	0.183 *** (.0001)	0.179 *** (.0002)	0.249 *** (.0002)	0.246 *** (.0002)	0.161 *** (.0002)	0.100 *** (.0002)
Local administration	0.200 *** (.0001)	0.177 *** (.0002)	0.246 *** (.0002)	0.296 *** (.0002)	0.179 *** (.0002)	0.117 *** (.0002)
R ²	0.5278	0.2392	0.3474	0.3870	0.3373	0.2239
Sample size	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733
	Alberta					
	OLS	q=0.10	q=0.25	q=0.50	q=0.75	q=.90
Public employee, not admin	0.042 *** (.0001)	0.031 *** (.0002)	0.096 *** (.0002)	0.061 *** (.0002)	0.002 *** (.0002)	0.004 *** (.0002)
Federal administration	0.190 *** (.0004)	0.303 *** (.0009)	0.286 *** (.0007)	0.360 *** (.0006)	0.008 *** (.0006)	-0.073 *** (.0006)
Provincial administration	0.266 *** (.0004)	0.309 *** (.0009)	0.322 *** (.0006)	0.438 *** (.0006)	0.164 *** (.0006)	0.041 *** (.0006)
Local administration	0.269 *** (.0004)	0.308 *** (.0008)	0.329 *** (.0006)	0.423 *** (.0006)	0.179 *** (.0006)	0.081 *** (.0006)
R ²	0.5164	0.2718	0.3558	0.3794	0.3125	0.2089
Sample size	678,563	678,563	678,563	678,563	678,563	678,563

Note: See notes for Table 2.

The pattern of the estimates for Alberta is similar: the highest premiums are in the middle of the distribution with the lower premiums at the tails. The difference is that compared to the national estimates, the premiums for those not in administration tend to be smaller while those in administration tend to have higher premiums at the median and below, and lower premiums at the 75th quantile and above. For example, public employees not in administration at the 10th quantile have a 3.1-per-cent premium, with those at the 75th and 90th quantiles having premiums that are essentially zero. The pattern for federal employees shows large wage premiums at the median and below, with those at the 90th quantile having a wage penalty of 7.3 per cent. Provincial and local employees, by contrast, have wage premiums throughout the distribution, with those at the 90th quantile having premiums of 4.1 per cent and 8.1 per cent, respectively. Since we are controlling for industry in these models, and since all public administration employees are in the same industry, the coefficient estimate for public employees not in administration reflects the premium at each quantile level for being a public employee compared to being a private employee, whereas the coefficients for the different levels of public administration are relative to the omitted industry category which is agriculture, forestry, fishing and hunting in Table 8a.

As noted, agriculture is the industry with among the lowest wages when other characteristics are controlled and so estimates of wages for those in federal, provincial and local administration tend to look relatively large. We repeat the exercise performed earlier on the OLS estimates in Table 3b and omit the mining, quarrying, and oil and gas extraction industry from the model, the industry with the highest wages in both Canada and Alberta when all other variables are controlled. The results are presented in Table 8b with the OLS results from Table 3b replicated in the first column for comparison purposes.

The coefficients for public employees not in administration are identical to those in Table 8a since they are not sensitive to the choice of omitted industry variable. Now, the coefficient estimates for the administration employees at all three levels of government are largely negative, although the same basic pattern seen in Table 8a is preserved with public employees in administration having larger penalties at the top of the wage distribution. For example, federal employees in Alberta at the 90th quantile have a 38.2 per cent wage penalty relative to otherwise comparable employees in the mining, quarrying, and oil and gas extraction industry, whereas in Table 8a, with the agriculture industry as the comparator, the wage penalty was only 7.3 per cent.

Decomposing the Unconditional Quantile Regressions

The use of unconditional quantile regressions in Tables 8a and 8b suffers from the same limitation as the OLS estimation: we are assuming that the rates of return to various attributes are identical for both private and public employees. This could be a serious limitation if, for example, the returns to schooling are much higher in the public sector. Here, we run separate unconditional quantile regressions for the group of private employees and the four groups of public employees and then use Eq. (4) to decompose the results at five different quantile levels.¹³ These results are presented in Tables 9a

¹³

The Stata commands “rifreg” and “oaxaca8” are used for all estimates in Tables 9a-9d.

through 9d.¹⁴ The unexplained portions of the total wage differential using the public employees' share of total employment is highlighted in each case, as was done in Table 7.

TABLE 8B PUBLIC SECTOR REAL WAGE PREMIUMS BY PUBLIC SECTOR JOB TYPE, CANADA AND ALBERTA, UNCONDITIONAL QUANTILE REGRESSIONS, NO DECOMPOSITION (STANDARD ERRORS ARE IN PARENTHESES)

	Canada					
	OLS	q=0.10	q=0.25	q=0.50	q=0.75	q=.90
Public employee, not admin	0.059 *** (.0000)	0.034 *** (.0001)	0.126 *** (.0001)	0.096 *** (.0001)	0.018 *** (.0001)	0.025 *** (.0001)
Federal administration	-0.114 *** (.0001)	-0.031 *** (.0001)	-0.054 *** (.0001)	-0.054 *** (.0001)	-0.174 *** (.0002)	-0.205 *** (.0002)
Provincial administration	-0.140 *** (.0001)	-0.010 *** (.0001)	-0.027 *** (.0001)	-0.121 *** (.0001)	-0.237 *** (.0002)	-0.249 *** (.0002)
Local administration	-0.123 *** (.0001)	-0.012 *** (.0001)	-0.030 *** (.0001)	-0.071 *** (.0001)	-0.218 *** (.0002)	-0.230 *** (.0002)
R ²	0.5278	0.2392	0.3474	0.3870	0.3373	0.2339
Sample size	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733	6,118,733
	Alberta					
	OLS	q=0.10	q=0.25	q=0.50	q=0.75	q=.90
Public employee, not admin	0.042 *** (.0001)	0.031 *** (.0002)	0.096 *** (.0002)	0.061 *** (.0002)	0.002 *** (.0002)	0.004 *** (.0002)
Federal administration	-0.176 *** (.0002)	-0.026 *** (.0003)	-0.064 *** (.0031)	-0.100 *** (.0004)	-0.320 *** (.0004)	-0.382 *** (.0005)
Provincial administration	-0.100 *** (.0002)	-0.020 *** (.0003)	-0.029 *** (.0003)	-0.022 *** (.0003)	-0.164 *** (.0004)	-0.268 *** (.0005)
Local administration	-0.097 *** (.0002)	-0.021 *** (.0002)	-0.021 *** (.0002)	-0.038 *** (.0003)	-0.149 *** (.0004)	-0.228 *** (.0005)
R ²	0.5164	0.2718	0.3558	0.3794	0.3125	0.2089
Sample size	678,563	678,563	678,563	678,563	678,563	678,563

Note: See notes for Table 2.

¹⁴

As with the previous decompositions in Table 7, we are not able to control for industry in general due to multicollinearity. The exception is for the case of public employees who are not in administration since both private and public employees are employed in all industries that are not public administration.

For all public employees not in administration throughout Canada, the top panel of Table 9a shows the premiums relative to their private sector counterparts with the same attributes. The (now) familiar pattern of a declining overall wage differential is again seen as we move up into higher quantiles, as does the unexplained portion, becoming essentially zero at the 50th quantile and above. Similarly, for Alberta the overall wage differential is smaller, but the same declining wage differential pattern exists, albeit with wage premiums turning into penalties above the median.¹⁵

For federal employees in Canada, similar patterns are exhibited in Table 9b - namely, that the overall differential declines moving from lower to higher quantiles and that the premium at each quantile level is lower for Alberta. The interesting result is at the 75th and 90th quantiles in Alberta where the unexplained portion is negative, implying that federal employees at this point in the wage distribution are paid less than they would be in the private sector, i.e., a wage penalty relative to their private employee counterparts.

Table 9c compares provincial employees to private employees at each quantile for both Canada and Alberta. The same patterns described above are generally preserved, with overall wage differentials lower in Alberta than nationally. The exception is the earnings differential for provincial employees in Alberta which is now much closer to that for all provincial employees in Canada (and in fact higher at the 50th quantile). Again, however, wage penalties are the norm for those above the median for both Canada and Alberta.

¹⁵

The exercise in Table 9a was also conducted including the categorical variables for industry. Again, this is the only case where this can be done because there are both public non-administration employees and private employees who work in each of the 19 industries. The estimates for Canada do not change by more than about two percentage points in any case. For Alberta, the pattern of the results does not change, although the premiums are slightly higher at the upper tail of the wage distribution (e.g., 0.8 per cent at the 90th quantile) and slightly lower at the lower tail (e.g., 7.0 per cent at the 10th quantile).

**TABLE 9A DECOMPOSITION OF PUBLIC SECTOR REAL WAGE PREMIUMS,
BY QUANTILE, PUBLIC SECTOR NOT ADMINISTRATION, CANADA
AND ALBERTA (STANDARD ERRORS ARE IN PARENTHESES)**

	Canada									
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.411	***	0.338	***	0.288	***	0.241	***	0.119	***
	(.0000)		(.0000)		(.0000)		(.0000)		(.0000)	
Unexplained (W=1)	0.156	***	0.182	***	0.055	***	0.097	***	0.071	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0001)	
% unexplained	37.96		53.78		18.93		40.36		59.58	
Unexplained (W=0)	0.218	***	0.098	***	-0.012	***	-0.030	***	-0.016	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0001)	
% unexplained	53.09		28.83		-4.24		-12.26		-13.28	
Unexplained (W=sample weight)	0.204	***	0.117	***	0.003	***	0.000		0.004	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0001)	
% unexplained	49.56		34.62		1.14		-0.04		3.61	
Sample size	5,645,783		5,645,783		5,645,783		5,645,783		5,645,783	
Private sector	4,333,263		4,333,263		4,333,263		4,333,263		4,333,263	
Public sector	1,312,520		1,312,520		1,312,520		1,312,520		1,312,520	
Public sector sample weight	0.2325		0.2325		0.2325		0.2325		0.2325	
	Alberta									
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.283	***	0.239	***	0.215	***	0.168	***	0.027	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0001)	
Unexplained (W=1)	0.025	***	0.075	***	0.004	***	0.055	***	0.024	***
	(.0005)		(.0003)		(.0003)		(.0002)		(.0002)	
% unexplained	8.73		31.45		1.95		32.68		88.19	
Unexplained (W=0)	0.131	***	0.024	***	0.057	***	-0.035	***	-0.050	***
	(.0002)		(.0002)		(.0003)		(.0003)		(.0003)	
% unexplained	46.36		10.02		26.65		-20.93		-184.13	
Unexplained (W=sample weight)	0.112	***	0.033	***	0.048	***	-0.019	***	-0.036	***
	(.0002)		(.0002)		(.0002)		(.0003)		(.0003)	
% unexplained	39.43		13.96		22.09		-11.03		-133.95	
Sample size	641,365		641,365		641,365		641,365		641,365	
Private sector	522,865		522,865		522,865		522,865		522,865	
Public sector	118,500		118,500		118,500		118,500		118,500	
Public sector sample weight	0.1848		0.1848		0.1848		0.1848		0.1848	

Note: Sample sizes are rounded slightly to satisfy Statistics Canada vetting requirements.

**TABLE 9B DECOMPOSITION OF PUBLIC SECTOR REAL WAGE PREMIUMS,
BY QUANTILE, FEDERAL ADMINISTRATION, CANADA AND ALBERTA
(STANDARD ERRORS ARE IN PARENTHESES)**

	Canada									
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.570	***	0.520	***	0.427	***	0.317	***	0.213	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0001)	
Unexplained (W=1)	0.057	***	0.243	***	0.188	***	0.201	***	0.166	***
	(.0010)		(.0005)		(.0003)		(.0002)		(.0002)	
% unexplained	9.97		46.84		44.11		63.32		78.01	
Unexplained (W=0)	0.317	***	0.219	***	0.046	***	-0.042	***	-0.048	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0002)	
% unexplained	55.60		42.19		10.71		-13.21		-22.41	
Unexplained (W=sample weight)	0.306	***	0.220	***	0.052	***	-0.032	***	-0.039	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0002)	
% unexplained	53.70		42.38		12.10		-10.00		-18.22	
Sample size	4,521,493		4,521,493		4,521,493		4,521,493		4,521,493	
Private sector	4,333,263		4,333,263		4,333,263		4,333,263		4,333,263	
Public sector	188,230		188,230		188,230		188,230		188,230	
Public sector sample weight	0.0416		0.0416		0.0416		0.0416		0.0416	
Alberta										
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.354	***	0.239	***	0.208	***	0.101	***	-0.009	***
	(.0006)		(.0001)		(.0003)		(.0003)		(.0003)	
Unexplained (W=1)	-0.099	***	0.075	***	0.024	***	-0.019	***	-0.146	***
	(.0027)		(.0003)		(.0007)		(.0007)		(.0006)	
% unexplained	-27.89		31.45		11.46		-18.57		1567.74	
Unexplained (W=0)	0.150	***	0.024	***	0.014	***	-0.139	***	-0.103	***
	(.0007)		(.0002)		(.0004)		(.0005)		(.0006)	
% unexplained	42.49		10.02		0.01		-138.13		1111.61	
Unexplained (W=sample weight)	0.146	***	0.025	***	0.015	***	-0.137	***	-0.104	***
	(.0007)		(.0002)		(.0004)		(.0005)		(.0006)	
% unexplained	41.24		10.41		6.98		-136.04		1119.35	
Sample size	532,155		532,155		532,155		532,155		532,155	
Private sector	522,865		522,865		522,865		522,865		522,865	
Public sector	9,290		9,290		9,290		9,290		9,290	
Public sector sample weight	0.0175		0.0175		0.0175		0.0175		0.0175	

Note: Sample sizes are rounded slightly to satisfy Statistics Canada vetting requirements.

**TABLE 9C DECOMPOSITION OF PUBLIC SECTOR REAL WAGE PREMIUMS,
BY QUANTILE, PROVINCIAL ADMINISTRATION, CANADA AND ALBERTA
(STANDARD ERRORS ARE IN PARENTHESES)**

	Canada									
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.511	***	0.435	***	0.369	***	0.288	***	0.189	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0001)	
Unexplained (W=1)	0.186	***	0.209	***	0.175	***	0.223	***	0.206	***
	(.0008)		(.0004)		(.0004)		(.0003)		(.0004)	
% unexplained	36.51		48.08		47.44		77.58		108.77	
Unexplained (W=0)	0.280	***	0.160	***	0.022	***	-0.037	***	-0.048	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0002)	
% unexplained	54.87		36.74		6.06		-12.72		-25.51	
Unexplained (W=sample weight)	0.277	***	0.161	***	0.027	***	-0.028	***	-0.040	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0002)	
% unexplained	54.28		37.11		7.43		-9.75		-21.04	
Sample size	4,481,823		4,481,823		4,481,823		4,481,823		4,481,823	
Private sector	4,333,263		4,333,263		4,333,263		4,333,263		4,333,263	
Public sector	148,560		148,560		148,560		148,560		148,560	
Public sector sample weight	0.0331		0.0331		0.0331		0.0331		0.0331	
Alberta										
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.441	***	0.399	***	0.331	***	0.236	***	0.129	***
	(.0005)		(.0002)		(.0002)		(.0002)		(.0003)	
Unexplained (W=1)	0.012	***	0.222	***	0.215	***	0.222	***	0.103	***
	(.0027)		(.0007)		(.0006)		(.0006)		(.0005)	
% unexplained	2.65		55.73		65.03		94.10		79.72	
Unexplained (W=0)	0.243	***	0.139	***	0.119	***	-0.019	***	-0.072	***
	(.0005)		(.0003)		(.0003)		(.0003)		(.0004)	
% unexplained	55.10		34.90		35.95		-7.88		-56.20	
Unexplained (W=sample weight)	0.238	***	0.141	***	0.121	***	-0.013	***	-0.069	***
	(.0005)		(.0003)		(.0003)		(.0003)		(.0004)	
% unexplained	53.97		35.35		36.58		-5.67		-53.22	
Sample size	534,395		534,395		534,395		534,395		534,395	
Private sector	522,865		522,865		522,865		522,865		522,865	
Public sector	11,530		11,530		11,530		11,530		11,530	
Public sector sample weight	0.0216		0.0216		0.0216		0.0216		0.0216	

Note: Sample sizes are rounded slightly to satisfy Statistics Canada vetting requirements.

**TABLE 9D DECOMPOSITION OF PUBLIC SECTOR REAL WAGE PREMIUMS,
BY QUANTILE, LOCAL ADMINISTRATION, CANADA AND ALBERTA
(STANDARD ERRORS ARE IN PARENTHESES)**

	Canada									
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.465	***	0.446	***	0.381	***	0.280	***	0.170	***
	(.0001)		(.0001)		(.0001)		(.0001)		(.0001)	
Unexplained (W=1)	0.105	***	0.245	***	0.213	***	0.166	***	0.130	***
	(.0007)		(.0004)		(.0004)		(.0002)		(.0002)	
% unexplained	22.60		54.88		55.84		59.29		76.35	
Unexplained (W=0)	0.249	***	0.197	***	0.060	***	-0.025	***	-0.039	***
	(.0003)		(.0002)		(.0003)		(.0004)		(.0006)	
% unexplained	53.60		44.25		15.71		-8.81		-22.71	
Unexplained (W=sample weight)	0.245	***	0.199	***	0.064	***	-0.019	***	-0.034	***
	(.0003)		(.0002)		(.0003)		(.0004)		(.0001)	
% unexplained	52.70		44.56		16.87		-6.81		-19.82	
Sample size	4,463,643		4,463,643		4,463,643		4,463,643		4,463,643	
Private sector	4,333,263		4,333,263		4,333,263		4,333,263		4,333,263	
Public sector	130,380		130,380		130,380		130,380		130,380	
Public sector sample weight	0.0292		0.0292		0.0292		0.0292		0.0292	
Alberta										
	q=0.10		q=0.25		q=0.50		q=0.75		q=.90	
Total log differentials	0.439	***	0.397	***	0.346	***	0.223	***	0.095	***
	(.0004)		(.0003)		(.0003)		(.0002)		(.0002)	
Unexplained (W=1)	0.133	***	0.227	***	0.121	***	0.131	***	0.062	***
	(.0035)		(.0018)		(.0005)		(.0003)		(.0005)	
% unexplained	30.35		57.11		34.88		58.83		0.00	
Unexplained (W=0)	0.217	***	0.130	***	0.106	***	-0.071	***	-0.073	***
	(.0006)		(.0006)		(.0006)		(.0008)		(.0009)	
% unexplained	49.39		32.61		30.56		-31.73		-76.85	
Unexplained (W=sample weight)	0.215	***	0.132	***	0.106	***	-0.065	***	-0.069	***
	(.0006)		(.0006)		(.0006)		(.0008)		(.0009)	
% unexplained	48.84		33.32		30.70		-29.03		-72.56	
Sample size	538,735		538,735		538,735		538,735		538,735	
Private sector	522,865		522,865		522,865		522,865		522,865	
Public sector	15,870		15,870		15,870		15,870		15,870	
Public sector sample weight	0.0295		0.0295		0.0295		0.0295		0.0295	

Note: Sample sizes are rounded slightly to satisfy Statistics Canada vetting requirements.

Finally, local employees and private employees are compared in Table 9d. Again, we see the same general patterns as above, and with local employees at the 75th and 90th quantile having negative wage premiums for both jurisdictions.

To summarize, the unconditional quantile regression decompositions show that the public employee premium is not constant across the wage distribution; rather, premiums are higher at the lower tail and lower (and sometimes negative) at the upper tail, with premiums in Alberta generally less than those nationally. This pattern is consistent for all four public employee definitions.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

The existing literature on public-private sector wage differentials in Canada generally shows an overall public sector wage premium with heterogeneity between different definitions of the public sector, genders and at different points of the wage distribution. The results of this research show that public employees in Canada – at least those who are not involved in public administration – continue to be paid a wage premium of about 5.9 per cent when estimating using a simple OLS model, which also controls for the all demographic and job-related variables, including occupation and industry. In Alberta, the comparable figure is 4.2 per cent.

For those in public administration who, by definition, are all part of the same industry, comparisons are more difficult and whether a wage premium or penalty exists depends on the industry used as a comparator. When agriculture, forestry, fishing and hunting (a low-wage industry) is the comparator, wages for public employees in administration are relatively high, with a maximum estimated wage premium of about 21 per cent for federal administration workers throughout Canada, and a high of about 27 per cent for provincial and local administration employees in Alberta. However, when mining, quarrying, and oil and gas extraction (a high-wage industry) is the comparator, these premiums decrease by over 30 percentage points in both Canada and Alberta and become double-digit wage penalties (up to about 18 per cent in the case of federal administration employees in Alberta).

Comparing the wage differentials of Alberta public employees to national and other provincial averages, non-administration and federal workers in Alberta have somewhat lower premiums than the average, while provincial and local employees in Alberta have wages that are somewhat higher. Across provinces and types of government employment, there is a great deal of heterogeneity in wage premiums, but Alberta does not stand out in any uniform fashion, with some other provinces having both higher and lower premiums for each public employee definition.

When the sample is limited to include only those employees – either private or public – not involved in public administration, we find a public sector premium in some industries, but a penalty in others, although the overall wage premium does not change much for either Canada or Alberta (decreasing to 5.6 per cent and 3.7 per cent, respectively). We interpret this as meaning that competition between the public and private sectors is not acting to equate wages, at least at the aggregate level. Another interpretation is

that there is something unobservable (at least in our data) that is possessed by public employees in the public sector and that is related to higher overall wages.

Addressing the wage differentials in Alberta for each year between 2006 and 2017 does not appear to yield the pattern we expected – namely, that this differential should increase during Alberta’s two recessions over this period – at least in simple OLS models. Drilling a little deeper by calculating correlations coefficients using the estimated public sector wage differentials from these models, as well as two each of unemployment and employment rates (current and lagged one year), provides some evidence that the public sector wage differential increases during recessionary periods, but only for those not in administration. For the three groups involved at various levels of administration, the correlations coefficients have the incorrect sign and/or are small in magnitude.

Simple Oaxaca-Blinder decompositions of earning differentials uncover a great deal of heterogeneity by public sector employee type, with those at the federal level in Canada having the highest premium at 9.8 per cent while provincial employees in Alberta have the highest premium at 9.4 per cent.

Using unconditional quantile regressions, we find that there is variance in the public sector wage premium throughout the wage distribution and by different definitions of the public sector. In general, across Canada these public sector wages tend to be higher in the middle of the wage distribution compared to the tails, and higher among federal employees. For Alberta, the federal employee premium tends to be lower, and even negative at the top of the distribution, while provincial and local employees tend to have the highest wage premiums throughout the distribution.

Decomposing the unconditional quantile regression estimates results in similar estimates, but generally, the premiums are higher at the lower tail and lower (and often negative) at the upper tail of the distributions, with premiums for Alberta public employees generally lower than those for their national counterparts.

For policy purposes, which estimates are the most appropriate? The answer depends on what the policy objectives are. Attempting to ascertain the total potential savings that could be realized by cutting public sector compensation would use the mean wage differentials at the relevant level of public services. This would give a reasonable dollar estimate of the total savings that are possible by reducing compensation across the board. Implementation of such a blanket policy, however, would almost certainly be inappropriate given the estimated wage premiums across the wage distribution.

For example, the 2018-2019 Alberta budget (Government of Alberta 2018) includes \$56.2 billion of total expenditures, \$21.6 billion of which is budgeted for salaries, wages and employee benefits. Stated differently, 38.4 per cent of Alberta government expenditures are earmarked for compensation to the 210,104 full-time equivalent employees, some \$102,773 per employee. The same budget estimates a deficit of \$8.8 billion for the

fiscal year. If we use an overall Alberta public sector wage premium of 3.7 per cent,¹⁶ and assuming that provincial employee non-wage benefits are also 3.7 per cent higher than those in the private sector and that all those compensated at the provincial level (i.e., both those in and out of public administration) also have this total compensation premium, it implies that a mean 3.7-per-cent decrease in total compensation would be possible without disrupting government services. This would save the government \$799.2 million, or about 9.1 per cent of the budget deficit. This figure could be somewhat larger if the savings in compensation at the municipal level of government (where wage premiums are similar) were to be realized and this resulted in smaller grants to municipal governments. However, given the total of \$1.15 billion for municipal affairs in this budget, these savings would be minimal, at least in terms of the provincial budget (although local governments may be able to save on their budgets as well).

That said, an across-the-board cut in public sector wages in Alberta would result in the continued overpayment of those at the lower tail, while potentially exacerbating the wage penalty at the upper tail of the same distribution. Thus, government must be cognizant of the fact that any wholesale changes to wages would have quite different effects at different points of the wage distribution – namely, the potential and continuing overpayment of those whose earnings are relatively low, and the reduction of wages of those at the upper tail who may be poached by other public sector jurisdictions or the private sector. While public employees' wages do tend to be higher than private employees' wages in Alberta, they are also higher elsewhere, and Alberta does tend to be on the low end, especially given the importance of the high-paying resource extraction industry in the province.

Several caveats regarding the results of this research must be mentioned. First, this paper has not addressed the sources of the wage differentials noted above. These could be the result of (say) higher returns to various attributes that are higher in the public sector compared to the private sector (e.g., higher rates of return to unionization). Unpacking these sources is certainly a fruitful avenue for future research. Second, and related to the first point, is that there may be unobservable individual characteristics (or at least unobserved in these data) that are rewarded in the public sector, but not the private sector, and these could be driving wage differentials. Factors such as superior language skills, motivation and other productivity-enhancing characteristics would result in a wage premium and yet not be explained by the previous analysis. In other words, public sector workers may be the cream of the crop and are rewarded as such on characteristics that cannot be observed in our data. Third, our analysis does not extend to the extreme lower and upper tails of the wage distribution owing to small sample sizes (e.g., the first and 99th quantiles). In the case of the upper tail, the lack of adequate compensation has often been blamed for government's inability to attract and retain talent at these ranks, in particular senior managers. Fourth, the current research says nothing about how any wage differentials differ along gender lines (as suggested by previous research). Fifth,

¹⁶

This is the estimate from Table 4, our apples-to-apples comparison of the two sectors for those not involved in public administration. This figure is chosen since this group of public employees accounts for 75 per cent of all public sector employees in Alberta (see Table 1) and this estimate is not sensitive to the choice of comparator industry as is the case with those employed in public administration. We consider this to be the most accurate estimate on the public sector wage differential in Alberta.

risk aversion by public sector employees that could result in selectivity bias into this sector and, insofar as stable employment (or at least what is perceived to be stable) is a compensating differential for these individuals, wage premiums may be underestimated. Finally, other compensation – health benefits, defined pension plans, etc., which are normally considered to be more generous in the public sector – means that the total compensation differentials between the sectors could be larger than reported. Again, a more detailed analysis would be required to ascertain total compensation differentials.

In addition to these factors, it is imperative to emphasize that changing government employee compensation is certain to have macroeconomic effects as well as impacts on the private sector labour market. Thus, any modifications to public employees' compensation cannot be considered in a partial equilibrium framework and it is important to realize and understand how any changes might filter through the economy. Changes to overall employment and compensation, tax revenues and economic growth are but a few of the metrics that could be affected.

APPENDIX

TABLE A1 SELECTED PREVIOUS RESEARCH ON PUBLIC SECTOR WAGE DIFFERENTIALS

Paper	Data	Findings
Gunderson (1979)	Census, 1971	8.6% premium for women, 6.2% for men. Public sector rent higher for low-wage workers.
Robinson and Tomes (1984)	Social Change in Canada Survey, 1979	Allowed for the endogeneity of union status and found reduced public sector wage differentials.
Simpson (1985)	Labour Canada Wages Survey, 1974	Higher public sector earnings appear to be due to the higher incidence of public sector unionization.
Shapiro and Stelcner (1989)	Census, 1981	12.2% premium for women, 4.2% for men. Public sector rent higher for low-wage workers.
Robinson (1995)	Survey of Union Membership, a supplement to the Labour Force Survey, December 1984	Public sector wage differential dependent on empirical model specification. If private sector union coverage were as high as that in the public sector, the public sector wage premium would be negative.
Mueller (1998)	Labour Market Activity Survey, 1990	Using a broad definition of public sector workers (which include health and education workers), there is no premium for male workers, a small premium of 2.7% for those involved in public administration, with those in federal administration having a 6.1% premium and those at the provincial level having a wage penalty of 2.6%. Females have a premium at all levels of the public service. Any wage premiums are higher at the lower tail of the wage distribution. Many premiums become penalties at the top of the wage distribution.
Prescott and Wandschneider (1999)	Survey of Consumer Finances, 1982 and 1991	14.3% for males and 25.0% for females in 1990; 15.1% for males and 15.7% for females in 1981. Comparisons to Gunderson (1979) and Shapiro and Stelcner (1989), results show an increasing public sector premium.
Mueller (2000)	Labour Market Activity Survey, 1988-1990	Decomposition: public sector wage advantage always higher for women; Fixed effects: public sector premium of up to 10% but only for females.
Fuller (2005)	LFS, PUMF 2002 (May and November)	No statistically significant premium for men, 15.3% premium for women.
Tiagi (2010)	LFS, 2008 (September only)	Males (females) earn a 5.4% (19.8%) premium; public (private) sector workers are positively (negatively) selected on observables.
Palacios, et al. (2016)	LFS PUMF 2013 (January-December)	Government workers have a 9.7% wage premium, decreasing to 6.2% when controlling for union status.

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