

Canadian Labour Force Analysis

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Introduction

One of the first topics students in econometrics is the relationship between job tenure and wages. In theory, we expect that the more work experience an individual has, the higher wages they should be earning. Intuitively, they are learning skills within the workplace that develops their productivity towards a company. In addition, minority groups may experience lower average hourly wages. Nobel Prize winner Claudia Goldin shows that females experience a wage gap largely due to giving birth to their first child which causes a reduction in work hours (Goldin, Kerr, and Olivetti 2022). While research show that immigrants who are visible minorities experience an earnings gap of almost 16 percent (Pendakur and Pendakur 1998). In the same paper, immigrants who studied in Canada, still faced an earnings gap. This result leads to a different implication, other than education, among immigrants. This paper will examine two outcomes. First, what are the returns to experience with an employer on earnings? Secondly, how do these earnings vary among females and immigrants?

Data Description

I use the Labour Force Survey: Public Use Microdata file to do my analysis. I use all 12 months in the year 2022. This data set is particularly helpful for this analysis as it provides information on Canada's working population's labour market activities. The data set contains more than 1 million observations however I restrict my sample to people currently employed and working. As a result, my sample size contains 696, 324 observations however, I kept all *NAs* so this number changes throughout my regressions. I chose 13 variables and the ones of interest are hourly wage, job tenure, sex, and immigration status. Additionally, I create dummy variables, if necessary, to ensure I get the effects of different categories.

Empirical Methodology

In order to obtain the effects on earnings, a linear model (1) is specified.

$$HRLYEARN = \alpha_0 + TENURE\alpha_1 + IMMIGRANT\alpha_2 + FEMALE\alpha_3 + Z\beta + \epsilon \quad (1)$$

$$HRLYEARN = \hat{\alpha}_0 + \hat{TENURE}\hat{\alpha}_1 + \hat{IMMIGRANT}\hat{\alpha}_2 + \hat{FEMALE}\hat{\alpha}_3 + Z\beta + \hat{\epsilon} \quad (2)$$

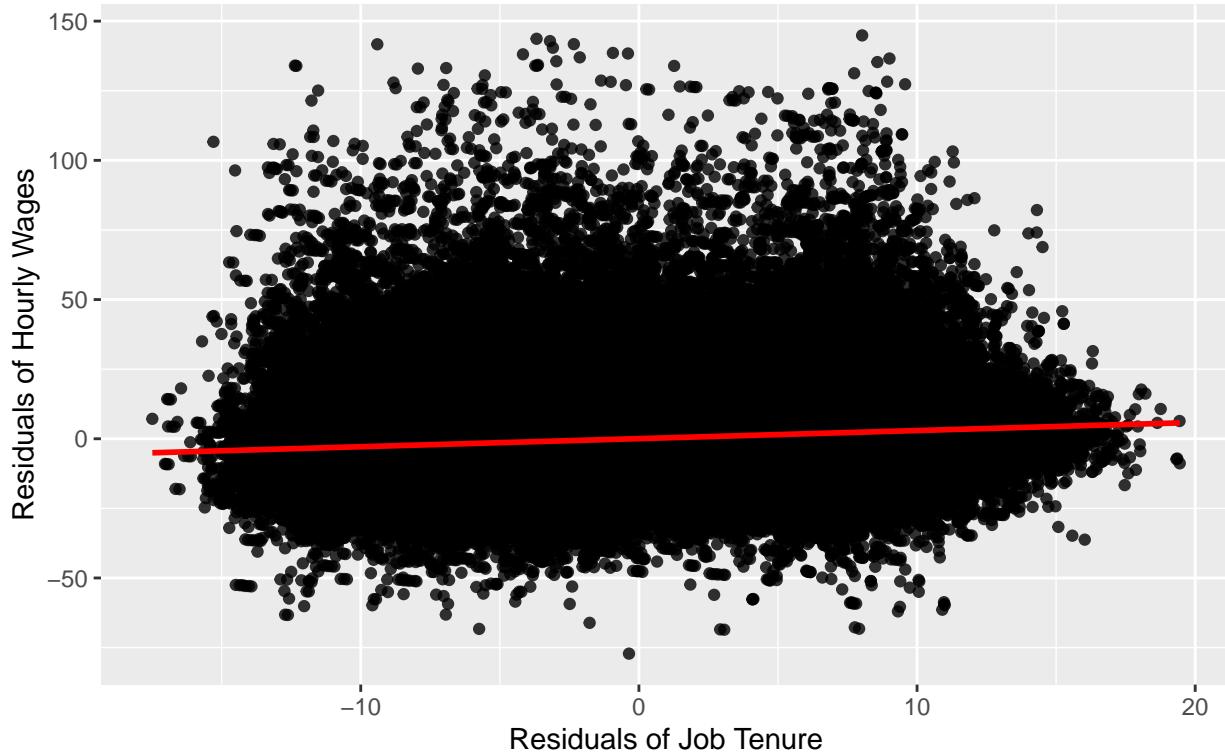
Then, I use OLS to estimate the model and get (2). My dependent variable is hourly wages and my dependent variables of interest are job tenure, immigration status, and female. The rest of my dependent variables are in $Z\beta$. These variables control for factors that will influence hourly wages but am not interested in. My model will allow me to find causal effects of my independent variables on my dependent variable however, under a strong set of assumptions.

Table 1: LFS 2022 Summary

	Mean	Std. Dev.
hourlyearn	31.4	16.8
jobtenure	7.9	7.1
female	0.5	0.5
immigrant	0.2	0.4
ychild_clean	0.1	0.3
	N	Pct.
AGE_12	01	34695
	02	50394
	03	61866
	04	69159
	05	76320
	06	78326
	07	76085
	08	76362
	09	74150
	10	56819
	11	25792
	12	16356

Results

Figure 1: Relationship between Earnings and Wages



Data is from Labour Force Survey 2022 using all 12 months.

Table (2) shows that when all variables are controlled for, a one-year increase in job tenure increases hourly

Table 2: Full OLS

	Model 1
Job Tenure (yrs)	0.29*** (0.00)
Female	-3.19*** (0.04)
Immigrant	-2.47*** (0.04)
R ²	0.52
Adj. R ²	0.52
Num. obs.	599787

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.
Table 2 also controls for whether person has child under 6, age, education, marital status, economic family type, job type, industry type, provinces, and survey month.

Table 3: Interaction OLS

	Model 1
Job Tenure (yrs)	0.32*** (0.00)
Female	-2.76*** (0.05)
Immigrant	-2.51*** (0.06)
Tenure*Immigrant	0.01 (0.01)
Tenure*Female	-0.06*** (0.00)
R ²	0.52
Adj. R ²	0.52
Num. obs.	599787

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.
Table 3 also controls for whether person has child under 6, age, education, marital status, economic family type, job type, industry type, provinces, and survey month.

wage by 0.29 dollars, on average. Figure (1) visualizes this small effect with an almost flat slope across the data points. Additionally, figure (1) shows that there is no pattern within our residuals which means our key OLS assumption of homoskedasticity holds. Females make 3.19 dollars less than males. While immigrants make 2.47 dollars less than non-immigrants.

Heterogeneity

In table (3), when variables are interacted, the standard errors in female and immigrant increases. An explanation for this is that we are allowing for correlation. An extra year of job tenure increases hourly wages by 0.32 cents. While females make 2.76 dollars less than males. Immigrants make 2.51 dollars less than non-immigrants. When tenure and immigrant are interacted, there is minimal effect on average. This is the same case when tenure is interacted with female.

Robustness

Table (4) shows that columns full OLS and heteroscedasticity are similar. The similarities in the two columns can be seen in Figure (1). The residuals show constant variance between tenure and hourly wage. When

Table 4: Regression Comparisons

	Full OLS	Heteroskedasticity	Clustered
Job Tenure (yrs)	0.29*** (0.00)	0.29*** (0.00)	0.30*** (0.03)
Female	-3.19*** (0.04)	-3.19*** (0.04)	-2.51** (0.37)
Immigrant	-2.47*** (0.04)	-2.47*** (0.04)	-2.72** (0.38)
R ²	0.52	0.52	0.53
Adj. R ²	0.52	0.52	0.53
Num. obs.	599787	599787	11983
RMSE		11.65	11.73
N Clusters			10

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Table 4 also controls for whether person has child under 6, age, education, marital status, economic family type, job type, industry type, provinces, and survey month.

robust standard errors are applied, the goal is to ensure the assumption of constant variance holds. Since it already holds prior to robust standard errors, we get similar estimates.

The results from clustered standard errors are on par with effects on job tenure and immigrants while female varies. On average, females make 3.77 dollars less than males, when we cluster in provinces. Though, these results may be biased due to the reduced sample size. As expected, since we are allowing for correlation, standard errors are much higher as opposed to the previous estimates.

Conclusion

This paper investigates returns to experience with an employer on earnings and how it differs among females and immigrants. I estimate a model using OLS and find that females make 3.19 dollars less than males, in hourly wages. While immigrants' hourly wages decrease by 2.47 dollars on average, compared to non immigrants. When I use robust standard errors, the results are exactly the same. Additionally, I cluster within provinces and find that females earn an average hourly wage of 3.77 dollars less compared to men. Moreover, effects on immigrants are similar to my other estimates. However, a reduced sample size and increased standard errors should be noted when I cluster within provinces. In three different estimates, an increase in job tenure seem to have similar but minimal effects on average hourly wages, varying between 0.27 and 0.30.

Results show that policy implications should be directed towards supporting women and immigrants, rather than increasing job experience. For females, the gender wage gap has been prevalent. Much of this is due to the reduction in work hours after the birth of the first child (Goldin, Kerr, and Olivetti 2022). There is no policy intervention regarding having a child, as that is entirely the woman's choice. However, examples to reduce the wage gap are: promoting diversity and inclusion within the workplace and addressing wage discrimination. For immigrants, providing support to adjust to the country's standards may help them seek opportunities that provide higher wages. For example, English lessons, as communication is an important skill. Additionally, investing towards on the job training for immigrants, may give them the necessary tools to adapt to Canada's working environment.

References

- Goldin, Claudia, Sari Pekkala Kerr, and Claudia Olivetti. 2022. "WHEN THE KIDS GROW UP: WOMEN'S EMPLOYMENT AND EARNINGS ACROSS THE FAMILY CYCLE." *NATIONAL BUREAU OF ECONOMIC RESEARCH*, NBER WORKING PAPER SERIES, no. WORKING PAPER 30323 (August).
- Pendakur, Krishna, and Ravi Pendakur. 1998. "The Colour of Money: Earnings Differentials Among Ethnic Groups in Canada." *The Canadian Journal of Economics / Revue Canadienne d'Economique* 31 (3): 518–48. <https://doi.org/10.2307/136201>.