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The gender wage gap in Canada: 1998 to 2018

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Table of contents

The gender wage gap in Canada: 1998 to 2018

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Highlights

- In 2018, female employees aged 25 to 54 earned $4.13 (or 13.3%) less per hour, on average, than their male counterparts. In other words, these women earned $0.87 for every dollar earned by men.
- The gender gap in hourly wages has narrowed by $1.04 (or 5.5 percentage points) since 1998, when it was $5.17 (or 18.8%).
- The reduction in the gender wage gap between 1998 and 2018 was largely explained by changes in the distribution of men and women across occupations; women's increased educational attainment; and the decline in the share of men in unionized employment.
- The two largest factors explaining the remaining gender wage gap in 2018 were the distribution of women and men across industries, and women's overrepresentation in part-time work. These were also the largest explanatory factors behind the gap in 1998.
- Similar to other studies, nearly two-thirds of the gap in 2018 was unexplained. Possible explanations for this portion include gender differences in characteristics that were beyond the scope of this study, such as work experience, as well as unobservable factors, such as any gender-related biases.

Introduction

In Canada, women in the core working ages of 25 to 54 earned an average of $26.92 per hour in 2018, while their male counterparts earned $31.05.[1] In other words, women earned $4.13 (or 13.3%) less per hour, on average, than men, or $0.87 for every dollar earned by men. Recent studies indicate that, in general, the gender wage gap has narrowed over time, both in Canada (Baker and Drolet 2010; Drolet 2011; Morissette et al. 2013; Schirle 2015; Moyser 2017) and elsewhere (Blau and Kahn 2017; Olsen et al. 2018; McGuiness and Redmond 2018). However, given that women in Canada have surpassed men in educational attainment, diversified their fields of study at post-secondary institutions, and increased their representation in higher-status occupations (Moyser 2019), the persistence of gender-based wage inequality warrants continued attention.

Building on the work of Baker and Drolet (2010) and Drolet (2011), this study examines the evolution of the gender gap in average hourly wages since 1998. In choosing to examine hourly wages, as opposed to other measures of earnings, this study highlights gender differences in pay for an equal unit of work.[2] The analysis includes both full- and part-time[3] employees, and is restricted to people in the core working ages of 25 to 54 (see Appendix A: Data sources and methods).

Specifically, this study addresses three questions:

1. How did the gender wage gap in 2018 compare with the gap in 1998?
2. What factors contributed to the narrowing of the gender wage gap between 1998 and 2018?
3. What factors explained the remaining gender wage gap in 2018, and did these factors differ from those that explained the gap in 1998?

1. Statistics Canada, Labour Force Survey, table no. 14-10-0064-01.
2. For a discussion of different measures of gender-based pay inequality, see Moyser (2019).
3. Part-time work is defined as less than 30 hours per week.

To answer these questions, this study uses the Blinder-Oaxaca decomposition method, which is consistent with most similar past research (Schirle 2015; Drolet 2011; Baker and Drolet 2011; Baker et al. 1995). Blinder-Oaxaca decomposition is a statistical method that can be used to quantify how much of the wage differential between two groups can be explained by various control factors.

The control variables used in this study are consistent with traditional economic explanations of the gender wage gap; namely, gender differences in human capital and job attributes, and gender-based occupational and industrial segregation (Blau and Kahn 2017; Moyser 2019). The analysis is based on annualized data from the Labour Force Survey (LFS), a monthly cross-sectional household survey conducted by Statistics Canada. Understanding the impacts of various factors on the gender wage gap, and its change over time, contributes to broader efforts to monitor gender-based pay disparity in Canada, and could point the way towards relevant policy interventions.

The gender wage gap decreased between 1998 and 2018

Real wages (adjusted for inflation) grew faster for women aged 25 to 54 than for men in this age group between 1998 and 2018 (Table 1). Specifically, women's average real hourly wages increased by 20.5% over the period, while men's increased by 12.9%. As a result, the gender wage gap decreased by 5.5 percentage points, from 18.8% in 1998 to 13.3% in 2018.

The decrease in the wage gap occurred in a somewhat step-wise manner over the period, with sharper declines observed during the early 2000s and around the 2008-2009 recession (Chart 1). Both of these decreases reflect periods of stagnant or declining wages among men, rather than notable increases in women's wages.

Table 1
Wages and wage gap for core-aged (25 to 54) employees, 2018 constant dollars, 1998 to 2018

	Average real hourly wages			
	Men	Women	Wage gap[1]	Wage gap[2]
	dollars		dollars	percent
1998	27.51	22.34	5.17	18.8
2018	31.05	26.92	4.13	13.3
	percent		dollars	percentage points
Change, 1998 to 2018	12.9	20.5	-1.04	-5.5

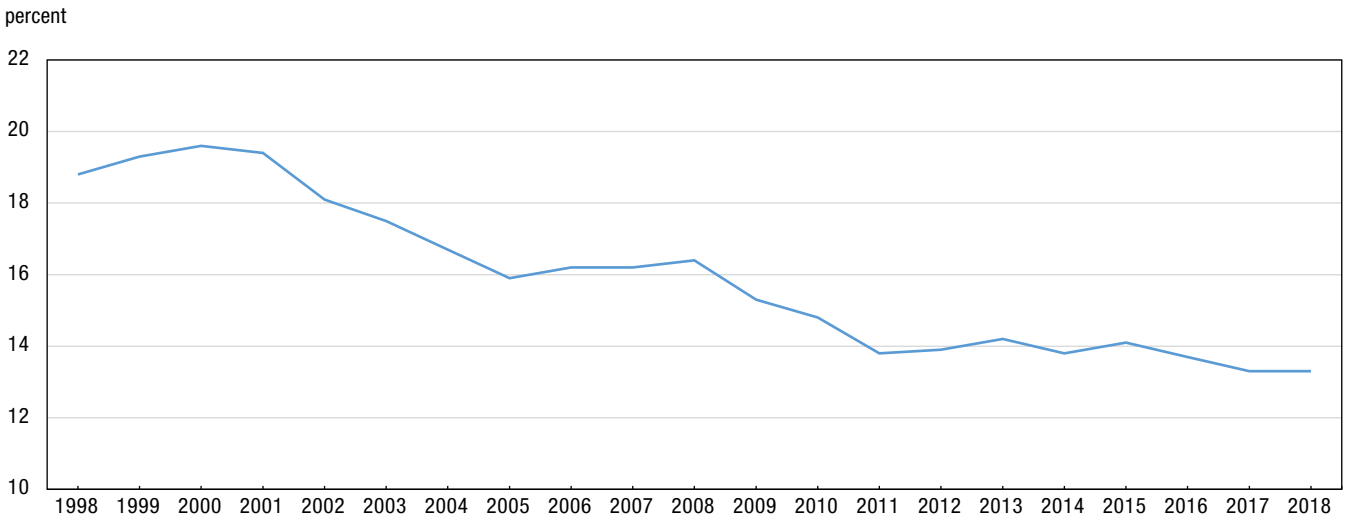
1. The wage gap in dollars is calculated by subtracting women's average wage from men's average wage.

2. The wage gap in percentage is calculated by first dividing women's average wage by men's average wage, then subtracting that result from 1.

Note: The difference between men's and women's average wages was found to be statistically significant at a 95% confidence level.

Source: Statistics Canada, Labour Force Survey, authors' calculations.

Chart 1
Gender wage gap among employees aged 25 to 54, 1998 to 2018



Note: The difference between men's and women's average wages was found to be statistically significant at a 95% confidence level in all years.
Source: Statistics Canada, Labour Force Survey, authors' calculations.

What drove the narrowing of the gender wage gap between 1998 and 2018?

Factors contributing to the narrowing of the gender wage gap over time can be identified and analyzed using a dynamic Blinder-Oaxaca decomposition. A complete description of this method is provided in Appendix A: Data sources and methods. In short, this procedure separates the change in the gender wage gap over time into two portions: first, the part explained by relative changes in the characteristics of men and women over the time period (such as level of education or occupational distribution), and second, the part that is unexplained by such factors.

The unexplained portion is attributable to some combination of two effects; namely, the impact of any observable wage-related characteristics that were not able to be included in the model, plus the effect of all unobservable factors. For more details and examples of what may be captured in the unexplained portion, see the textbox: What is in the unexplained portion?

What is in the unexplained portion?

It may be tempting to view the unexplained portion of the Blinder-Oaxaca decomposition results as evidence of gender-based wage discrimination, however, it is important to understand that this portion captures two kinds of effects.

First, there is the impact of any measureable wage-related characteristics that were not able to be included in the particular study. A notable example in this study is total work experience, which is not available in the Labour Force Survey. The higher prevalence of work interruptions among women, strongly linked to their caregiving responsibilities (Moyser 2019), is an important component of gender differences in annual or lifetime earnings, and has been shown to partially account for differences in hourly wages (Drolet 2002; Blau and Kahn 2017; Olsen et al. 2018). In this study, any such effects are reflected in the unexplained portion of the gap. Field of study serves as another example of an observable characteristic not available in this study, which could bring more nuance to the effects of level of education and occupation/industry of work.

The second type of effect captured in the unexplained portion is that of any unobservable wage-related characteristics. Theories suggest this could include gender differences in behaviours such as work motivation/effort or wage negotiation, as well as the impact of explicit or implicit gender-based wage discrimination, societal expectations or constrained choices in terms of gender roles in paid work, and other related issues. These kinds of factors are very difficult to measure in traditional surveys, and there is considerable debate about the relative importance or strength of any such effects. See Moyser (2019) for a more thorough discussion.

The control variables used in this study are as follows (see Appendix A: Data sources and methods for a more detailed description):

- Human capital: level of education; tenure at current job
- Job attributes: part-time employment (as opposed to full-time); public sector employment (as opposed to private sector); coverage by a union or collective agreement; firm size
- Occupational and industrial segregation: North American Industry Classification System (NAICS) and the National Occupational Classification (NOC) system, both at the 2-digit level
- Demographics:[4] age; province of residence; number of children; marital status

Over half of the narrowing explained by changes in men's and women's characteristics

The results of the dynamic Blinder-Oaxaca decomposition (Table 2) show that the variables included in the model were able to explain a total of 56.6% of the narrowing of the gender wage gap between 1998 and 2018. For each variable, a positive percentage means that the variable helped contribute to the narrowing of the wage gap, while a negative percentage means that the variable had a widening effect on the gap. The larger the value shown for any

4. Indicators of immigrant status and Aboriginal status are available in the LFS from 2006 and 2007 onwards, respectively, but they were found to have little impact on the results. Therefore, these two variables have been excluded to allow for the models to be consistent across the entire period from 1998 to 2018.

given variable, the greater the effect, with the combined effect summing to the 56.6% of the change in the gender wage gap that was explained overall.

In general, a variable could help narrow (or widen) the gender wage gap for two reasons. First, women's average characteristics (e.g. level of education, job tenure, etc.) could change relative to men's. Second, the wage premiums, also known as "returns", for these characteristics could change differently for men and women. Either of these factors could narrow or widen the gender wage gap, depending on whether the change favoured the wages of men or women. Details on how or why each individual variable helped to narrow or expand the gap are provided in the discussion below. For variables that have multiple sub-categories (e.g., occupation and industry), further detail is also provided on which sub-category contributed the most to the change over time.[5]

Table 2
Accounting for the narrowing of the wage gap, 1998 to 2018

	percent
Total explained portion (sum of effects of variables below)	**56.6**
Human capital	**18.2**
Education	12.7
Job tenure	5.5
Job attributes	**22.1**
Part-time	4.8
Public sector	4.8
Union	9.3
Firm size	3.1
Occupation and industry	**18.4**
Occupation	26.3
Industry	-8.0
Demographics	-2.1
Age	**-1.9**
Province	-3.3
Children	1.4
Marital status	1.6
Total unexplained portion	**43.4**

Source: Statistics Canada, Labour Force Survey, authors' calculations.

Change in occupational distribution a key contributor

Between 1998 and 2018, the occupational distribution of men and women explained just over a quarter (26.3%) of the reduction in the gender wage gap. Notable narrowing effects came from professional occupations in law and social, community and government services (8.5%), professional occupations in education services (7.7%) and professional occupations in business and finance (7.2%). These three higher-paying occupational groups employed a larger share of core-aged women in 2018 than in 1998. Also, earnings grew faster for women than men in two of the three groups (professional occupations in law and social, community and government services and professional occupations in business and finance).

Despite the net positive effect of occupation on the narrowing of the gender wage gap, some individual occupations served to widen the gap, notably professional occupations in natural and applied sciences (-9.2%) and administrative and financial supervisors and administrative occupations (-7.4%). These two groups employed a larger share of core-aged men in 2018 than in 1998, while earnings also increased faster for men than women in professional occupations in natural and applied sciences.

Changes in industrial distribution had opposite effect

Although changes in occupational distribution contributed to the decrease in the gender wage gap from 1998 to 2018, the distribution of men and women across industries served to widen the gap (-8.0%). This was driven by the high-paying and male-dominated construction sector (-14.0%), where employment increased over the period. The manufacturing sector helped to counteract the effect of construction, contributing 7.3% to the narrowing of the gap over the 20 years. This was largely due to the decline in employment in manufacturing that occurred over the period, with 25.2% of core-aged men employed in this sector in 1998, compared with 15.5% in 2018.[6]

Women's increased educational attainment helped to narrow gap

The increase in women's educational attainment, relative to men's, was the second most important determinant of the decrease in the gender wage gap between 1998 and 2018. While equivalent proportions of women and men had a university degree at the bachelor level or above in 1998 (21.6% and 21.5%, respectively), the proportion of women with at least a bachelor's degree increased to a greater extent in the following 20 years than did the equivalent proportion of men (+19.6 percentage points vs. +10.8 percentage points). As workers with higher

5. The contributions of individual sub-categories are not presented in Table 2. A complete list of all sub-categories can be made available upon request.
6. The share of women employed in manufacturing also fell between 1998 (10.9%) and 2018 (6.1%), but to a lesser extent than men.

education earned more on average, the relative increase in women's educational attainment accounted for 12.7% of the decrease in the gender wage gap that occurred over the period.

The other human capital variable, job tenure, explained 5.5% of the reduction in the gap, largely due to a decline in men's job tenure relative to women's between 1998 and 2018. By 2018, women's average job tenure (89.4 months) surpassed that of men (86.8 months).

Men's decreased union coverage also had narrowing effect

Changes in job attributes also contributed to the decrease in the gender wage gap that occurred over the 20 years. Particularly important in this regard was union coverage. While the proportion of men covered by a union or collective agreement decreased by 8.6 percentage points between 1998 and 2018 (from 38.2% to 29.5%), the equivalent proportion for women held steady at a little less than 36%. These differing trends largely reflected the fact that men with union coverage were concentrated in manufacturing—a declining sector through the first half of the period—whereas women in unionized jobs have been concentrated in health care and social assistance, and educational services. Since union coverage is associated with higher average wages, the decrease in the proportion of men with union coverage led this variable to account for 9.3% of the decrease in the gender wage gap that occurred between 1998 and 2018.

The other job attribute variables each accounted for a smaller part of the narrowing over the period, with part-time and public sector employment at 4.8% each, and firm size at 3.1%. Beginning with part-time employment, the narrowing effect was tied to a decline in the proportion of women working part time, from 21.0% in 1998 to 16.0% in 2018. Meanwhile, the narrowing explained by public sector employment was due to an increase in the proportion of women working in the public sector (34.1% in 2018, compared with 31.1% in 1998), while earnings returns for these workers also increased. Lastly, the portion of the narrowing explained by firm size was driven by an increase in the proportion of women working for large firms (defined as having more than 500 workers), which tend to have higher wage premiums than smaller firms.

Large portion of narrowing unexplained by control variables

Finally, 43.4% of the decrease in the gender wage gap between 1998 and 2018 was unexplained by the characteristics discussed above. This means that a little less than half of the decrease in the gap over the 20 years was due to differences in characteristics that were not included in the model, and/or unobservable factors (see textbox: What is in the unexplained portion?). This proportion of unexplained variation is consistent with earlier research on the narrowing gender wage gap in Canada (Drolet 2011).

What factors explained the wage gap in 2018, and did they differ from those in 1998?

While the previous section described the factors that narrowed the gender wage gap between 1998 and 2018, this section focuses on the total gender wage gap that existed in both 1998 and 2018, and the factors that explained the gap in each year (Table 3). As such, the percentages associated with each variable take on new meanings in this section, now representing how much each contributed to the gender wage gap. The larger the value, the stronger the effect, with a negative value indicating that, if all else were held constant, that variable would lead to women having higher average wages than men. While results discussed in this section are for Canada as a whole, select information on the gender wage gap in 2018 by province is presented in Appendix B: Provincial results.

Table 3
Explaining the gender wage gap, 1998 to 2018

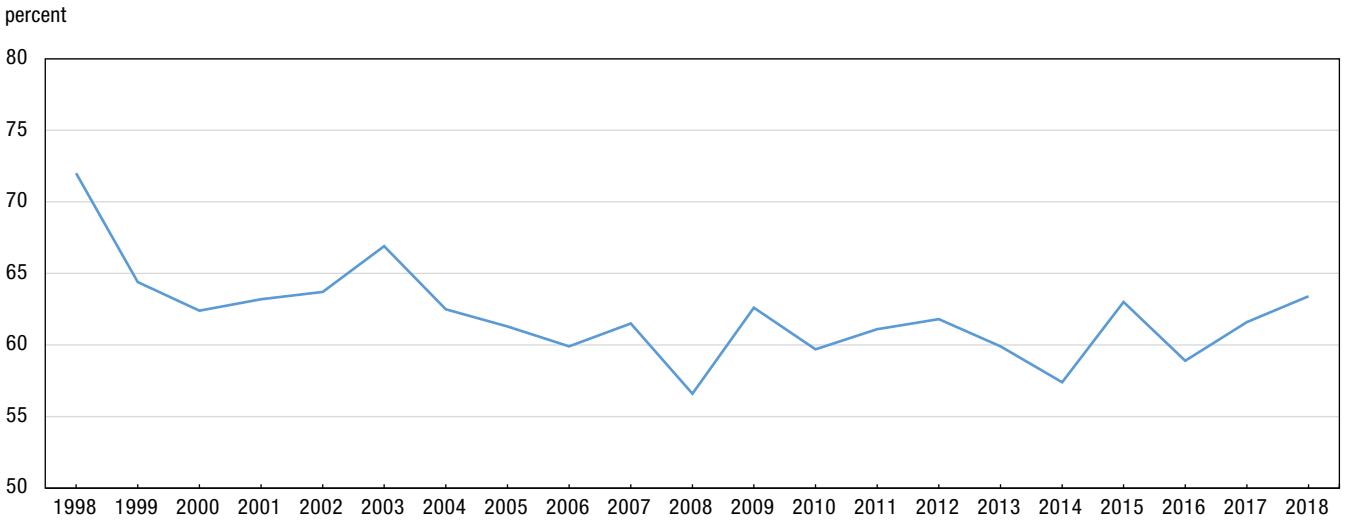
	1998	2018
	percent	
Total explained portion (sum of effects of variables below)	**28.0**	**36.6**
Human capital	**1.8**	**-6.1**
Education	-0.5	-4.8
Job tenure	2.3	-1.3
Job attributes	**10.1**	**-0.7**
Part-time	8.9	9.2
Public sector	-0.6	-5.3
Union	0.7	-3.4
Firm size	1.1	-1.1
Occupation and industry	**18.3**	**44.8**
Occupation	1.8	5.1
Industry	16.5	39.7
Demographics	**-2.2**	**-1.6**
Age	-0.4	-0.3
Province	-0.1	1.0
Children	-0.3	-0.8
Marital status	-1.4	-1.5
Total unexplained portion	**72.0**	**63.4**

Source: Statistics Canada, Labour Force Survey, authors' calculations.

Altogether, the variables included in the model explained over one-third (36.6%) of the gender wage gap in 2018, compared with 28.0% in 1998. In both years, then, the wage gap was driven by unexplained factors, consistent with previous research (e.g., Blau and Kahn 2017; Fortin et al. 2017; McGuiness and Redmond 2018; Schirle 2015).

Many studies have observed that as women's characteristics (e.g., level of education) increasingly converge with, or surpass, those of men, they explain less of the remaining gender wage gap and that the unexplained portion of the gap grows (e.g., Blau and Kahn 2017; Fortin et al. 2017; McGuiness and Redmond 2018). However, in this study, the unexplained portion decreased from 72.0% in 1998 to 63.4% in 2018. This discrepancy may be due to variability in the unexplained portion from year to year (Chart 2). Given this variation, and the lack of a clear trend over time, this study suggests that caution should be used in drawing conclusions concerning trends in the explained and unexplained portions based on only two selected end points.

Chart 2
Unexplained portion of the gender wage gap, 1998 to 2018



Source: Statistics Canada, Labour Force Survey, authors' calculations.

Key part of remaining gap explained by industrial distribution

The industrial distribution of men and women explained the largest portion of the gender wage gap in both 1998 (16.5%) and 2018 (39.7%). Additionally, the same three sectors drove the gender wage gap in both years: construction (6.3% in 1998 and 17.7% in 2018), manufacturing (8.5% in 1998 and 9.1% in 2018), and mining, quarrying, and oil and gas extraction (3.5% in 1998 and 6.7% in 2018).[7] These three sectors drove the gender wage gap in both 1998 and 2018 due to employing substantially larger shares of men than women, and due to their relative wage premiums.

Along with industry, occupational distribution also explained a small part of the gap in 1998 (1.8%) and 2018 (5.1%). Among all occupations, the male-dominated professional occupations in natural and applied sciences contributed the most to the existence of the wage gap in both 1998 and 2018. This is consistent with the results discussed in the previous section, showing that increased employment and earnings for men in this occupational group had a widening effect on the gap over time.

Part-time employment contributes to the gap

Beyond gender differences in industry and occupation, only women's overrepresentation in part-time employment explained a notable portion of the gap in 1998 (8.9%) and 2018 (9.2%). While the previous section showed that some reduction in part-time work among women contributed to the narrowing of the gap over the period, and even

7. The contributions of individual sub-categories are not presented in Table 3. A complete list of all sub-categories can be made available upon request.

though women received a smaller wage penalty for part-time work than men, women's higher likelihood of working part time still contributed to the existence of a gender wage gap in both 1998 and 2018.

Despite having virtually no effect in 1998, public sector employment and union status each counteracted the gap in 2018, at -5.3% and -3.4%, respectively. This is consistent with the previously-discussed increase in public sector employment for women and decrease in union coverage among men between 1998 and 2018.

While job tenure had little impact on the gap in 2018, men's longer job tenure than women in 1998 explained a small portion of the gap (2.3%) at that time. Education had virtually no impact on the gap in 1998, but it counteracted it in 2018 (-4.8%). This finding largely reflects the fact that more women than men had a university degree at the bachelor level or above in 2018.

Conclusion

As of 2018, the gender gap in hourly wages among employees aged 25 to 54 was 13.3%, down 5.5 percentage points from 1998.

More than half of this narrowing was attributable to the control variables in this study (human capital, job attributes, occupation and industry, and demographics), with changes in the occupational distribution of men and women being the largest contributor. Women's increased educational attainment relative to men's, and the decline in the share of men in unionized employment, also contributed to the narrowing of the wage gap. Gender differences in industry—notably, the under-representation of women in the increasingly highly paid construction sector—worked against the narrowing trend in the gender wage gap.

In terms of explaining the gender wage gap remaining in 2018, this study finds that the industrial distribution of women and men played a key role. This was also the most important explanatory factor behind the gap in 1998. The same three sectors (construction; manufacturing; and mining, quarrying, and oil and gas extraction) accounted for most of the effect in both years. The only other factor explaining a notable portion of the gap in both 1998 and 2018 was women's higher rate of part-time work, which had lower average wages than full-time work.

While the above-noted factors were important, more than two-thirds of the gender wage gap in 2018 was unexplained by standard controls for human capital, job attributes, occupation and industry, and demographics. This points to a continued need for analysis in this area, in order to better understand gender-based wage disparity.

One potential avenue of enquiry is differences in work experience between men and women. Women tend to have fewer total years of work experience, due to their increased likelihood of work interruptions, particularly related to child bearing and rearing (Moyser 2019). Earlier research in Canada (Drolet 2002), as well as more recent research in the United States (Blau and Kahn 2017) and the United Kingdom (Olsen et al. 2018), has shown that work history can explain a significant portion of the gender wage gap. Therefore, finding ways to incorporate actual work experience in the models will likely be an important component of understanding the gender wage gap in Canada going forward.

Further opportunities also exist to explore the gender wage gap among specific sub-groups, particularly more vulnerable populations. While a body of literature exists on the wage gaps between immigrants and those born in Canada (e.g., Hou and Lu 2017), and between Indigenous and non-Indigenous Canadians (e.g., Lamb et al. 2018; Nadeau and Seckin 2010), the gender wage gaps within such sub-groups and others, including persons with disabilities, could be further examined and more fully decomposed.

Finally, given the strong role that changes in occupational and industrial distribution have played, and continue to play, in explaining the evolution of the wage gap, this remains an important area for continued research. Understanding how and why occupational and industrial segregation happens, and why average returns to employment in certain occupations and industries differ between men and women, could be useful for policy makers and others seeking to address gender differences in these areas.

Appendix A: Data sources and methods

Data source

This study uses annualized data from the Labour Force Survey (LFS), a monthly household survey conducted by Statistics Canada.[8] Survey weights were divided by 12 to calculate annual estimates from the monthly data. The LFS provides timely and reliable data relating to the Canadian labour market by dividing the working-age population (those aged 15 and over) into three categories—employed, unemployed, and not in the labour force.

The LFS provides data on hourly wages for men and women, as well as on key demographic variables and a number of other factors commonly linked to the gender wage gap, including: age, marital status, province, highest level of education obtained, number of children, part-time/full-time status, job tenure, firm size, union coverage, public sector/private sector status, occupation, and industry.

The survey data is based on a sample of approximately 56,000 households, and excludes persons living on reserves and other Aboriginal settlements, full-time members of the Canadian Armed Forces, the institutionalized population, and households in extremely remote areas with very low population density.

Methodology

Models and Independent Variables

First, in order to ensure comparability and consistency with other gender wage gap studies done in Canada and around the world, the sample is limited to core-aged men and women between the ages of 25 and 54.[9,10] In doing so, results are less likely to be affected by transitions in and out of school or in and out of retirement, as workers in this core-aged group are more likely to hold career jobs rather than transitory positions. Furthermore, the sample excludes the self-employed, as the focus is on employer-paid wages, and hourly wages for the self-employed are not available in the LFS. In order to show the change in the gender wage gap over the last 20 years, data from 1998 to 2018 are used.[11]

Once the sample is selected, a method for measuring and comparing the earnings of men and women must be chosen. In this case, hourly wages are used rather than weekly earnings or annual income, in order to avoid comparing different quantities of work. Real hourly wages must then be calculated from these nominal hourly wages, by dividing them by the Consumer Price Index[12] (CPI) for the year, then multiplying the result by 100. For this study, CPI=100 in 2018, meaning that results are presented in 2018 constant dollars.

In accordance with the existing research on the topic, men's and women's wage structures in each year are estimated using ordinary least squares (OLS) regression. The equation is as follows:

$$lnWage = \alpha + \beta X + \varepsilon$$

where $lnWage$ is the natural logarithm of the real hourly wage, α is the intercept, β is the set of coefficients showing the return to wage-determining variables represented by X, and ε is the error term.

The full set of variables used in this study is as follows:

1. Education (three groups): high school diploma or less; college graduate;[13] and university graduate.[14] The reference group is "high school diploma or less".
2. Job tenure (referring to length of time in current job; six groups): one year or less; more than 1 year to 3 years; more than 3 years to 5 years; more than 5 years to 10 years; more than 10 years to 20 years; and more than 20 years. The reference group is "one year or less".

8. For more information, see the *Guide to the Labour Force Survey, 2018* at https://www150.statcan.gc.ca/n1/pub/71-543-g/71-543-g2018001-eng.htm.
9. In general, the gender wage gap has tended to increase with age, even within the 25- to 54-year-old age group. For a discussion of this topic, see Drolet (2011).
10. During the analysis for this study, results were compared for both the bottom 90% of earners aged 25 to 54 as well as for the entire group, however the results were not found to be significantly different. As such, results presented in this study are for all earners.
11. Results and analysis presented in this study do not account for selection bias, as correcting for selection bias was found to have little effect on the results for the 1998 to 2018 time period.
12. CPI values are from Statistics Canada, Table 18-10-0005-01: Consumer Price Index, annual average, not seasonally adjusted, at https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1810000501.
13. "College graduate" includes postsecondary certificate or diploma, trades certificate or diploma, community college, CEGEP, and university certificate below Bachelor's.
14. "University graduate" includes Bachelor's degree or above.

3. Part-time: equal to 1 if an individual is employed part-time, 0 if full-time.
4. Public sector: equal to 1 if an individual is employed in the public sector, and 0 if they are employed in the private sector.
5. Union: equal to 1 if an individual is in a union or covered by a collective agreement, 0 if not.
6. Firm size (the total number of persons employed at all locations of the firm where an individual works; four groups): small (less than 20); small-medium (20 to 99); medium-large (100 to 500); and large (over 500). The "small (less than 20)" category is omitted from the regression and used as the reference.
7. Occupation: the 40 major groups (2-digit) under the National Occupational Classification (NOC) system. NOC 65, service representatives and other customer and personal services occupations, is the reference category.
8. Industry: sector under the North American Industry Classification System (NAICS), divided into 17 groups. NAICS 44-45, retail trade, is the reference category.
9. Age (six groups): 25 to 29 years; 30 to 34 years; 35 to 39 years; 40 to 44 years; 45 to 49 years; and 50 to 54 years. The age group "25 to 29 years" is omitted from the regression and used as the reference category.
10. Province: corresponds to the province where an individual lives. Ontario is the reference category.
11. Children: the number of the respondent's own children (any age) living in the household at the time of the survey.
12. Couple (three groups): single, never married; married or common-law; and widowed, separated, or divorced. "Single, never married" is used as the reference group.

Blinder-Oaxaca Decomposition

The next step in examining the gender wage gap is to use the Blinder-Oaxaca decomposition procedure on the OLS regression results. This procedure separates the gap into an explained portion (the result of differences in characteristics between men and women) and an unexplained portion (due to any characteristics that were not included in the model, as well as all unobservable factors).

In order to perform the Blinder-Oaxaca decomposition, the results of the OLS regressions for men and women in the same year must be gathered, presented here as:

$$\overline{ln Wage}_m = \alpha_m + \hat{\beta}_m \overline{X}_m + \varepsilon_m$$

and

$$\overline{ln Wage}_w = \alpha_w + \hat{\beta}_w \overline{X}_w + \varepsilon_w$$

In this case, the m and w represent whether figures for men or women are being used, and $\overline{ln Wage}$ is the natural logarithm of the average real hourly wage. Similarly, $\hat{\beta}$ represents the estimated regression coefficients, and $\overline{X}$ represents the averages for the wage-determining variables. Once these results are gathered, a counterfactual equation for women is calculated, showing what they would earn if they received the same pay for their wage-determining characteristics as men. This counterfactual equation is as follows (note that the asterisk in $\overline{ln Wage}^*_w$ represents the counterfactual equation):

$$\overline{ln Wage}^*_w = \alpha_m + \hat{\beta}_m \overline{X}_w + \varepsilon_w$$

with the explained portion of the gender wage gap then expressed as:

$$\text{Explained} = \overline{ln Wage}_m - \overline{ln Wage}^*_w$$

and the unexplained portion of the gender wage gap expressed as:

$$\text{Unexplained} = \overline{lnWage}^{*}_{w} - \overline{lnWage}_{w}$$

This process is then repeated for any other years being examined, to allow for the comparison of the explained and unexplained portions of the gender wage gap over time.

Finally, a calculation can be performed in order to decompose the change in the gender wage gap over time into explained and unexplained portions. The formula to decompose the change between two time periods (expressed as t and $t-1$) is as follows:

$$(\overline{lnWage}_{m,t} - \overline{lnWage}_{m,t-1}) - (\overline{lnWage}_{w,t} - \overline{lnWage}_{w,t-1}) =$$

$$[\hat{\beta}_{m,t}(\overline{X}_{m,t} - \overline{X}_{m,t-1}) - \hat{\beta}_{w,t}(\overline{X}_{w,t} - \overline{X}_{w,t-1})] + [\overline{X}_{m,t-1}(\hat{\beta}_{m,t} - \hat{\beta}_{m,t-1}) - \overline{X}_{w,t-1}(\hat{\beta}_{w,t} - \hat{\beta}_{w,t-1})]$$

where $[\hat{\beta}_{m,t}(\overline{X}_{m,t} - \overline{X}_{m,t-1}) - \hat{\beta}_{w,t}(\overline{X}_{w,t} - \overline{X}_{w,t-1})]$ is the explained portion of the change, and $[\overline{X}_{m,t-1}(\hat{\beta}_{m,t} - \hat{\beta}_{m,t-1}) - \overline{X}_{w,t-1}(\hat{\beta}_{w,t} - \hat{\beta}_{w,t-1})]$ is the unexplained portion of the change.

Appendix B: Provincial results

This section provides the gender wage gap and Blinder-Oaxaca decomposition results for 2018 for each province (Table 4). Gaps ranged from 7.4% in New Brunswick to 18.9% in British Columbia. There was no statistically significant gender gap in hourly wages in Prince Edward Island. As seen in the national results, gender differences in occupation and industry were an important factor in explaining the wage gap in 2018 in all provinces with a wage gap. Gender differences in human capital and job attributes generally counteracted the gender wage gap, leaving a notable portion of the provincial gaps unexplained by the variables used in this study.

Table 4
Gender wage gap and Blinder-Oaxaca decomposition, provinces, 2018

	Newfoundland and Labrador	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Average hourly wages, men, in dollars	**$29.16**	**$26.81**	**$24.33**	**$25.83**	**$28.71**	**$31.43**	**$27.96**	**$31.92**	**$35.99**	**$31.73**
Average hourly wages, women, in dollars	**$26.72**	**$24.30**	**$24.18**	**$23.91**	**$25.85**	**$27.60**	**$24.72**	**$27.04**	**$29.67**	**$25.83**
Gender wage gap[1]										
In dollars	$2.44	$2.51	…	$1.92	$2.86	$3.83	$3.24	$4.88	$6.32	$5.90
In percentage	8.4	9.4	…	7.4	10.0	12.2	11.6	15.3	17.6	18.9
					percent					
Total explained portion of gender wage gap	**47.1**	**6.5**	**…**	**13.0**	**22.1**	**29.1**	**20.0**	**44.4**	**58.0**	**52.3**
Human capital	-15.3	-11.7	…	-18.8	-11.7	-6.5	-2.0	-5.5	-4.0	-1.0
Job attributes	-10.6	-15.0	…	-15.9	-7.9	-1.8	-1.7	7.0	0.3	6.0
Occupation and industry	74.3	39.5	…	58.1	44.3	39.7	28.3	45.1	64.6	48.7
Demographics	-1.3	-6.2	…	-10.3	-2.6	-2.3	-4.7	-2.2	-2.9	-1.5
Total unexplained portion of gender wage gap	**52.9**	**93.5**	**…**	**87.0**	**77.9**	**70.9**	**80.0**	**55.6**	**42.0**	**47.7**

1. Gender wage gaps are reported and decomposed for provinces where the difference between men's and women's average wages was found to be statistically significant at a 95% confidence level.

… not applicable

Source: Statistics Canada, Labour Force Survey, authors' calculations.

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