

Effects of Second-Official Language on Earning Premiums in Ontario, Canada: Case of Male and Female Differentials

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ABSTRACT

This paper is focusing on the effects of learning French as a second language, where English serves as the mother tongue amongst both male and female Ontarians. With other factors considered, the paper responds to the question; would it be beneficial in terms of earnings for both male and female residents of Ontario to either use only English, both English and French, or only French at work? Using census data from 2016, a log-linear model was fitted to a total sample 27,362 males and 22,752 females. Generally, there is significant difference ($t=30.65>1.96$; $p=0.000<0.05$) in wages between male and female workers. Also, the study concludes that there is only a significant difference in earnings if French is used alongside English at the workplace; however, both male and females need not to learn a second-official language while residing and working within Ontario as it does not benefit them in terms of their wages.

Keywords: earnings, French, male and female, Ontario, second language.

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I. INTRODUCTION

Globalization advances traveling, interactions, and the flow of communications among countries, provinces, and groups of people, implying a need for learning a second language. According to Grenier and Vaillancourt (1982), economists view acquiring a second language as an addition to the individual's human capital. A person can plan to learn a second language for many reasons but is not limited to, cultural, intellectual, political, and economic returns (Christofides & Swidinsky, 2008), where economic returns include labor market earnings. Employers may also find individuals who have linguistic duality more attractive to hire, as well as individuals who acquire a second language have a sense of job mobility and job security.

Christofides and Swidinsky (2008) reported that a high proportion of French immersion graduates consider and are hired by enhanced job opportunities, which is the most significant long-term effect of learning French as a second language. This would make sense as to why parents would enroll their children in French immersion schools, where the gain of learning another language is expected to reflect in the children's future economic returns. In Canada in 2011, the level of plurilingualism was 17.5% (Canadian Heritage, 2016).

This paper will focus on the differential in earnings of bilingual and unilingual individuals who work in the province of Ontario in Canada, as English and French are both the official languages of the country. Christofides and Swidinsky (2008) carefully noted that earnings are one dimension of the economic returns that knowledge of an additional language could affect. Prior to the 2001 Census survey results, there was no evidence that an individual is bilingual because he or she has knowledge of the language, uses it in his or her workplace, or both. However, for the first time, the 2001 Census reported that respondents were asked if they were bilingual and to what extent they used their linguistic skills at work. Thus, sampling a group of individuals with both knowledge and use of the second language in Ontario would help measure the additional earnings received, if any.

As the Canadian government notes in its study of the economic advantages of bilingualism, it notes that bilingual job candidates have a comparative advantage depending on the local supply and demand of employees who are fluent in both English and French. Among the top 20 Canadian cities, Toronto has been ranked first whereas Ottawa is eleventh in rankings where bilingual candidates hold a comparative advantage due to their knowledge and use of their second language (Canadian Heritage, 2016).

Theoretically, Cañibano (2019) noted that human capital investments connect education markets, language skills (presented as unilingual and bilingualism), and labor markets (presented as occupation and industry in this paper) for an expected higher income. Therefore, this study not only analyzes the effects of a second official language on the economic earnings of males and females, but it also analyzes other variables, namely, city, age, marital status, education, occupation, and industry on the annual wages of males and females.

II. METHODOLOGY

The data set was obtained from the 2016 Census of Canada Public Use Microdata File: Individuals Database from Odesi/Statistics Canada. To construct the data set for Ontario only, we filtered for individuals who are 18 to 64 years of age, Canadian-born, at least with high school diplomas or equivalent, English as their mother tongue, claim language fluency in both knowledge and use of English only or in both English and French, and paid workers who worked full-time, full year in 2015. Variables of interest are, namely, wages, cities (Toronto and Ottawa), marital status, age, education, languages, occupations, and industries. The data were cleaned for possible non-applicable cases (outliers and high variation observations).

Further refinements were made to produce dummy variables to represent subgroups in the study sample. This paper will focus on residents in the province of Ontario, collectively noted as the variable, city (Toronto and Ottawa). Both males and females legally married and common law are classified categorically within the variable, marital status. Education is presented in four categories: high school, trade/college, university, and post-graduate. Both males and females are also split into four language groups, identified as individuals that claim their official language is only English (UNIL/ENGLISH), individuals who are bilingual are classified into the other three categories: Mostly English, frequently English (BIL/MEFE), mostly English, frequently French (BIL/MEFF), and individuals who only speak French (BIL/FRENCH). Males and females are also split into occupations, consisting of four groupings: management, professional, semi-professional, and blue collar. Industries are also sorted into four categories: namely, public, goods, and service (for coding and details see Appendix).

Splitting the sample into male and female for clear interpretations, the variables of interest are defined in their categories and descriptive statistics are reported in Table I as follows. The authors of the accepted manuscripts will be given a copyright form and the form should accompany your final submission.

TABLE I: DESCRIPTIVE SUMMARY STATISTICS

Variable	Male		Female	
	Mean	Standard Deviation	Mean	Standard Deviation
Wages*	83,870.39	95,379.06	62,817.71	44,411.63
City	0.397	0.489	0.406	0.491
Age Group*	11.916	2.328	12.048	2.303
Marital status	0.695	0.460	0.656	0.474
High school	0.310	0.462	0.243	0.429
Trade/college	0.399	0.489	0.362	0.480
University	0.216	0.411	0.290	0.454
Postgraduate	0.073	0.260	0.103	0.304
UNIL/ENGLISH	0.912	0.283	0.876	0.328
BIL/MEFE	0.060	0.237	0.072	0.259
BIL/MEFF	0.021	0.143	0.036	0.186
BIL/FRENCH	0.001	0.037	0.005	0.075
Management	0.276	0.447	0.419	0.493
Professional	0.230	0.420	0.352	0.477
Semi-professional	0.159	0.366	0.190	0.392
Blue collar	0.333	0.471	0.037	0.190
Public	0.201	0.400	0.436	0.495
Goods	0.510	0.499	0.242	0.428
Service	0.288	0.453	0.320	0.466

Note that $*t=30.65>1.96$; $p=0.000<0.05$.

*Considered Variable Age Group Value (categories are in parathesis); 7 (18 to 19 years), 8 (20 to 24 years), 9 (25 to 29 years), 10 (30 to 34 years), 11 (35 to 39 years), 12 (40 to 44 years), 13 (45 to 49 years), 14 (50 to 54 years), 15 (55 to 59 years), 16 (60 to 64 years).

The actual annual average wage for males is greater than the average wage for females (where CAD\$83,870.39>CAD\$62,817.71 per year). The standard deviation for males is higher than its mean, implying the distribution for the wage is widely spread for men, but the standard deviation for females is lower than its mean; however, there is significant difference ($p=0.000<0.05$) in wages between male and female workers. It is also found that 39.7% of males reside in both Ottawa and Toronto whilst 40.6% of females reside in both Ottawa and Toronto, where both cities are within the province of Ontario. The average age for both males and females within this sample are approximately in the age category of 12 (meaning most of the respondents are in the age group of 40 to 44 years). The standard deviations for both males and females are relatively low; meaning most of the age observations are not far from their means. Marital status considers both category 2 (defined as legal married) and category 3 (defined as common law), resulting in 69.5% of males are married (while $100\%-69.5\%=30.5\%$ of males are in common law), and 65.6% of females are married (on the other hand, $100\%-65.6\%=34.4\%$ of females are in common law relationships).

Within this census data set, 31% of males reported to be in high school, 39.9% reported to be in trade or college, 21.6% reported to be in university, and a smaller percentage of 7.3% of males reported to be in post-graduate education. For females, 24.3% reported to be in high school, 36.2% reported to be in trade or college, 29% reported to be in university, and 10.3% of females were in post-graduate education, which is a larger proportion compared to the percent of males that attended post-graduate studies. Looking at the education dummy variables, ranging from high school to post-graduate, all their standard deviations are bigger than their means, showing there are high variations in the education data for both male and female cases.

Referring to the sample of full-time working males and females, their mother tongue is mostly restricted to English. However, to determine if a language premium exists, language is divided into 4 categories: UNIL/ENGLISH (unilingual in English), BIL/MEFE (bilingual: mostly English, frequently English), BIL/MEFF (bilingual: mostly English, frequently French), and BIL/FRENCH (bilingual: French only, frequently French). From the sample, 91.2% of males are unilingual in English, 6% are bilingual but mostly and frequently use English, 2.1% are bilingual but mostly use English, however, frequently use French, and 0.1% are bilingual but frequently or only use French. Considering the female sample, 87.6% are unilingual in English, 7.2% are bilingual but mostly and frequently use English, 3.6% are bilingual but mostly use English and frequently use French, and 0.5% are bilingual but frequently or only use French. More males than females (91.2% and 87.6%, respectively), on average, are more unilingual in English and, generally less bilingual than females. It is important to note that the standard deviations for all the language variables, except unilingual (English), are greater than their means; implying higher variations among the language data points.

Among the occupation variables, males occupied, on average, 27.6% of management positions, followed by 23% in professional occupations, 15.9% in semi-professional occupations, and 33.3% in blue-collar occupations. For females, 41.9% are in management, 35.2% are in professional, 19% are in semi-professional, and 3.7% are reported in blue-collar occupations. It is evident that more females work in all occupations than males except blue-collar occupations (where 33.3% for males > 3.7% for females). This could perhaps be because of high proportion of females attending university and post-graduate studies than males, as males are found to have relatively higher attendance in high school and trade/college education, as reported in Table I summary. The standard deviations for the occupation dummy variables for both genders are high; indicating that observations are far from their means and suggesting wider variations or distributions of the observations.

Looking at the industry variables, 20.1% of males are in the public industry, 51% are in the goods industry, and 28.8% are in the service industry. Whereas 43.6% of females are in the public industry, 24.2% in the goods industry, and 32% in the service industry. Their standard deviations for both genders are fairly high.

Overall, high standard deviations imply more observations are far from the mean with the possibility of some outliers within the data set, and perhaps leading to non-normal (or asymmetric) distribution.

III. ECONOMETRICS MODEL

For this paper, the log-linear model, where the dependent variable takes on the log format whereas the independent variables remain in the linear format.

$$\ln Y_i = \beta_0 + \beta_1 X_{1i} + U_i \quad (1)$$

where

Y_i – dependent variable wages.

β_1 – parameter of vectors that will be estimated.

X_i – vector of independent variables.

namely: city, marital status, age, high school, trade/college, university, post-graduate, UNIL_ENGLISH, BIL_MEFE, BIL_MEFF, BIL_FRENCH, semi-professional, management, professional, blue collar, goods, public, and service (see appendix for details).

Although the data are cleaned for the wage observations of 0, negative numbers, and missing values, the log form is used for the dependent variable (wages) to minimize the variation and keep the variance constant, as some outliers remain in the data set. Overall, this would give a better prediction of the dependent variable.

IV. ESTIMATES AND INTERPRETATIONS

Table II breaks down the sample size of the census population surveyed into males and females, and the

effects of a second language on their average annual earnings as residents of Ontario represented by the cities of Ottawa and Toronto.

TABLE II: SAMPLE SIZE AND AVERAGE ANNUAL EARNINGS FOR ONTARIO

	Sample Size	Percent of Total Sample	Percent of Bilingual	Annual Earnings (\$)	Percent Differential
Men					
Total Sample	27,362	100	-	83,870.39	-
Unilingual	24,954	91.20	-	82,435.54	-
Bilingual	2056	8.24	100	99,074.70	20.2
BIL/MEFE	1,495	6.00	72.75	98,787.84	19.8
BIL/MEFF	524	2.10	25.52	101,032.92	22.5
BIL/FRENCH	35	0.14	1.72	82,729.59	0.36
Women					
Total Sample	22,752	100	-	62,817.71	-
Unilingual	19,951	87.69	-	60,997.49	-
Bilingual	2,282	11.44	100	76,083.85	24.7
BIL/MEFE	1,448	7.26	63.46	76,207.70	24.9
BIL/MEFF	721	3.61	31.57	76,370.90	25.2
BIL/FRENCH	113	0.56	4.95	72,972.79	19.6

As presented in Table II, among 27,362 men in Ontario, 91.2% are unilingual in English only whilst 8.24% are overall bilingual. Among those who are bilingual, the vast majority (72.75%) use English only at work (BIL/MEFE). Also, 25.52% of bilingual men use mostly English and frequently French (BIL/MEFF), and a small proportion of 1.72% of men in Ontario using only French (BIL/FRENCH) at the workplace.

Table II also presents the percent differential in annual earnings for the four different categories. First, there is a 20.2% wage earnings difference between unilingual and bilingual men with a statistically significant difference at a 5% level of significance (i.e., $p\text{-value}=0.0000<0.05$). Bilingual men that use only English (BIL/MEFE) at work earn 19.8% higher than unilingual men. Although the only difference between the two groups is the knowledge of French, it shows that the knowledge of a second language is sufficient to earn more. Bilingual men who used mostly English but frequently used French (BIL/MEFF) received a slightly higher premium (22.5%). However, men working in Ontario that only use French earn 0.36% difference which shows that, although the knowledge of French is valued in Ontario, the use of only French does not significantly contribute to a higher yearly earning premium.

The results in Table II for Ontario women are very similar to that of the men. Of the 22,752 females in Ontario, 87.69% are unilingual in English only and 11.44% are generally bilingual. Within the bilingual group, a dominant amount (63.46%) uses only English at work (BIL/MEFE), which is similar to the men's sampling, 31.57% use mostly English and frequently French (BIL/MEFF), and a smaller amount of 4.95% use only French (BIL/FRENCH) at the workplace, a proportion higher than men who use only French.

Looking at the percent differential in annual earnings for women, their proportions are slightly higher than the men's. Bilingual women earn a 24.7% increase in earnings than unilingual women. The differential in earnings for bilingual women who use only English at work is 24.9%, and those who frequently use French earn 25.2% higher, and women whose work language is only French earn a premium of 19.6% compared to women who are unilingual. However, women in all language categories relatively earn less average annual earnings than men in Ontario. There is also a statistically significant proportional difference between females (19.6%) and males (0.36%) who only use French at workplace.

Note that the category of both men (CAD\$101,032.92) and women (CAD\$76,370.90) who mostly use English and frequently French (BIL/MEFF) earn the highest earnings premium among individuals in other bilingual categories.

The regression results for both male and female samples are shown in Table III. The annual wages variable in the sample are logged to easily present the effects of the independent variables on the dependent variable (wages). Logging also possibly reduces the high variation in the wage data.

Interpreting results for men in Table III, individuals who reside in either city (Toronto or Ottawa) in Ontario gain a 9.4% increase in their annual salaries, whilst women who live in the same city earn a higher proportional increase (15.5%) in annual wages. For both male and females living in Ontario, there are significant effects on annual average wages ($t=12.65 > 1.96$ for men and $t=21.92 > 1.96$).

Marital status considers both legally married and common law relationships; men's marital status significantly affects their average annual wage by 20.8% than their female counterparts, where the influence is 7% increase annually. The significant difference between males and females implies there is perhaps inequality and inequity based on the social norms of the roles the sexes take on in society (Pilossoph and Shu, 2021).

TABLE III: HUMAN CAPITAL EARNINGS FUNCTION LOG EARNINGS REGRESSION
RESULTS FOR WOMEN AND MEN IN ONTARIO (T-STATISTICS IN PARENTHESES)

	Men	Women
Intercept	6.672 (69.453) *	6.531 (69.545) *
City	0.094 (12.659) *	0.155 (21.928) *
Marital Status	0.208 (25.167) *	0.070 (9.632) *
Age	0.586 (35.241) *	0.562 (34.616) *
Age Squared	-0.021 (-31.135) *	-0.020 (-29.790) *
Education (High School)		
Trade/College	0.163 (19.542) *	0.090 (10.062) *
University	0.367 (34.544) *	0.389 (38.726) *
Post-Graduate	0.486 (31.225) *	0.530 (39.076) *
Language (UNIL_ENGLISH)		
BIL_MEFE	-0.008 (-0.544)	0.038 (2.963) *
BIL_MEFF	0.027 (1.154)	0.080 (4.508) *
BIL_FRENCH	-0.086 (-0.953)	0.020 (0.474)
Occupation (Semi-Professional)		
Management	0.346 (31.088) *	0.311 (32.841) *
Professional	0.287 (23.409) *	0.307 (26.738) *
Blue Collar	0.182 (16.464) *	0.214 (11.201) *
Industry (Goods)		
Public	0.012 (1.228)	0.025 (2.510) *
Service	-0.042 (-4.895) *	0.004 (0.446)
Adjusted R Squared	0.304	0.343
Total # of Observations	27,362	22,752

Note that *indicates significant at 5% level of significance (where t-value in a parenthesis is either negative t-calculated < -1.96 or t-calculated > 1.96)

As men grow older, for example, an increase by 1 year, their annual wage significantly increases by 58.6% whilst females' annual wage increment is by 56.2%. The age variable contributes a significant effect on wages for either males or females as evidenced by significant t-values ($t=35.24 > 1.96$ and $t=34.61 > 1.96$, respectively).

The returns from education also show significant increases as men progress from high school graduations to their completion of post-graduate studies. Completion of post-graduate studies for men have more significant influence on average annual earnings than completion of the other levels of schooling. Postgraduate studies influence the annual wage by 48.6% while a university degree and trade/college effect annually average earnings by 36.7% and 16.3%, respectively. Similarly, females show a comparable progression in earning returns from education. Comparing with high school graduates, women who completed trade/college earn 9% increase on average annual wages, with a university degree there is an increase by 38.9% and having a post-graduate degree gives them 53% increase in yearly average wages. Linking the results in Table III, for men, there is significantly higher percentage (16.3%) influence on annual earnings than for women (9%) who finished trade/college. However, for women who studied university or post-graduate level, there is 38.9% and 53%, respectively, had significantly higher annual premium earnings than men in the same category.

Looking at the language variables and comparing the average annual wage estimates to unilingual men; men who only use English at work have a non-significant ($t=-0.544 > -1.96$) decrease in annual earnings of 0.8%, those who use English mostly and French frequently earn a 2.7% increase, and the smaller minority of men (0.56%, as seen in Table II) who use French only at work face a decrease of 8.6% in their annual salaries. However, these fluctuations in wages with regards to attaining a second official language in Ontario are not significant in all categories for men and thus do not affect annual earnings significantly. Likewise, comparing to unilingual women, those who use English only at work have an increase of 3.8% in their earnings, those who use English mostly and French frequently earn an 8% increase, and the small minority of women who speak French only (4.95%), as seen in Table II earlier, earn 2% increase to their annual wages. In contrast to their male counterparts, women who speak mostly English and frequently French significantly influence average annual premiums whilst women who only speak French in Ontario do not have a significant effect on their average annual earnings.

For both men and women, the results in Table III show that the knowledge and use of French language only in the province of Ontario does not significantly impact annual wage premiums ($t=-0.953 > -1.96$ for men, and $t=0.474 < 1.96$ for women).

In terms of occupation, men earn a 34.6% increase in wages if they take on management positions, 28.7% increase if they take on professional positions, and 18.2% increase in annual salary if they take on blue collar jobs, where all increases compare to men in semi-professional as base positions. These increases show significant implications on the wages for the male regression model. For women, 31.1% gain an increase in earnings if they are in management, 30.7% increase if they are in professional careers, and 21.4% increase in their annual salary if they are in blue collar jobs. Similar to the results for men, increases

on wages for the female regression model are all significant.

Interpreting the estimates for the industry variable, men in the public sector earn a 1.2% increase in their wages compared to the those working in the goods sector, as a base sector, although not significant since $t=1.228 < 1.96$. However, men working in the service industry experience a 4.2% significant ($t=-4.895 < -1.96$) decrease in their annual earnings. Looking at the results for women, the estimate is not significant for the service sector. Women in the public industry receive a 2.5% significant ($t=2.51 > 1.96$) increase in their wages, compared to the goods sector, and those in the service industry earn a 0.4% increase, in contrast to the men in the same industry.

Looking at the regression model for men, the reported adjusted R squared, that is, 30.4% of the variation in the average annual wages is explained by the independent variables, and for women 34.3% of the variance in the regression is explained by the regressors. However, the low coefficient of determination results may suggest that there are some omitted independent variables in the model.

V. CONCLUSIONS

As stated earlier, human capital involves multiple markets in the expectation of higher future earnings. Some of the other variables of study proved to contribute to this increase in the earning premium. However, focusing on the interpretation of the results that bilingualism has on economic earnings, it generally concludes to substantial and statistically significant effects on the earnings of the male and female samples. The only exception to this statement is found within the sample of women who are bilingual but only speak French at the workplace, implying that there is no measure of a significant difference in the earnings only French speakers receive comparing to the earnings unilingual women receive. For the sample of men who are bilingual but only use French at work, there is a decrease in approximately 8.6% in their economic earnings. Thus, the use of French alone is not valued within Ontario. However, the use of English alongside French is shown to hold importance earning both male and female workers a higher and significant premium among other language categories. However, it is important to remember that other influences contribute to this difference. As workers contemplate learning a second language, they will consider other factors and their personal gain from the time spent on attaining a second official language.

APPENDIX

City: PR (35): resident of Ottawa (505) and resident of Toronto (535) in Ontario.

Marital Status: MARSTH; legally married (2) and common law (3).

Education: HDGREE; High School (2), Trade/College (3-7), University (8, 9) and Postgraduate (10-13).

Languages: MTNEN (1), KOL (1-3), LWAEN, LWBFR, LWAFR, LWBEN; In Ontario, UNIL/ENGLISH (Mother tongue English, knowledge of English only, work language as English only); BIL/MEFE (Mother tongue English, knowledge of English and French, work language as English only); BIL/MEFF (Mother tongue English, knowledge of English and French, work language mostly English frequently French); BIL/FRENCH (Mother tongue English, knowledge of English and French, work language French only, mostly or both English and French).

Occupation: NOCS; Management (1-2), Professional (3, 4, 5), Semi-professional (6, 7), and Blue Collar (8, 9, 10).

Industry: NAICS; Public (3, 14, 15, 19), Goods (1, 2, 4, 5, 6, 7, 8), and Service (9, 10, 11, 12, 13, 16, 17, 18).

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REFERENCES

- Cañibano, C., & Potts, J. (2019). Toward an evolutionary theory of human capital. *Journal Evolutionary Economics* 29, 1017–1035. <https://doi-org.ezproxy.lib.torontomu.ca/10.1007/s00191-018-0588-y>.
- Canadian Heritage. (2016). Economic advantages of bilingualism: Literature review May 2019. Department of Canadian Heritage, Government of Canada. <https://www.caslt.org/wp-content/uploads/2022/03/pch-bilingualism-lit-review-final-en.pdf>.
- Christofides, L. N., & Swidinsky, R. (2008). The economic returns to a second official language: English in Quebec and French in the rest-of-Canada. *SSRN Electronic Journal*, Discussion Paper No.3551, 1–34., <http://dx.doi.org/10.2139/ssrn.1150720>.
- Grenier, G., & Vaillancourt, F. (1982). An economic perspective on learning a second language. *Journal of Multilingual and Multicultural Development*, 4 (6), 471–483. <https://doi.org/10.1080/01434632.1983.9994130>.
- Pilosoph, L., & Shu L. W. (2021). Household search and the marital wage premium. *American Economic Journal: Macroeconomics*, 13 (4), 55–109.DOI: 10.1257/mac.20180092.

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