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PUBLIC AND PRIVATE SECTOR WAGES: HOW DOES ALBERTA COMPARE TO THE "BIG 3" PROVINCES?*

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ALBERTA FUTURES PROJECT PRE-PUBLICATION SERIES

Alberta has a long history of facing serious challenges to its economy, including shocks in the form of resource price instability, market access constraints, and federal energy policies. However, the recent and current challenges seem more threatening. It seems that this time is truly different.

The collapse of oil and gas prices in 2014 combined with the rapid growth of U.S. oil production, difficulties in obtaining approval for infrastructure to reach new markets and uncertainty regarding the impacts of climate change policies world-wide have proven to be strong headwinds for the province's key energy sector. Together, the negative effects on employment, incomes and provincial government revenues have been substantial. To make matters worse, in early 2020 the Covid-19 pandemic struck a major blow to the lives and health of segments of the population and to livelihoods in many sectors. The result has been further employment and income losses, more reductions in government revenues and huge increases in government expenditures and debt. These events, combined with lagging productivity, rapid technological shifts, significant climate policy impacts and demographic trends, call for great wisdom, innovation, collective action and leadership to put the province on the path of sustainable prosperity.

It is in this context that we commissioned a series of papers from a wide range of authors to discuss Alberta's economic future, its fiscal future and the future of health care. The plan is that these papers will ultimately be chapters in three e-books published by the School of Public Policy. However, in the interest of timeliness and encouraging discussion, we are releasing selected chapters as pre-publications.

INTRODUCTION

In their recent work on the state of Alberta's public finances, MacKinnon and Mintz (2017) note that relative to other provinces, public sector salaries in Alberta are relatively high and that Alberta could have saved about $2.1 billion in 2016 if public sector compensation was at the same level as the average of British Columbia, Ontario and Quebec. This point was further emphasized in the September 2019 report from the Blue Ribbon Panel on Alberta's Finances (2019). More commonly referred to as the MacKinnon Report, it argued that both the size and compensation of Alberta's public sector were larger than those of these comparator provinces. Both reports, however, use aggregated data that makes pinpointing any wage differences by occupation impossible. Ascertaining if and where any public sector wages premiums may exist requires a much more detailed and nuanced analysis.

The perennial work by the Fraser Institute on the topic (e.g., Palacios et al. 2019) offers the beginnings of such a detailed analysis. The authors utilize the Public Use Microdata File (PUMF) from the Labour Force Survey (LFS), aggregated over each of the 12 months of 2018, along with a simple human capital model with a dummy variable for public sector workers. They find that Alberta public sector workers earn wages 9.3 per cent higher on average than wages in the private sector, a figure which decreases to 6.2 per cent when union status is controlled. The LFS-PUMF, however, has two major limitations. First, it includes all public sector workers regardless of public sector definition. Thus, federal, provincial, local, Indigenous and (a small group of) international administration employees, as well as non-administration employees are all included in this definition. As a result, this estimate of the public sector wage premium is a weighted average of all public sector employees, regardless of level of government or function. For example, if (say) federal administration employees earn larger wage premiums, this could increase the overall premium while provincial employees may have no wage (or even a negative) premium. Second, while the authors do control for occupation and industry, there is a lack of detail which limits the usefulness of estimates for policy purposes since the results show the weighted average of all wage premiums (and penalties) without addressing how wage premiums may differ by occupation. Even if these estimates were done by occupation, the PUMF only includes a maximum of 40 aggregated occupations and thus lacks sufficient detail for our purposes. For example, teachers at all levels, college instructor, professors, and others in education are all considered one occupation ("professional occupations in educational services") in the LFS-PUMF.

Work by the Institute for Competitiveness and Prosperity (2012) is closest in intent to this research in addressing the wage premiums of various occupations in the public sector. It uses the LFS-PUMF over the 1997-2012 period to compare relative weekly earnings for public sector workers in Ontario, as well as in British Columbia, Quebec and Alberta. They limit their sample to include only those aggregated occupations which have significant representation in both the private and public sectors, a total of 18 two-digit (out of 47 in total) occupations using the 2006 National Occupational Classification System (NOCS). Using a standard human capital model, they find that these public sector earnings are generally higher in all provinces, with the exception of

Alberta where public sector earnings are either lower than those in the private sector or the gap between them is statistically indistinguishable from zero in all years, with the exception of 2008, the time of the international financial crisis when relative public sector earnings tended to spike. This paper also disaggregates the data into specific (albeit highly aggregated) occupations and finds that those in clerical occupations tend to have a weekly earnings premium, while those in managerial and professional occupations have a weekly earnings penalty. This pattern is found in Ontario and in the (aggregated) comparator provinces, although such details are not provided for any other province. Further, for policy purposes even this level of occupational detail in the PUMF may not be sufficient. For example, one of aggregated occupation groups includes lawyers, judges, psychologists, social workers, etc. Furthermore, the small numbers of some occupations in the private sector means that some comparisons were not made. Indeed, important occupations such as those in health care and education are largely not addressed in the study owing to these data limitations. Considering the number of public sector workers in these industries – and the importance they are playing in the current public sector debates in Alberta – this is a serious limitation. For example, Mueller (2019b) reports that about 64 per cent of Alberta's 420,605 public sector workers in the LFS-PUMF in 2016 were involved in the educational services and health care and social assistance industries. Another limitation of this study is that public sector workers are aggregated so that comparisons with the private sector include both those involved in public administration at the various levels of government (federal, provincial, etc.) as well as those in non-administration roles (including the majority of teachers, nurses, etc.). This is problematic since public sector workers cannot be identified by function or level of government. Furthermore, real weekly earnings are used as the outcome variable with no control for weekly hours worked. This could underestimate the hourly wage premium for public sector workers since they do tend to work fewer hours per week compared to those in the private sector. Similarly, using weekly earnings will also tend to overestimate any Alberta wage premium since Albertans tend to work longer hours compared to the national average in both the public and private sectors.[1]

The purpose of this research is twofold. First, to estimate the real wage premiums of the largest public sector occupations in Alberta compared to the same occupations in the private sector. For comparison purposes, this exercise is also performed for the three largest provinces: British Columbia, Ontario, and Quebec, the chosen comparators for much of what has been written on the topic recently (MacKinnon and Mintz 2017; Blue Ribbon Panel 2019). Second, to compare sectoral wages in Alberta with the other provinces, again using the largest public sector occupations in Alberta. Here we compare private sector real wages in Alberta to the other three provinces as well as the public sector wages using three definitions of the public sector: (1) the broad public sector which includes all employees in government administration at the federal, provincial, municipal levels, as well as a few individuals in international and Aboriginal

[1] Author's calculations using the aggregated monthly data from the 2016-2018 LFS-PUMF (using the same restrictions listed below in the data section). Public sector workers over this period in Alberta worked about 1.25 weekly hours less than those in the private sector. Overall, Albertans worked about between about 1 and 1.5 hours more those in British Columbia, Ontario and Quebec with the differential higher in the private sector.

administration, and the large number of individuals employed in non-administration; (2) only those in non-administration who are individuals in occupations related to education, health care, social assistance, and other non-administration occupations; and, (3) those employed in provincial administration.[2] It is these final two definitions that are important for policy purposes since these are largely under the purview of the provincial government. In sum, public sector wages relative to those in the private sector are estimated *within* each of Alberta and the three largest provinces are estimated, as are public and private sector wages *between* Alberta and the other provinces. Performing this exercise offers a much more detailed and nuanced treatment of public sector wage differentials in Alberta compared to the previous literature.

The findings suggest that public sector wages in Alberta are not, on average, out of line with public sector wages for comparable occupations in the three other provinces. When comparing wages within each province, Alberta public sector workers do tend to have higher hourly real wages compared to their private sector counterparts, but so to do public sector workers in the three other provinces, and the overall public sector premium for Alberta is generally smaller. When comparing these wages across provinces, Alberta's public sector wages are often higher than those in other provinces, but not as high as the province's private sector wage premium. These wage patterns are consistent with the argument that a robust energy sector in the province inflated private sector wages and these spilled over into the public sector.

DATA AND METHODOLOGY

Since we are interested in comparing the public sector wage premium *within* each of the four provinces, as well as the sectoral wage differentials *between* Alberta and the other three provinces, two simple models are utilized. First, comparisons between Alberta and the other three provinces for each sector (when cell counts are at least 100 observations). Thus, we compare the private sector and the public sector (using all three definitions) in Alberta to the other three provinces as:

$$lnw_i = X_i\beta + AB_i\gamma + \eta_i \quad (1)$$

where lnw_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, AB_i is a dummy variable for individuals in Alberta, γ is the Alberta wage differential within each sector relative to the comparator provinces, and η is the usual error term. This model is first estimated with all occupations that meet the inclusion criteria, and then estimated again by occupation where sample sizes permit.

[2] See Mueller (2019a) for details on how these categories are constructed.

Second, the standard human capital model is again used to compare the public sector wage premium within each province:

$$lnw_i = X_i\beta + PS_i\delta + \varepsilon_i \quad (2)$$

where lnw_i, X_i *and* β are as above, PS_i is a dummy variable for those in the public sector, δ is the wage premium or penalty for public sector employment in comparison to employment in the private sector, and ε_i is the usual error term. This model is estimated using the aggregated data and then again by comparing the public sector premium for each occupation and province.

The vector X_i includes controls for highest level of education attained, age and its square, landed immigrant, sex, marital status, economic family type, survey year, survey month, province, urban status, firm size, job tenure and union status. Occupation is also included a control in the aggregated estimates. The inclusion of union status is important given that public sector employees are much more likely to be unionized than their counterparts in the private sector (Mueller 2019a). Furthermore, those occupations that are concentrated in the public sector (e.g., health and teaching professionals) have among the highest public sector unionization rates (Card, Lemieux and Riddell (2020).

To remove any ambiguity in what follows, the public sector *premium* refers to the within province estimates of the payment to public sector workers compared to their observationally equivalent private sector counterparts, while the *wage differential* is used when comparing the wages of Albertans with the wages of those in the same sector in the comparator provinces. As shown below, for example, Alberta nurses in the public sector have an estimated wage premium of 5.1 per cent relative to those in the private sector in Alberta but have a 1.5 per cent wage differential compared to public sector nurses in British Columbia.

As mentioned above, the public sector is defined in three separate ways: all public sector workers employed in federal, provincial, local, Aboriginal, or international public administration, as well as those who are in the public sector but not involved in administration. This latter group would include those who work for government-funded entities such as hospitals, school boards, universities, and colleges. Since most of these are under the purview of the provincial government, separate estimates will be done for this group relative to the private sector. For the same reason, provincial public administration will also be separately compared to the private sector. In the figures and tables below, these are labelled as “all public”, “non-administration”, and “provincial”.

Data from the master files of the Labour Force Survey for the 36-month period between January 2016 and December 2018 are used.[3] The LFS is a compulsory monthly survey of approximately 56,000 households and includes all non-institutionalized individuals and civilians aged 15 or over. We limit our sample to those individuals between the ages of 25 and 64. Full-time students were also removed from the sample.

[3] These dates were chosen to overlap the time periods addressed in other recent analysis (MacKinnon and Mintz 2017; Mueller 2019b).

Real wages are in 2002 dollars are calculated by dividing the nominal hourly wage rate by the province-specific monthly consumer price index (CPI) for each month. This accounts for different inflation rates in each province. Individuals with real wages of less than $5 per hour are dropped from the sample as are those who reported working fewer than five hours per week or more than 100 hours in the reference week. Survey weights are used throughout and robust standard errors are used in the regression results.

The other criterion for inclusion is that there are at least 100 observations in each occupation in Alberta and in the broad public sector definition when calculating the aggregate estimates. Only when there are at least 100 observations in each cell (i.e., for each occupation and for each sector) will these premiums be estimated. Again, these comparisons are done for the three public sector definitions for Alberta, British Columbia, Ontario and Quebec, for a total of 12 comparisons within for each occupation where the number of observations in each cell permit. For example, if there are 120 observations for secondary school teachers (NOCS code 4031) in the public sector, but only 80 in the private sector, this comparison will not be made. The Institute for Competitiveness and Prosperity (2012) also uses the LFS and compares public and private sector wages in occupations with a significant presence in both sectors (since there are many occupations that are not common in one sector or the other). This results in 18 (out of a total of 47) occupations at the two-digit level using the 2006 National Occupational Classification System (NOCS). In our data, there are 96 such occupations which meet the 100-observation threshold in the overall Alberta public service.[4] The limitation here is that many occupations between sectors or within sectors but between provinces cannot be compared in what follows. This is likely not a serious problem since most of the major occupations – such as those in education and health care – are included and these are where the current Alberta government has focused its attention.

RESULTS

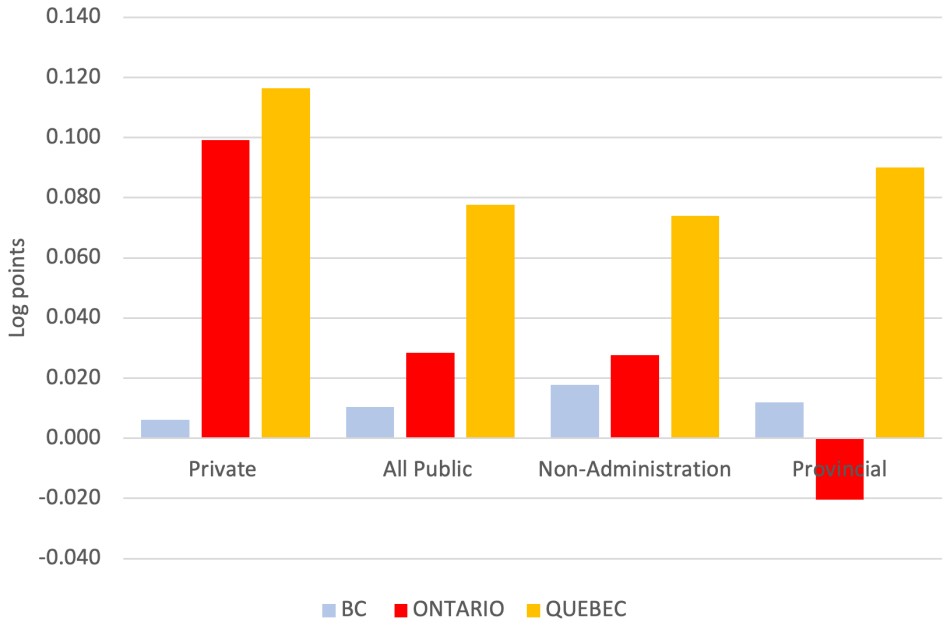
The estimation of the above two equations will result in several comparisons of private and public sector wage differentials. First, equation (1) gives the difference in the Alberta wage differential relative to the other provinces for the private sector as well as using three different definitions of the public sector using all individuals in the top 96 occupations. Next, where sample size permits (i.e., at least 100 in each occupation and in each comparator), between province wage differentials by occupation in each sector are compared. Second, the estimation of equation (2) allows the comparison of public sector wage premiums within each province as well the occupational public sector premium (again, where sample sizes permit).

[4] A detailed list of these top 96 occupations is found in Appendix Tables A2 and A4. We also performed this exercise with only the top 45 occupations (i.e., those with at least 200 relevant observations) and the results were very similar.

SECTORAL WAGE DIFFERENTIALS BETWEEN PROVINCES

Estimated wage differentials in various sectors between Alberta and the three other provinces are shown in Figure 1. There are four comparisons: the private sector, along with three definitions of the public sector. The first public sector definition includes all public sector workers who are not involved in administration as well as those at all levels of public administration – mainly federal, provincial and local administration workers. The non-administration public sector includes those largely involved in education and health care and include most of the public sector workers in Alberta (Mueller 2019a, 2019b). The final columns in the figure compare Alberta public administration wages at the provincial level. It is these latter two groups of public employees that are of most interest in the current work since their wages can be influenced by the provincial government, largely through the collective bargaining process. All results (except for the provincial coefficient for BC) are statistically different from zero at at least the five per cent level.

Figure 1: Alberta Wage Differentials Relative to the Three Largest Provinces, Top 96 Occupations



Source: Appendix Table A1.

Comparing wages in Alberta to those in British Columbia there are only small differences between the two provinces with wages about the same in the private sector and less than 2 per cent higher in the Alberta public sector using the first two definitions (the coefficient on provincial for British Columbia is not significantly different than zero).[5] Compared to Ontario and Quebec, the Alberta wage differentials are larger (with the exception of provincial administration in Ontario). Indeed, compared to Quebec

5 Log points can be interpreted as an approximation of the percentage differences in relative wages. Thus, 0.02 log points represent approximately 2 percentage points. For ease of interpretation, percentages will generally be used throughout the remainder of this paper.

they are substantial, being in the 7.4-9.0 per cent range. Still, these are smaller than the private sector wage premium where Albertans in that sector have wages 11.6 per cent above those in Quebec and 9.9 per cent above those in Ontario.[6]

The next two figures contain the estimates of the sectoral wage differentials by occupation in Alberta relative to the other three provinces. To reiterate, comparisons are only made when there are at least 100 observations for each comparator occupation within each comparator province. We limit the sample to include only those occupations with at least 100 observations in Alberta using the broadest definition of the public sector. This gives a total of 96 occupations that can be matched with other jurisdictions. Equation (1) is estimated by occupation where this 100-observation threshold holds for both comparators. The vertical axis in each case is the log real wage differential, and the horizontal contains the occupations ranked by size from the largest (i.e., registered nurses and registered psychiatric nurses on the left hand side of the figure) to the smallest (i.e., automotive services technicians, truck and bus mechanics and mechanical repairs on the righthand side). Appendix A2 contains the ranking of each of these 96 occupations as well as the coefficient estimates presented below. Note that missing data points mean that the 100-observation threshold is not met for at least one of the comparator occupations.[7]

Figure 2a shows the comparison of within occupation wage differentials in the private sector between provinces.[8] The horizontal axis has the 96 occupations ranked from largest to smallest and labelled as such, while the vertical axis is the log wage difference for each of these occupations between Alberta and the comparator province. At the far-left side, the largest occupation (i.e., registered nurses) has a 13.2 per cent differential compared to Ontario, a 6.7 per cent difference compared to British Columbia, and a 7.8 per cent difference compared to Quebec. In other words, private sector wages for nurses in Alberta are about 7 to 13 per cent higher than in the three comparator provinces. Nurses aides, orderlies and patient service assistants earn 2.5 per cent less in Alberta than in British Columbia, but 12.8 per cent and 20.1 per cent more than their private sector counterparts in Ontario and Quebec, respectively. Administrative assistants (the eighth ranked occupation) show an Alberta wage advantage of between 4.2 and 10.3 per cent relative to the other three provinces. The highest estimated wage premium for Alberta public sector workers is 35.5 per cent compared to Quebec for natural and applied science policy researchers, consultants and program officers, and the lowest is -26.7 per cent when compared to correspondence, publication and regulatory clerks in British Columbia.

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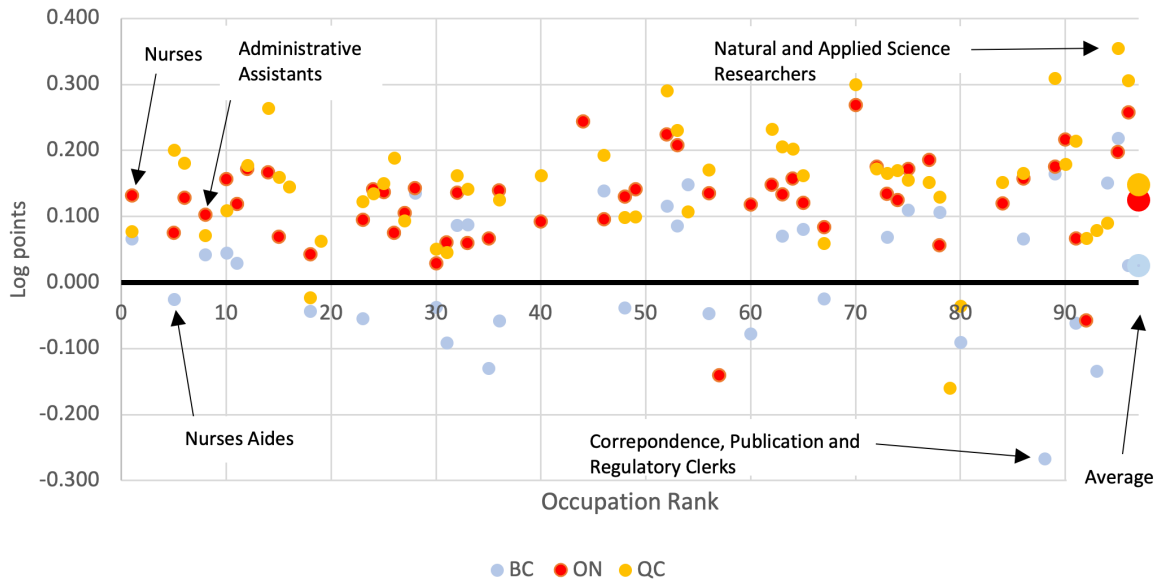
6 These results do not change markedly (either here or below) when we limit the sample to include only the top 45 occupations nor when regressions are estimated without occupational controls.

7 Separate graphs for non-administration and provincial administration are not included here. The former results are like those in Figure 2a while the latter has few comparisons owing to small sample sizes. These results, however, can be found in Appendix Table A2.

8 In doing the comparisons, there were 37 private sector occupational matches with British Columbia, 52 with Ontario, and 53 with Quebec.

Taking a bird's eye view of the scatterplot, we see that Alberta's private sector wages are similar on average to those in British Columbia and higher than those in Ontario and Quebec. Indeed, calculating a simple (i.e., unweighted) average of these premiums (see Appendix Table A2) shows that private sector wages in these occupations in Alberta are 2.6 per cent higher than in British Columbia, 12.5 per cent higher than in Ontario, and 14.8 per cent higher than in Quebec. This pattern is comparable to that observed in Figure 1 above.

Figure 2a: Alberta Private Sector Wage Differentials Relative to the Three Largest Provinces, Top 96 Occupations (where sample sizes permit)



Source: Appendix Table A2.

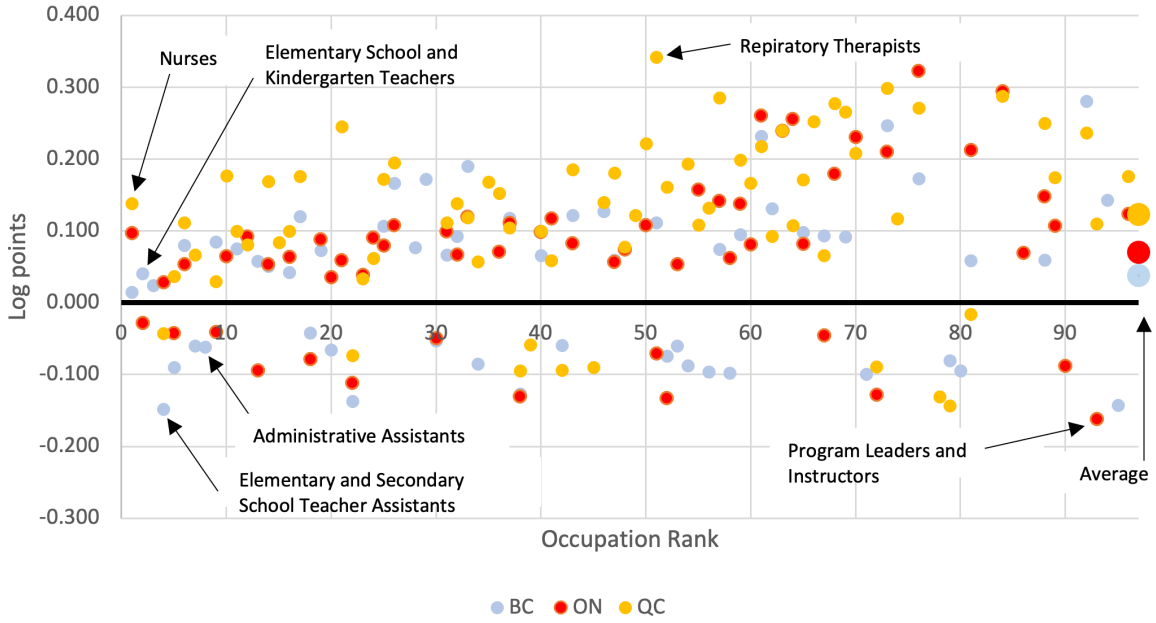
Figure 2b presents similar data, but for all public sector workers in each occupation that meet the criteria for inclusion. Here there is more overlap within occupations between provinces compared to the private sector comparisons above, mainly because several occupations (e.g., teachers) do not have large numbers in the private sector.

The first noteworthy item is that there are more occupations in Alberta where real wages are below parity with the other provinces compared to the private sector comparisons in Figure 2a. Again, a simple average of the data points in this scatterplot reinforces this point; real wage differentials in Alberta of 3.8, 7.0, and 12.3 per cent compared to British Columbia, Ontario, and Quebec, respectively. Recall that the relative Alberta private sector differentials in the previous figure were 2.6, 12.5, and 14.8 percent, respectively, higher than the figures here when comparing Alberta and Ontario and Quebec, and comparable to British Columbia.

In terms of some specific occupations, registered nurses and registered psychiatric nurses in the public sector in Alberta have a 1.5 per cent wage advantage compared to nurses in British Columbia, increasing to 9.7 per cent compared to Ontario and 13.8 per cent compared to Quebec. Comparing these to the figures for nurses above, the public sector differential in Alberta is higher than the private sector differential compared

to Quebec, but smaller when compared to British Columbia and Ontario. Elementary and secondary school teacher assistants in Alberta have real hourly wages 2.8 per cent above those in Ontario but lag their counterparts in British Columbia and Quebec by 14.8 per cent and 4.3 percent, respectively. Elementary school and kindergarten teachers in Alberta earn 2.4 per cent more relative to their counterparts in British Columbia but are at par statistically with those in Ontario and Quebec. Administrative assistants in the public sector in Alberta have earnings 6.1 per cent less than in British Columbia, but comparable to their equivalents in the other two provinces. The largest differential is with respiratory therapists, clinical perfusionists and cardiopulmonary technicians in Quebec (34.2 percent) and the lowest with Ontario's program leaders and instructors in recreation, sport and fitness.[9]

Figure 2b: Alberta Public Sector Wage Differentials Relative to the Three Largest Provinces, Top 96 Occupations (where sample sizes permit)



Source: Appendix Table A2.

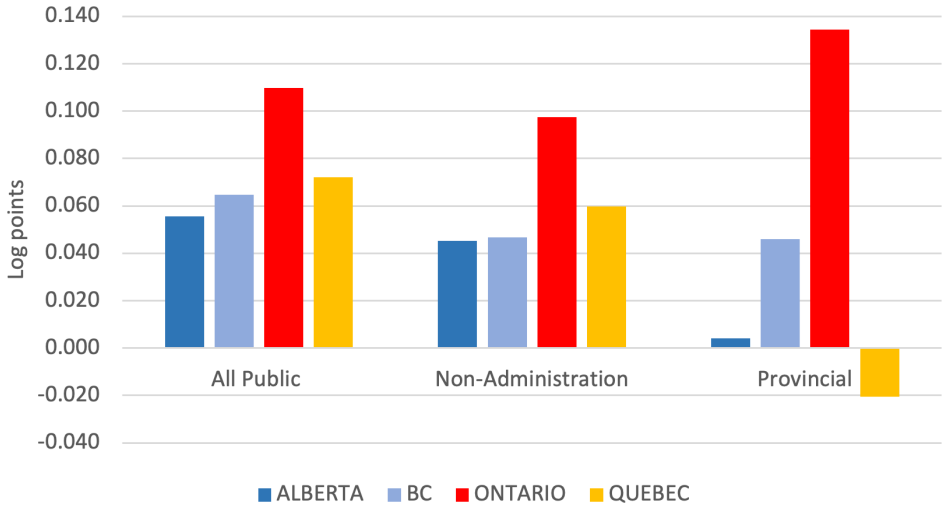
In sum, comparing wage differentials shows that overall public sector workers in Alberta tend to have higher wages on average than their counterparts in British Columbia, Ontario and Quebec. However, private sector wages in Alberta are also higher than those in Ontario and Quebec and this Alberta advantage is higher than for those in the public sector. Overall, public and private sector wages in Alberta are comparable to those in British Columbia. Within specific occupations, there are differences between provinces when comparing both the private and public sectors, but there does not appear to be systemic differentials for public sector workers in Alberta vis-à-vis the other three provinces.

[9] See Appendix Table A2 for these and other comparisons.

PUBLIC SECTOR WAGE PREMIUMS WITHIN PROVINCES

Figure 3 compares public sector to private sector wages within each province, again limiting the sample to the top 96 occupations. All results are statistically significant at the one per cent level (except for provincial administration workers in Alberta). Except for provincial public administration workers in Quebec, public sector workers in all provinces and by each definition have non-negative wage premiums relative to the private sector, ranging from a statistically insignificant 0.4 per cent in the case of Alberta's provincial administration workers, to 13.5 per cent in the case of this group of workers in Ontario. Specifically, what is noteworthy is that, with one exception, the public sector wage premium tends to be the lowest in Alberta, and often by a sizeable margin.

Figure 3: Public Sector Wage Premiums Relative to the Private Sector, Alberta and the Three Largest Provinces, Top 96 Occupations



Source: Appendix Table A3.

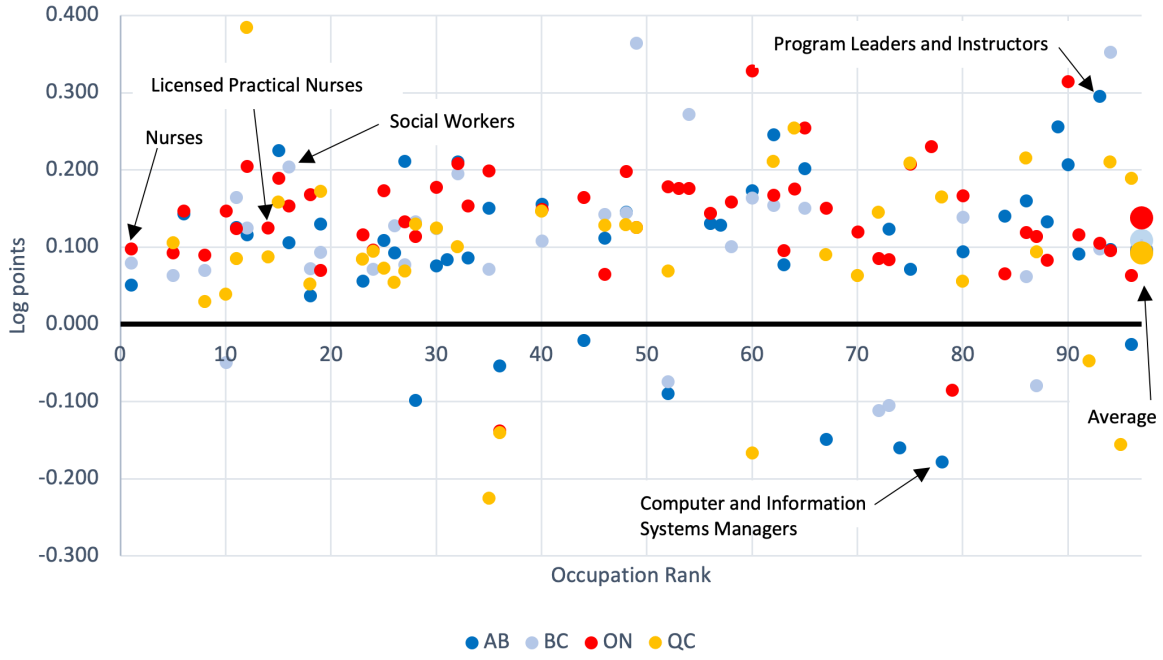
We perform the exercise of estimating any public sector wage premium by occupation using both the broad definition of the public sector, as well as the only non-administration public sector workers.[10] Figure 4 presents these premiums by province for the broad definition of the public sector.[11] A simple unweighted average (see Appendix Table A4) reveals that this wage premium is 9.5 per cent in Alberta, smaller than the 10.9 per cent and 13.8 per cent premiums for British Columbia and Ontario, respectively, and about the same as the 9.3 per cent premium for Quebec. Again, the overall pattern here is like the results in Figure 3 with Alberta having among the lowest public sector wage premium among its comparator provinces. Overall, the Alberta premiums by occupation do not appear to stand out in any way compared to those

10 Results for those not involved in public administration as well as the few occupations where there is sufficient overlap of private and provincial administration workers are contained in Appendix Table A4. The results for non-administration workers are similar to those presented in this figure.

11 In Alberta, British Columbia, Ontario and Quebec there were 45, 35, 54, and 39 occupations, respectively, that overlapped between the private and public sectors.

of the other three large provinces. There are, however, several outliers in Alberta with the largest premium being for program leaders and instructors in recreation, sport and fitness (29.5 per cent) and the lowest for computer and information systems managers (-17.8 per cent).

Figure 4: Public Sector Wage Premiums by Province, Top 96 Occupations
(where sample sizes permit)



Source: Appendix Table A4.

Looking at the results by selected major occupations, registered nurses and registered psychiatric nurses in the Alberta public sector earn 5.1 per cent more than those in the private sector, but comparable figures for British Columbia show a wage premium of 8.0 percent, with a 9.8 per cent premium in Ontario, and no statistical difference between the sectors in Quebec. Licensed practical nurses (LPNs) in both Alberta and British Columbia have no statistically significant public sector premium, while those in Ontario and Quebec have premiums of 12.5 per cent and 8.7 percent, respectively. In Alberta, social workers in the private sector have real hourly wages about 9 per cent higher than those in the private sector, while in British Columbia this premium is 22 percent, it stands at 15 per cent in Ontario, while in Quebec there is no premium.[12] A simple average of these coefficient estimates shows an overall Ontario premium of 13.8 percent, with premiums of 10.9 per cent in British Columbia and 9.3 per cent in Quebec, the latter two hiding the Alberta premium of 9.5 per cent in the figure.

Again, it appears that public sector wages in Alberta do not stand out in any systemic way. Where comparisons are available, public sector wages in all four provinces tend to be higher than those in the private sectors in those same provinces (as evidenced by

12 See Appendix Table A4 for details on the overall public sector premiums for all occupations as well as for those not involved in administration and for those employed in provincial administration.

the number of plots above the parity line in Figure 4). If anything, public sector workers in Alberta tend to have premiums on the low side relative to the other three provinces.

CONCLUSIONS

Using data from the 2016-2018 monthly Labour Force Survey and including in the analysis only the 96 largest public sector occupations, we find that when comparing public sector real wages in Alberta to those in its three comparator provinces they do tend to be higher. But so too are comparable private sector wages in Alberta relative to these other provinces. By addressing the wage differentials between provinces in each occupation, we find larger differences in some occupations in Alberta but negative differences (i.e., wage penalties) in others.

Within each province, the public sector wage premium tends to be positive relative to wages in the private sector, but the premium in Alberta tends to be on the low side and there is large variance when looking at differences in occupational premiums within provinces.

In sum, public sector wages in Alberta do not stand out, except that they do tend to be on small side relative to other provinces and to the private sector within the province.

That public sector workers in Alberta are "overpaid" is not supported by the data presented here. Alberta is a high wage province, and these high wages are found in both the private and public sectors. Of course, there are differences between occupations with some having larger premiums and differentials. Similarly, wage differentials within occupations compared to the other three provinces can be negative or positive. But in either case there does not appear to be any systemic overpayment of public sector workers. A limitation of this analysis has been that not all occupations are able to be compared owing to the criterion for inclusion not being met. But by definition these are occupations with few workers and so, even if these are outliers in terms of relative wages, they are unlikely to change the main findings of this analysis.

That wages throughout Alberta are high is not surprising given the rapidly expanding energy sector in the province, at least until 2014. Fortin and Lemieux (2015) and Marchand (2012, 2015) discuss the positive spillover on earnings from the resource extraction to other industries in the local economies. Marchand and Weber (2018, 470) elaborate on this:

> During a boom in energy prices, greater extraction requires additional labor, thereby attracting people from elsewhere and raising earnings and income. In the presence of spillovers, greater labor demand from extraction may also affect other individuals and firms across the local economy who have no direct connection to the natural resource sector.

Similarly, Fortin and Lemieux (2015, 683) conclude:

> In the case of Newfoundland, Saskatchewan and Alberta, employment in the extractive resources sector (mining, oil and gas) grew by about 50% between

> 1999 and 2013. The effect (due mostly to spillovers) of the extractive resources sector boom accounts for about two thirds of the divergence in the growth in mean wages between these provinces and the rest of the country.

The Alberta economy slowed beginning in 2014 and this has been reflected in earnings growth over this period compared to the preceding period. Using the Survey of Employment, Payrolls and Hours (SEPH), data complementary to the LFS used above, appears to support the proposition that there is spillover between the private and public sectors. These data show that between 2001 and 2014 nominal weekly earnings (including overtime) increased by 70 per cent in Alberta, twice that of the 35-36 per cent increases recorded in the three comparator provinces. The comparable Alberta figures for those in educational services, and health care and social assistance – the two broad industries with the majority of public sector workers and those under much of the current scrutiny of the provincial government – was about 60 per cent – compared to increases in the range of 27-55 per cent in the other jurisdictions.[13] Alberta was – and remains – a high wage province and this is reflected in the employee compensation in both private and public sectors.

The most recent Alberta budget (Government of Alberta 2021, 17) reports that the government spends approximately half of its operating budget on employee compensation and further notes that:

> In order to continue to ensure the efficient delivery of government services and that taxpayer dollars are directed to the important services that Albertans rely on, right-sizing public sector compensation is critical to achieving government's fiscal objectives.

While obviously the adjustment of employee compensation is an important component of the overall fiscal position of Alberta, there is evidence that this adjustment has already begun. Just as the labour market adjusted as expected to the expansion of the energy sector, so too is it responding to its contraction. Between 2014 to 2020, overall nominal weekly earnings in Alberta have increased by about five per cent, compared to increases of 20-22 per cent in the other three provinces. Earnings increases in the Alberta public sector have been higher in the 10-14 per cent range, but lower than the 13-21 per cent increases in the other public sector industries in Quebec, Ontario and British Columbia. While the consumer price index rose by 39.9 per cent in Alberta between 2000 and 2014, compared to a national average of 31.2 per cent, between 2014 and 2020, Alberta's inflation rate was 9.5 per cent, or about the same as the

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13 Over this same period, nominal weekly earnings for those in public administration, the Alberta industry with the third largest number of public employees, increased by about 80 per cent. However, the majority of employees are in federal and local administration, not at the provincial level. The nominal earnings figures here are calculated from Statistics Canada, Table 14-10-0204-01. Given that the inflation rate in Alberta over this period was higher than that in the comparator provinces over this period, relative real wage increases in the provinces would be somewhat lower. See Mueller (2019b) for the number of employees in these various industries by provinces, and the proportion of public and private sector workers within each. Anecdotal evidence suggests that it is local government employees that may weigh heavily in this weekly earnings increase as municipalities were forced to compete for the services of the many skilled trades and others who could easily move to private-sector employment in the energy sector.

national average.[14] Since many public sector unions have been accepting zeros or small scale increases, real wages have fallen and will likely continue to do so as the Alberta labour market continues to adjust. This is indicative of an efficient labour market as it adjusts to this (to use a common contemporary cliché) "new normal."

14 Author's calculations using data from Statistics Canada Table 18-10-0005-01.

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Table A1: Alberta Real Wage Differentials by Sector, Relative to the Three Largest Provinces

	British Columbia								Ontario								Quebec							
	Private		All Public		Non-Admin		Provincial		Private		All Public		Non-Admin		Provincial		Private		All Public		Non-Admin		Provincial	
Coefficient	0.006	**	0.011	***	0.018	***	0.012		0.099	***	0.029	***	0.028	***	-0.021	**	0.116	***	0.078	***	0.074	***	0.090	***
SE	(0.0029)		(0.0026)		(0.0030)		(0.0093)		(0.0024)		(0.0023)		(0.0027)		(0.0095)		(0.0028)		(0.0027)		(0.0031)		(0.0101)	
R2	0.5338		0.4768		0.4835		0.5085		0.5589		0.4621		0.4548		0.5231		0.5748		0.4935		0.5092		0.4856	
N	81,530		71,860		56,470		4,780		141,060		127,480		98,070		6,890		102,180		98,720		74,930		7,030	

Note: Author's calculations using the 2016-2018 Labour Force Survey master files. Controls for highest level of education, age and its square, landed immigrant, sex, martial status, economic family type, survey year, survey month, province, urban status, firm size, job tenure, union status, and occupation are included in all regessions. SE is the robust standard error of the coefficient estimate. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A2: Alberta Real Wages Premiums in Various Sectors Relative to the Three Largest Provinces

		Coefficient Est. - AB versus BC								Coefficient Est. - AB versus ON								Coefficient Est. - AB versus QC							
Rank	Occupation (NOC 2016 Code)	Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.	
1	Registered Nurses and Registered Psychiatric Nurses (3012)	0.067	**	0.015	**	0.014	**			0.132	***	0.097	***	0.099	***			0.078	***	0.138	***	0.141	***		
2	Secondary and Elementary School Teachers and Educational Councellors (4030)			0.040	***	0.040	***					-0.028	***	-0.028	***					-0.016		-0.016			
3	Elementary School and Kindergarten Teachers (4032)			0.024	*	0.024	*					-0.015		-0.015						0.015		0.015			
4	Elementary and Secondary School Teacher Assistants (4413)			-0.148	***	-0.148	***					0.028	**	0.028	**					-0.043	***	-0.043	***		
5	Nurses Aides, Orderlies and Patient Service Associates (3413)	-0.025	**	-0.090	***	-0.090	***			0.075	***	-0.042	***	-0.042	***			0.201	***	0.037	***	0.039	***		
6	General Office Support Workers (1411)	-0.014		0.080	***	0.105	***			0.128	***	0.054	***	0.060	***			0.181	***	0.112	***	0.110	***		
7	Police Officers (Except Commissioned) (4311)			-0.060	***							0.006								0.067	**				
8	Administrative Assistants (1241)	0.042	***	-0.061	***	-0.071	***			0.103	***	-0.017		-0.011		-0.063	*	0.072	***	-0.009		0.004		0.139	***
9	Secondary School Teachers (4031)			0.085	***	0.085	***					-0.040	***	-0.040	***					0.030	**	0.030	**		
10	Janitors, Caretakers and Building Superintendents (6733)	0.045	***	0.023		0.004				0.156	***	0.065	***	0.053	***			0.110	***	0.177	***	0.198	***		
11	Administrative Officers (1221)	0.030	**	0.075	***	0.065	*	0.186	***	0.119	***	0.023		-0.007		0.098	**	0.014		0.100	***	0.055	***	0.108	***
12	Bus Drivers, Subway Operators and Other Transit Operators (7512)	0.013		0.010		0.011				0.172	***	0.093	***	0.098	***			0.178	***	0.081	***	0.081	***		
13	University Professors and Lecturers (4011)			0.058	**	0.058	**					-0.094	***	-0.094	***					-0.011		-0.011			

Rank	Occupation (NOC 2016 Code)	Coefficient Est. - AB versus BC								Coefficient Est. - AB versus ON								Coefficient Est. - AB versus QC							
		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.	
14	Licensed Practical Nurses (3233)	-0.014		0.051	***	0.051	***			0.167	***	0.054	***	0.054	***			0.264	***	0.169	***	0.169	***		
15	College and Vocational Instructors (4021)	-0.012		0.016		0.016				0.070	**	0.027		0.025				0.160	***	0.084	***	0.101	***		
16	Social Workers (4152)	-0.023		0.042	**	0.039	**			-0.004		0.064	***	0.057	***			0.146	***	0.100	***	0.117	***		
17	Principals and Administrators of Elementary and Secondary Education (0422)			0.120	***	0.120	***					0.010		0.010						0.176	***	0.176	***		
18	Light Duty Cleaners (6731)	-0.043	***	-0.042	***	-0.047	***			0.043	***	-0.079	***	-0.102	***			-0.022	**	0.007		0.006			
19	Social and Community Service Workers (4212)	-0.008		0.073	***	0.072	***			-0.004		0.089	***	0.109	***			0.063	***	0.019		0.059	**		
20	Letter Carriers (1512)			-0.066	***	-0.066	***					0.036	**	0.036	**					0.014		0.014			
21	Firefighters (4312)			0.026								0.059	***							0.245	***				
22	Post-Secondary Teaching and Research Assistants (4012)			-0.137	***	-0.137	***					-0.112	***	-0.112	***					-0.073	**	-0.073	**		
23	Receptionists (1414)	-0.054	***	0.015		-0.001				0.095	***	0.039	**	0.028				0.123	***	0.034	*	0.008			
24	Human Resources Professionals (1121)	0.032		0.010		-0.033		0.043		0.141	***	0.091	***	0.119	***	0.020		0.135	***	0.062	***	0.150	***	0.051	
25	Medical Administrative Assistants (1243)	-0.029		0.107	***	0.105	***			0.137	***	0.080	***	0.079	***			0.151	***	0.173	***	0.172	***		
26	Financial Auditors and Accountants (1111)	0.075	***	0.167	***					0.075	***	0.108	***	0.201	***			0.189	***	0.195	***	0.280	***		
27	Accounting and Related Clerks (1431)	0.013		-0.017		0.098	*			0.106	***	-0.036		0.106	**			0.094	***	-0.022		0.045			
28	Managers in Health Care (0311)	0.136	***	0.077	***	0.077	***			0.143	***	0.027		0.028				0.094		-0.014		-0.014			
29	Paramedical Occupations (3234)			0.172	***	0.148	***					0.002		-0.013											
30	Food Counter Attendants, Kitchen Helpers and Related Support Occupations (6711)	-0.037	***	-0.053	***	-0.046	***			0.029	***	-0.049	***	-0.053	***			0.051	***	0.019		0.032	**		
31	Information Systems Analysts and Consultants (2171)	-0.091	***	0.067	***	0.043				0.061	***	0.099	***	0.126	***			0.046	***	0.112	***	0.096	***		
32	Purchasing Agents and Officers (1225)	0.087	***	0.093	***	0.163	***			0.136	***	0.068	**	-0.023				0.162	***	0.138	***	0.111	*		
33	Family, Marriage and Other Related Counsellors (4153)	0.088	***	0.190	***	0.204	***			0.060	**	0.120	***	0.121	***			0.142	**	0.119	***	0.128	***		
34	Employment Insurance, Immigration, Border Services and Revenue Officers (1228)			-0.085	***							0.004								0.058	***				
35	Other Assisting Occupations in Support of Health Services (3414)	-0.130	***	0.020		0.020				0.067	***	-0.022		-0.021				-0.009		0.168	***	0.168	***		
36	Heavy Equipment Operators (Except Crane) (7521)	-0.058	***							0.139	***	0.071	***	0.054	**			0.126	***	0.152	***	0.250	***		
37	Health Policy Researchers, Consultants and Program Officers (4166)			0.118	***							0.111	***							0.104	***				
38	Other Managers in Public Administration (0414)			-0.127	***			-0.125	*			-0.130	***							-0.095	***			-0.168	***
39	Mail, Postal and Related Workers (1511)			-0.030		-0.045	**					0.024		0.029	*					-0.058	***	-0.061	***		

Rank	Occupation (NOC 2016 Code)	Coefficient Est. - AB versus BC								Coefficient Est. - AB versus ON								Coefficient Est. - AB versus QC							
		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.	
40	Professional Occupations in Advertising, Marketing and Public Relations (1123)	0.036		0.066	**					0.092	***	0.099	***					0.162	***	0.099	***				
41	Nursing Coordinators and Supervisors (3011)			-0.022		-0.022						0.117	***	0.118	***					0.059	**	0.059	**		
42	Correctional Service Officers (4422)			-0.059	**			-0.114	***			-0.031				-0.020				-0.094	***			-0.020	
43	Education Policy Resarchers, Consultants and Program Officers (4164)			0.122	***			0.119	***			0.083	***			-0.035				0.185	***			0.320	***
44	Medical Laboratory Technicians and Pathologists' Assistants (3212)	-0.032		0.039		0.039	***			0.244	***	0.050		0.050						0.026		0.026			
45	Educational Counsellers (4033)			0.067		0.067						-0.001		-0.001						-0.090	***	-0.090	***		
46	Financial Managers (0111)	0.139	***	0.127	***					0.096	***	-0.046						0.193	***	0.140	***				
47	Social Policy Resarchers, Consultants and Program Officers (4165)			0.060	*	0.090	**					0.057	**	0.121	***					0.181	***	0.143	***		
48	Other Customer and Information Services Representatives (6552)	-0.038	**	-0.003		-0.074				0.130	***	0.074	***	-0.018				0.099	***	0.078	***	-0.024			
49	Inspectors in Public and Environmental Health and Occupational Health and Safety (2263)	-0.033		-0.016						0.141	*	0.032						0.100	***	0.122	***				
50	Occupational Therapists (3143)			0.037		0.037	***					0.108	***	0.108	***					0.222	***	0.223	***		
51	Respiratory Therapists, Clinicial Perfusionists and Cardiopulmonary Technologists (3214)			0.112	***	0.112	***					-0.070	***	-0.070	***					0.342	***	0.342	***		
52	Power Engineers and Power Systems Operators (9241)	0.116	***	-0.074	*	0.001				0.224	***.-.113	-0.133	***	-0.089	**			0.291	***	0.161	***	0.173	***		
53	Landscaping and Grounds Maintenance Labourers (8612)	0.086	***	-0.060	*					0.208	***	0.054	*					0.231	*						
54	Lawyers and Quebec Notaries (4112)	0.148	***	-0.088	*					0.051		-0.063						0.108	***	0.194	***				
55	Urban and Land Use Planners (2153)											0.158	***							0.109	**				
56	User Support Technicians (2282)	-0.047	*	-0.096	***	-0.002				0.135	***	0.049		0.064				0.171	***	0.132	***	0.061			
57	Medical Laboratory Technologists (3211)			0.075	***	0.075	***			-0.141	**	0.142	***	0.139	***					0.285	***	0.285	***		
58	Executive Assistants (1222)	-0.026		-0.098	**					-0.019		0.062	**					0.053		0.036					
59	Public Works Maintenance Labourers (7621)			0.095	***							0.138	***							0.199	***				
60	Supervisors, General Office and Administration Support Workers (1211)	-0.077	*	-0.011						0.119	***	0.081	**					0.032		0.167	***				
61	Electrical Power Line and Cable Workers (7244)			0.232	***	0.235	***					0.261	***	0.261	***					0.218	***	0.218	***		
62	Dispatchers (1525)	0.028		0.132	***					0.148	***	0.028						0.233	***	0.093	***				

Rank	Occupation (NOC 2016 Code)	Coefficient Est. - AB versus BC								Coefficient Est. - AB versus ON								Coefficient Est. - AB versus QC							
		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.	
63	Contractors and Supervisors, Heavy Equipment Operating Crews (7302)	0.071	***							0.134	***	0.240	***	0.030				0.206	***	0.240	***	0.248	***		
64	Business Development Officers and Marketing Researchers and Consultants (4163)	-0.020								0.158	***	0.256	***					0.202	***	0.107	***				
65	Other Medical Technologists and Technicians (Except Dental Health) (3219)	0.081	***	0.098	***	0.098	***			0.121	***	0.082	**	0.084	***			0.163	***	0.171	***	0.171	***		
66	Psychologists (4151)											0.065		0.067						0.252	***	0.268	***		
67	Cooks (6322)	-0.025	**	0.094	**	-0.026				0.084	***	-0.045	**	-0.050	**			0.060	***	0.066	**	0.062	**		
68	Librarians (5111)			0.014		0.015						0.180	***	0.181	***					0.277	***	0.279	***		
69	Medical Radiation Technologists (3215)			0.092	***	0.092	***					0.042		0.042	*					0.266	***	0.266	***		
70	Public Works Maintenance Equipment Operators and Related Workers (7522)	0.036								0.269	***	0.231	***	0.239	***			0.300	***	0.209	***	0.184	***		
71	Utilities Managers (0912)			-0.100	*	-0.100	*					-0.027		-0.028											
72	Financial and Investment Analysts (1112)	-0.034		0.001						0.175	***	-0.128	***	-0.158	***			0.173	***	-0.089	**				
73	Professional Occupations in Business Management Consulting (1122)	0.069	**	0.247	***					0.135	***	0.210	***					0.166	***	0.299	***				
74	Civil Engineers (2131)	-0.044		0.018						0.125	***	0.028						0.170	***	0.117	**				
75	Supervisors, Finance and Insurance Office Workers (1212)	0.110	***							0.172	***	0.037						0.156	***	-0.024					
76	Physiotherapists (3142)			0.173	***	0.173	***					0.323	***	0.315	***					0.271	***	0.263	***		
77	Supervisors, Petroleum, Gas and Chemical Processing and Utilities (9212)	0.010								0.186	***	0.109		0.108				0.152	**						
78	Computer and Information Systems Managers (0213)	0.107	***							0.057	**	-0.048						0.130	***	-0.130	***				
79	Pharmacists (3131)	-0.033		-0.080	**	-0.080	**			0.001		0.065		0.101	*			-0.159	***	-0.144	**	-0.116	*		
80	Early Childhood Educators and Assistants (4214)	-0.090	***	-0.095	*					0.023		-0.013		-0.037				-0.036	**	-0.070		-0.076	*		
81	Library Assistants and Clerks (1451)			0.059	**	0.057	*					0.213	***	0.207	***					-0.016	***	-0.006			
82	Specialist Physicians (3111)											-0.042		-0.041						0.025		-0.005			
83	General Practitioners and Family Physicians (3112)			-0.013		0.037						-0.056		-0.043						0.124		0.113			
84	Accounting Technicians and Bookkeepers (1311)	0.007		0.093						0.120	***	0.295	***					0.152	***	0.288	***				
85	Administrators, Post-Secondary Education and Vocational Training (0421)			0.002		0.002						0.054		0.054						-0.062		-0.062			
86	Payroll Clerks (1432)	0.066	***	-0.039						0.158	***	0.070	**					0.166	***	0.002					

Rank	Occupation (NOC 2016 Code)	Coefficient Est. - AB versus BC								Coefficient Est. - AB versus ON								Coefficient Est. - AB versus QC							
		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.		Private		Public		Non-ad.		Prov.	
87	Human Resources and Recruitment Officers (1223)	0.046		-0.011						-0.043		-0.042						0.059		0.038					
88	Correspondence, Publication and Regulatory Clerks (1452)	-0.267	***	0.059	*					-0.012		0.148	***					-0.060		0.250	***				
89	Database Analysts and Data Administrators (2172)	0.165	***							0.176	***	0.107	**					0.309	***	0.175	***				
90	Cleaning Supervisors (6315)	0.049		0.096						0.217	***	-0.088	**					0.179	***						
91	Data Entry Clerks (1422)	-0.061	*	-0.063						0.067	**	-0.055						0.214	***						
92	Computer Developers and Interactive Media Developers (2174)	-0.042		0.281	***					-0.057	***	0.011						0.067	***	0.237	***				
93	Program Leaders and Instructors in Recreation, Sport and Fitness (5254)	-0.134	**	0.039						0.016		-0.162	***					0.079	*	0.110	**				
94	Senior Government Managers and Officials (0112)	0.152	***	0.143	**					-0.040		-0.048						0.090	**	-0.021					
95	Natural and Applied Science Policy Researchers, Consultants and Program Officers (4161)	0.219	***	-0.142	***					0.198	***	0.001						0.355	***	0.083					
96	Automotive Service Technicians, Truck and Bus Mechanics and Mechanical Repairs (7321)	0.026	*	0.009						0.258	***	0.124	***					0.306	***	0.176	***				
	Average (unweighted)	0.026		0.038		0.044		0.016		0.125		0.070		0.063		0.017		0.148		0.123		0.122		0.100	
	Count	37		57		37		4		52		59		40		2		53		69		44		4	

Notes: The top 96 occupations are comprised of Alberta public sector occupations with at least 100 unweighted observations. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Blank cells mean that there were not 100 observations for at least one of the comparator groups. The coefficients are estimated using Model 1, with separate regressions performed by occupation and sector definiton. Only statistically significant estimates are included in the averages and counts at the bottom of the table.

Table A3: Real Wage Differentials, by Public Sector Definition, four largest provinces

	Alberta						British Columbia						Ontario						Quebec					
	All Public		Non-Admin		Provincial		All Public		Non-Admin		Provincial		All Public		Non-Admin		Provincial		All Public		Non-Admin		Provincial	
Coefficient	0.056	***	0.045	***	0.004		0.065	***	0.047	***	0.046	***	0.110	***	0.097	***	0.135	***	0.072	***	0.060	***	-0.021	***
SE	(0.0042)		(0.0046)		(0.0101)		(0.0042)		(0.0046)		(0.0088)		(0.0028)		(0.0031)		(0.0075)		(0.0034)		(0.0037)		(0.0071)	
R^2	0.5642		0.5631		0.5678		0.5311		0.5258		0.5225		0.5646		0.5560		0.5713		0.5957		0.5993		0.5945	
N	76,431		69,208		43,547		76,958		68,790		42,759		192,110		169,928		104,403		76,958		87,255		45,016	

Note: Author's calculations using the 2016-2018 Labour Force Survey master files. Controls for highest level of education, age and its square, landed immigrant, sex, martial status, economic family type, survey year, survey month, province, urban status, firm size, job tenure, union status, and occupation are included in all regessions. SE is the robust standard error of the coefficient estimate. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A4: Public Sector Wage Premiums Compared to the Private Sector, Various Public Sector Definitions, Four Largest Provinces

		Alberta						BC						Ontario						Quebec					
Rank	Occupation (NOC 2016 Code)	All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov	
1	Registered Nurses and Registered Psychiatric Nurses (3012)	0.051	**	0.050	**			0.080	***	0.077	***			0.098	***	0.095	***			-0.005		-0.011			
2	Secondary and Elementary School Teachers and Educational Councellors (4030)																								
3	Elementary School and Kindergarten Teachers (4032)																								
4	Elementary and Secondary School Teacher Assistants (4413)																								
5	Nurses Aides, Orderlies and Patient Service Associates (3413)	-0.002		-0.002				0.063	***	0.064	***			0.093	***	0.093	***			0.106	***	0.104	***		
6	General Office Support Workers (1411)	0.143	***	0.123	***			0.027		-0.034				0.147	***	0.116	***			0.046		0.040			
7	Police Officers (Except Commissioned) (4311)																								
8	Adminstrative Assistants (1241)	0.024		-0.034		-0.073		0.071	***	0.008				0.090	***	0.048	***	0.011		0.030	**	-0.014		-0.060	***
9	Secondary School Teachers (4031)																								
10	Janitors, Caretakers and Building Superintendents (6733)	-0.001		-0.027				-0.049	**	-0.041	*			0.147	***	0.141	***			0.039	***	0.018			
11	Administrative Officers (1221)	0.126	***	0.050		0.278	***	0.164	***	0.166	***	0.204	***	0.125	***	0.068	***	0.204	***	0.085	***	0.053	***	0.102	***
12	Bus Drivers, Subway Operators and Other Transit Operators (7512)	0.116	***	0.118	***			0.125	***	0.123	***			0.205	***	0.200	***			0.384	***	0.385	***		

Rank	Occupation (NOC 2016 Code)	Alberta						BC						Ontario						Quebec					
		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov	
13	University Professors and Lecturers (4011)																								
14	Licensed Practical Nurses (3233)	0.038		0.038				-0.010		-0.011				0.125	***	0.128	***			0.087	***	0.087	***		
15	College and Vocational Instructors (4021)	0.226	***	0.207	***			0.011		0.019				0.189	***	0.179	***			0.159	***	0.158	***		
16	Social Workers (4152)	0.106	***	0.087	**			0.204	***	0.222	***			0.154	***	0.151	***			0.012		-0.020			
17	Principals and Administrators of Elementary and Secondary Education (0422)																								
18	Light Duty Cleaners (6731)	0.037	*	0.021				0.072	***	0.067	***			0.168	***	0.177	***			0.052	***	0.029	**		
19	Social and Community Service Workers (4212)	0.130	***	0.138	***			0.094	***	0.093	***			0.070	***	0.077	***			0.172	***	0.159	***		
20	Letter Carriers (1512)																								
21	Firefighters (4312)																								
22	Post-Secondary Teaching and Research Assistants (4012)																								
23	Receptionists (1414)	0.057	**	0.014				-0.010		-0.029				0.116	***	0.117	***			0.085	***	0.089	***		
24	Human Resources Professionals (1121)	0.035		-0.020		-0.024		0.072	**	0.044		0.074		0.097	***	0.055	**	0.196	***	0.095	***	0.063	**	0.025	
25	Medical Administrative Assistants (1243)	0.109	***	0.108	***			0.011		0.011				0.173	***	0.172	***			0.073	***	0.073	***		
26	Financial Auditors and Accountants (1111)	0.093	***	0.138	***			0.128	***					0.009		-0.092	***			0.054	**	0.022			
27	Accounting and Related Clerks (1431)	0.212	***	0.117	***			0.078	***	0.020				0.133	***	0.081	***			0.069	**	-0.030			
28	Managers in Health Care (0311)	-0.098	***	-0.098	***			0.133	***	0.133	**			0.114	***	0.113	***			0.130	*	0.130	*		
29	Paramedical Occupations (3234)																								
30	Food Counter Attendants, Kitchen Helpers and Related Support Occupations (6711)	0.076	***	0.070	***			0.125	***	0.110	***			0.178	***	0.179	***			0.125	***	0.120	***		
31	Information Systems Analysts and Consultants (2171)	0.084	***	0.037				-0.004		0.007				0.026		0.014				-0.006		-0.008			
32	Purchasing Agents and Officers (1225)	0.211	***	0.297	***			0.195	***	0.109	**			0.209	***	0.131	***			0.101	***	-0.040			
33	Family, Marriage and Other Related Counsellors (4153)	0.087	*	0.040				-0.024		-0.036				0.154	***	0.150	***			-0.016		-0.019			
34	Employment Insurance, Immigration, Border Services and Revenue Officers (1228)																								
35	Other Assisting Occupations in Support of Health Services (3414)	0.151	***	0.151	***			0.072	**	0.072	**			0.199	***	0.199	***			-0.225	***	-0.225	***		
36	Heavy Equipment Operators (Except Crane) (7521)	-0.053	***	-0.048	***									-0.138	***	-0.126	***			-0.140	***	-0.215	***		
37	Health Policy Resarchers, Consultants and Program Officers (4166)																								

Rank	Occupation (NOC 2016 Code)	Alberta						BC						Ontario						Quebec					
		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov	
38	Other Managers in Public Administration (0414)																								
39	Mail, Postal and Related Workers (1511)																								
40	Professional Occupations in Advertising, Marketing and Public Relations (1123)	0.156	***					0.109	***					0.149	***					0.147	***				
41	Nursing Coordinators and Supervisors (3011)																								
42	Correctional Service Officers (4422)																								
43	Education Policy Resarchers, Consultants and Program Officers (4164)																								
44	Medical Laboratory Technicians and Pathologists' Assistants (3212)	-0.021	***	-0.021				-0.025		-0.025				0.164	***	0.164	***								
45	Educational Counsellers (4033)																								
46	Financial Managers (0111)	0.112	***					0.143	***					0.065	***					0.129	***				
47	Social Policy Resarchers, Consultants and Program Officers (4165)																								
48	Other Customer and Information Services Representatives (6552)	0.146	***	0.234	***			0.145	***	0.090	**			0.198	***	0.185	***			0.129	***	0.124	***		
49	Inspectors in Public and Environmental Health and Occupational Health and Safety (2263)	0.046						0.364	***					0.126	***					0.126	***				
50	Occupational Therapists (3143)																								
51	Respiratory Therapists, Clinicial Perfusionists and Cardiopulmonary Technologists (3214)																								
52	Power Engineers and Power Systems Operators (9241)	-0.089	**	-0.065	*			-0.074	*	-0.074	*			0.179	***	0.178	***			0.069	*	0.055			
53	Landscaping and Grounds Maintenance Labourers (8612)	0.069						0.065						0.177	***										
54	Lawyers and Quebec Notaries (4112)	0.052						0.272	***					0.177	***					-0.007					
55	Urban and Land Use Planners (2153)																								
56	User Support Technicians (2282)	0.131	***	0.213	***			-0.052		-0.078	**			0.144	***	0.088	***			-0.006		-0.034			
57	Medical Laboratory Technologists (3211)	0.129	***	0.129	***									-0.013		-0.013									
58	Executive Assistants (1222)	0.040						0.101	***					0.159	***					0.163					
59	Public Works Maintenance Labourers (7621)																								
60	Supervisors, General Office and Administration Support Workers (1211)	0.174	***					0.164	***					0.329	***					-0.167	*				

Rank	Occupation (NOC 2016 Code)	Alberta						BC						Ontario						Quebec					
		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov	
61	Electrical Power Line and Cable Workers (7244)																								
62	Dispatchers (1525)	0.246	***					0.154	***					0.167	***					0.211	***				
63	Contractors and Supervisors, Heavy Equipment Operating Crews (7302)	0.078	**	0.082	**									0.096	***	0.120	***			-0.010		0.013			
64	Business Development Officers and Marketing Researchers and Consultants (4163)	0.070												0.176	***					0.254	***				
65	Other Medical Technologists and Technicians (Except Dental Health) (3219)	0.202	***	0.202	***			0.151	***	0.151	***			0.255	***	0.254	***			0.008		0.008			
66	Psychologists (4151)																								
67	Cooks (6322)	-0.149	***	-0.133	***			0.002		0.043	*			0.151	***	0.122	***			0.090	***	0.076	***		
68	Librarians (5111)																								
69	Medical Radiation Technologists (3215)																								
70	Public Works Maintenance Equipment Operators and Related Workers (7522)	0.017		0.033										0.120	***	0.130	***			0.064	**	0.084	***		
71	Utilities Managers (0912)	0.004		0.003																					
72	Financial and Investment Analysts (1112)	-0.023		-0.030				-0.112	*					0.086	***	0.103	***			0.146	***				
73	Professional Occupations in Business Management Consulting (1122)	0.124	**					-0.104	***					0.084	*					-0.010					
74	Civil Engineers (2131)	-0.159	***					-0.081						0.049						0.038					
75	Supervisors, Finance and Insurance Office Workers (1212)	0.072	**											0.208	***					0.209	***				
76	Physiotherapists (3142)																								
77	Supervisors, Petroleum,Gas and Chemical Processing and Utilities (9212)	-0.034		-0.034										0.231	***	0.229	***								
78	Computer and Information Systems Managers (0213)	-0.178	***											0.074						0.165	***				
79	Pharmacists (3131)	-0.029		-0.029				0.064		0.064				-0.085	*	-0.092	**			-0.031		-0.058			
80	Early Childhood Educators and Assistants (4214)	0.094	**	0.087				0.139	***					0.167	***	0.173	***			0.056	***	0.056	***		
81	Library Assistants and Clerks (1451)																								
82	Specialist Physicians (3111)																								
83	General Practitioners and Family Physicians (3112)																								
84	Accounting Technicians and Bookkeepers (1311)	0.141	**					-0.030						0.066	**					-0.001					

Rank	Occupation (NOC 2016 Code)	Alberta						BC						Ontario						Quebec					
		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov		All		Non-ad		Prov	
85	Administrators, Post-Secondary Education and Vocational Training (0421)																								
86	Payroll Clerks (1432)	0.161	***					0.063	**					0.120	***					0.216	***				
87	Human Resources and Recruitment Officers (1223)	0.063						-0.079	**					0.114	***					0.094	**				
88	Correspondence, Publication and Regulatory Clerks (1452)	0.133	**					0.029						0.083	**					-0.018					
89	Database Analysts and Data Administrators (2172)	0.256	***											0.045						-0.056					
90	Cleaning Supervisors (6315)	0.207	***					0.103						0.315	***										
91	Data Entry Clerks (1422)	0.092	*					0.097						0.116	***										
92	Computer Developers and Interactive Media Developers (2174)	-0.015						-0.051						-0.004						-0.047	*				
93	Program Leaders and Instructors in Recreation, Sport and Fitness (5254)	0.295	***					0.098	***					0.106	***					0.098					
94	Senior Government Managers and Officials (0112)	0.097	**					0.353	***					0.096	***					0.211	***				
95	Natural and Applied Science Policy Researchers, Consultants and Program Officers (4161)	0.049						0.420	***					0.064						-0.156	**				
96	Automotive Service Technicians, Truck and Bus Mechanics and Mechanical Repairs (7321)	-0.026	**					-0.130	***					0.063	*					0.189	***				
	Average (uneweighted)	0.095		0.101		0.278		0.109		0.080		0.204		0.138		0.117		0.200		0.093		0.075		0.021	
	Count	45		21		1		35		17		1		54		35		2		39		18		2	

Notes: The top 96 occupations are comprised of Alberta public sector occupations with at least 100 unweighted observations. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Blank cells mean that there were not 100 observations for at least one of the comparator groups. The coefficients are estimated using Model 2, with separate regressions performed by occupation and sector definiton. Only statistically significant estimates are included in the averages and counts at the bottom of the table.

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Richard E. Mueller is Professor in the Department of Economics at the University of Lethbridge and Academic Director of the Lethbridge Branch of the Prairie Regional Research Data Centre. Dr. Mueller holds a B.A. (Honours) and an M.A. from the University of Calgary, and a Ph.D. from the University of Texas at Austin. He began his career at the University of Maine before joining the University of Lethbridge in 2000. He was seconded to Statistics Canada from 2009 through 2011 and was chair of the Department of Economics between 2014 and 2018. Dr. Mueller has a wide range of interests related to education and labour market policy and has taught and given presentations in Europe, Asia, the United States, Australia, the Middle East and Latin America. His research has been published in various economics, Canadian Studies and higher education journals, several edited volumes and reports, and highlighted by a number of media outlets.

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