



**THE ECONOMIC RETURNS TO THE
KNOWLEDGE AND USE OF A SECOND
OFFICIAL LANGUAGE: ENGLISH IN QUEBEC
AND FRENCH IN THE REST-OF-CANADA**

Louis N. Christofides and Robert Swidinsky

Discussion Paper 2010-04

The Economic Returns to the Knowledge and Use of a Second Official Language:

English in Quebec and French in the Rest-of-Canada

Louis N. Christofides*
University of Cyprus
Department of Economics
Kallipoleos, 75, P.O. Box 20537
1678 Nicosia, CYPRUS
Phone: 357 22 892448; Fax: 357 22 892432
Email: louis.christofides@ucy.ac.cy

and

Robert Swidinsky*
University of Guelph
Department of Economics
Guelph, Ontario, CANADA, N1G 2W1
Phone: 519 824 4120 Ext. 52188
Fax: 519 763 8497; Email: rswidins@uoguelph.ca

February 9, 2010

* The authors are members of the Canadian Language and Literacy Research Network. Louis Christofides is University Professor Emeritus at the University of Guelph, Research Associate at CESifo and Research Fellow at IZA. This research was supported by the CLLRNet, the SSHRC and programme 311 of the University of Cyprus.

Abstract

In a country with two official languages, such as Canada, the demand for bilingualism may lead individuals born with one mother tongue to acquire the second official language. Knowledge of an additional official language may be associated with enhanced earnings for two reasons; its actual value in the workplace, or its value as a screening mechanism for ability. Previously available data did not indicate whether bilingual language skills were actually being used at work. However, the 2001 Census reports, for the first time, the primary and secondary languages that an individual uses at work. Conditioning on *both* language knowledge and language use allows us to estimate the additional earnings that can be attributed to the use of a second official language. We find very substantial, statistically significant, rewards to second official language use in Quebec and much smaller, not statistically significant, effects in the Rest-of-Canada.

Keywords: wages, language knowledge, language use
JEL Classification: J31, J24, I2

I INTRODUCTION

There are many reasons why a person, fluent in one mother tongue, may choose to learn a second language. These include, among others, cultural, intellectual, linguistic, scientific, political, personal, and economic reasons. In this study we focus on the economic incentives that prevail in Canada for learning a second official language. Given that Canada is a linguistic duality with French dominant in Quebec and English dominant in the Rest-of-Canada (ROC), our primary objective is to estimate and compare the additional earnings ('returns' for short) obtained by Francophones in Quebec and Anglophones in the ROC who learn and use a second official language. Although the main focus of this study is on these two groups, we also explore and comment on the effects of second-official language skills on two other groups, Francophones in the ROC and Anglophones in Quebec. While educators, especially those promoting French immersion programs in the ROC, tend to emphasize the cultural, linguistic and cognitive merits of learning French as a second language (Lambert, 1977; Turnbull, Lapkin and Hart, 2001; Edwards, 2003), parents (CPF, 2004), students (Hussum and Bryce, 1991; MacFarlane and Wesche, 1995; Savoie, 1997), and employers (Chorney, 1998) are more likely to focus on the economic value of additional language skills.

Bilingual skills may have an effect on a variety of labour market outcomes. They may, for example, generate higher labour force participation, lower unemployment, increased job mobility, wider choices of jobs, more job training, more rapid promotion, and higher labour market earnings. Indeed, bilingualism may condition the entire fabric of social relations maintained by an individual, but these important effects are beyond the scope of this paper. Here, we focus on the effect of bilingual skills on the labour market earnings of Canadian paid workers who learn French or English as a second language. Admittedly, earnings are only one dimension of labour

market outcomes, but this is an important dimension and promotion, job training, job mobility, occupational and job choice are all ultimately connected to labour market earnings.

At present, there a number of studies that yield estimates of labour market returns to bilingual skills in Canada; see, for example, Grenier (1987), Shapiro and Stelcner (1987, 1997), Chiswick and Miller (1988), Vaillancourt (1992, 1997), Christofides and Swidinsky (1998), and Albouy (2006). These studies use various methodologies, data sets, time periods, regions and linguistic groups, making direct comparisons somewhat difficult. In general, the evidence shows that bilingual Francophone men in Quebec earn substantially more than their unilingual counterparts; the estimated returns to bilingualism range from 7 percent (Vaillancourt, 1997) to 16 percent (Albouy, 2006, Figure A2), depending on model specification and sample composition. Estimates of bilingual premiums for Francophone women in Quebec are more dispersed; Vaillancourt (1997) finds a net effect of 11.24 percent, Shapiro and Stelcner (1997) estimate a premium ranging from 7.5 to 10.7 percent, but Christofides and Swidinsky (1998) fail to detect any effect of bilingualism on the earnings of Francophone women in Quebec.

Considerably less information is available concerning the economic returns to bilingual language skills for Anglophone men in the ROC; estimates range from 2.2 percent (Christofides and Swidinsky, 1998) to 15 percent (Albouy, 2006). However, Albouy (2006, p. 26) notes that his implausibly high estimates may be due to differences in unobservable factors rather than returns to language capital. Estimates of the bilingual earnings differential for Anglophone women in the ROC are scarce; Christofides and Swidinsky (1998) find a differential equal to 4.5 percent in 1981 and 4.4 percent in 1991.

The above studies share several data-related attributes. First, they do not control for the quality of English or French second language skills; the information available is typically binary,

based on self-reporting, and it may contain significant measurement error (Savoie, 1997). If present, this error will bias downward the estimator of the coefficient on language proficiency. Second, estimators of the additional earnings accruing to bilingualism may suffer from the ability bias that plagues estimators of the returns to education.¹ Third, the additional earnings from a second language should be based not on *knowledge* of the language but on its *use* in the marketplace (Vaillancourt, 1992). This third issue, which is the focus of the present paper, is not unrelated to the issues of quality and ability identified above. Fourth, most studies ignore the possibility that language skills may be endogenous to the earnings equation. Grenier (1987), Shapiro and Stelcner (1997) and Christofides and Swidinsky (1998) all deal with the issue of language endogeneity, but only the latter study addresses the decision to acquire bilingual (English/French) language skills or remain unilingual in French or English.²

In principle, sample selection may be an acute problem when one considers the effects of bilingual language skills on earnings, particularly for Anglophones in the ROC. French immersion schooling is an increasingly important avenue for acquiring French language competency; 6.98 percent of all children in elementary, intermediate, and secondary schools were enrolled in French immersion programs in 2002-03 (CPF, 2004). Not only are children entering French immersion selected into the program on the basis of program compatibility, but they generally come from better-educated, higher-income, families (Allen, 2004). Family characteristics may have a bearing on subsequent earnings (Murmane, Willett and Levy, 1995; Currie and Thomas, 2001) and they may also influence the acquisition of language skills.

However, attempts to deal with sample selection, using mother tongue and other controls as

¹ Note, however, that the effect of ability bias is probably small – for a comprehensive review see Card (1999).

² Grenier (1987) explains the earnings differentials of individuals who stayed in Quebec between 1976 and 1981 and those who moved; language skills enter into the Probit equation explaining the migration decision. Shapiro and

identifying forces, did not generate results that were significantly different from those reported in the current paper.³

In this paper we provide separate estimates of the additional earnings resulting from the *knowledge* and *use* of bilingual language skills, based on data for individuals from the 2001 Census. This data set differs from information used in earlier studies in that individuals in the 2001 Census are identified not only by their official language knowledge status but also by the languages used at work. The additional information allows us to compare (i) the earnings of individuals who are unilingual and use only their mother tongue at work, (ii) the earnings of bilingual individuals who use only their mother tongue at work, and (iii) the earnings of bilingual individuals who actually use *both* official languages at work in varying proportions. Barring differences in the quality of French or English second language skills, or language-related differences in ability, the differential (ii)-(i) should measure the return to second-language *knowledge* whereas the differential (iii)-(ii) should measure the return to second-language *use* given its knowledge. To our knowledge, the differential (iii)-(ii) has not been previously calculated.

However, the assumptions underlying the above differentials may be too strong. Since it is not obvious why unused language knowledge should carry a reward in the marketplace, the differential (ii)-(i) may simply reflect what is commonly referred to as ability bias.⁴ The interpretation of the (iii)-(ii) differential should also be viewed with caution. Bilinguals who use

Stelcner (1997) use selection to address only the issue of inclusion in the wage sample.

³ The selection-adjustment variables in Christofides and Swidinsky (1998) were significant in only a small fraction of the estimated equations and the correction for possible endogeneity produced minor changes to the estimated wage equations. Shapiro and Stelcner (1997), in their own particular context, find that the effect of selection is minimal. Arguing that instruments are scarce, Albouy (2006) ignores such corrections.

⁴ This interpretation would suggest that all previous estimates of the bilingual premium (based, as they are, on a blend of language knowledge and language use) reflect elements of ability bias, sample selection and returns to language use.

both official languages at work may possess better second-language skills than bilinguals who use only their mother tongue; thus the differential (iii)-(ii) may incorporate, in addition to the bilingualism use premium, the effects of superior language fluency. However, because we control for language knowledge when measuring the additional return associated with language use, this return, if at all tainted by ability bias, will be tainted only to the extent that bilingual users of a second language are more able/fluent than bilingual non-users of this language. We use the results for bilingual *users* of the second language in the ROC to adjust the Quebec returns for potential ability bias. This adjustment, under conditions discussed below, should provide estimates of the returns to language use in Quebec that are relatively unaffected by ability bias.

Section II contains a description of the data and a discussion of the specification of the econometric approach employed in this study. Results and analysis for Anglophones in the ROC and Francophones in Quebec are presented in section III. Section IV contains a similar, but much abbreviated, analysis for Anglophones in Quebec and Francophones in the ROC. Section V concludes with a brief summary of the critical findings and some reflections on policy.

II DATA AND MODEL

Data for this study are obtained from the individual file of the 2001 Census Public Use Microdata File. To construct the working sample for the ROC we retain observations only if the individual is 15-64 years of age, is Canadian-born, has an English mother tongue, claims official language fluency in English only or in both English and French, has at least a high school certificate, and is a paid worker who worked full-time, full-year (FTFY) in 2000. These restrictions are imposed to make individuals in the working sample more homogeneous. The same restrictions are imposed on the working sample for Quebec, except that only individuals whose

mother tongue is French and whose official language is French, or both English and French, are retained.

Several additional data refinements are required to define language at work. For individuals in the ROC who declare official language fluency in English only we exclude all observations in which the language used most often or frequently at work is other than English. The analogous restriction is imposed on individuals in Quebec who declare French as their only official language. For individuals in both the ROC and Quebec who declare fluency in both English and French we exclude all observations in which the language ‘most often’ used is other than English, or French, or English and French. For the English language group we retain observations only if the language ‘frequently’ used is either none other (English) or French; for the French language group we retain observations only if the language frequently used is either none other (French) or English. For the bilingual group, that is the group in which individuals most often use both English and French, we retain observations only if the language frequently used is also English and French. In the ROC sample, the above exclusions result in losses of 327 and 361 observations for men and women, respectively; in the Quebec sample the respective losses are 661 and 677 observations. Larger samples would be available in the Master Files of Statistics Canada Data Resource Centres, though the definitions of the critical language variables could not be refined further.

The above data restrictions allow us to classify all individuals in the working sample into six potential work-language groups, based on official language and language at work. In the ROC, individuals whose official language is English only are assigned to a single unilingual category, UNIL/ENGLISH. Individuals who are bilingual are assigned to the following five work-language categories: Mostly English, frequently English (BIL/MEFE), mostly English, frequently French

(BIL/MEFF), mostly French, frequently English (BIL/MFFE), mostly French, frequently French (BIL/MFFF) and mostly bilingual, frequently bilingual (BIL/MBFB). However, the latter three groups contain very few observations; consequently they are combined into a single category, BIL/FRENCH. The respective categories in Quebec are unilingual French (UNIL/FRENCH), bilingual only French (BIL/MFFF), bilingual mostly French frequently English (BIL/MFFE), and bilingual English (BIL/ENGLISH); this latter group is comprised of individuals who work primarily in English (BIL/MEFF), only in English (BIL/MEFE), or both English and French (BIL/MBFB). Details on how our codes are structured are provided in the Appendix.

Summary statistics, presented in Table 1, show that 6.7 percent of the 44,557 men in the ROC working sample are bilingual; the unadjusted mean annual earnings of bilingual men are 14.7 percent higher than the earnings of unilingual men. Among Anglophone men who are bilingual, 71.8 percent use only English at work. The vast majority of those who use French at work (24.7 percent) function mainly in English, but frequently resort to French; French is the main work language for only a very small minority (3.5 percent). Table 1 also shows that using French at work is not a pre-condition for earning a bilingual premium; bilingual men who use only English (BIL/MEFE) earn 15.2 percent more than unilingual Anglophone men. Those who use French frequently (BIL/MEFF) receive a slightly higher premium (16.6 percent). However, Anglophone men whose work language is primarily French (BIL/FRENCH) earn considerably less (9.1 percent) than unilingual men. We caution that this last group contains relatively few observations (103 individuals) and may be dominated by special cases.

The summary statistics for Anglophone women in the ROC are very similar to the mean values for men, except that a slightly higher proportion (8.7 percent) are bilingual and, of these, a slightly higher proportion, 31.3 percent, use French at work (24.3 percent frequently and 7.0

percent mostly). The unadjusted bilingual-unilingual earnings differential is also higher than that for men, by almost 4 percent. The earnings differential for bilingual women who use only English at work is 18.3 percent; the differential for those who use French frequently is 23.0 percent. In contrast to bilingual men, women whose work language is primarily French earn 4.1 percent more than women who do not have French second language skills but, again, this is a small group of individuals (206).

In Quebec, English second language (ESL) proficiency is much more prevalent than French second-language proficiency (FSL) in the ROC. Of the 15,836 Francophone men in the Quebec sample, 59.2 percent are bilingual, that is, learned English as their second language, and the majority of bilinguals tend to use their English language skills at work, 43.6 percent frequently and 15.5 percent mostly. On average, Francophone men who have ESL skills earn 27.9 percent more than men who are proficient in only the French language. However, the unadjusted earnings advantage of bilingual men whose work language is exclusively French is only 16.4 percent. Men who use English frequently at work earn 35.6 percent more, while those who rely mostly or exclusively on English earn 37.1 percent more; note that this latter group is relatively and absolutely much larger than the analogous group of Anglophone men in the ROC.

Only 52.5 percent of the 12,448 French-language women in the Quebec sample are bilingual; on average, they earn 21.9 percent more than women who are not bilingual. Bilingual women who work exclusively in French earn a 21.5 percent premium; this is almost indistinguishable from the bilingual premium (22.0 percent) earned by women who frequently use English at work, or the bilingual premium (22.9 percent) earned by women who work mostly or only in English. As in the case of men, this latter group of Quebec women is considerably larger than the comparable group of women in the ROC.

Estimates of the adjusted effects of FSL and ESL skills on labour market earnings in the ROC and Quebec, respectively, are derived from the standard OLS log-earnings equation:

$$\ln E = \alpha + \beta X + \gamma Z + \varepsilon$$

where $\ln E$ is the natural logarithm of annual earnings, X is a set of variables that identify language at work, Z is a set of control variables, α , β and γ are the intercept and constant coefficients to be estimated, and ε is an error term assumed to have classical properties. In the ROC equation, language at work variables include BIL/MEFE, BIL/MEFF, and BIL/FRENCH, with UNIL/ENGLISH as the reference group; in the Quebec wage equation, the language at work variables include BIL/MFFF, BIL/MFFE, and BIL/ENGLISH, with UNIL/FRENCH as the reference group. Both earnings equations control for work experience, Census Metropolitan Area (CMA) location, marital status and schooling; the ROC equation includes, in addition, a set of regional variables (see the Appendix for variable definitions). Similar explanatory variables are fairly standard in earnings equations that employ census data (see, for example, Shapiro and Stelcner, 1987; Chiswick and Miller, 1988).

Occupation and industrial sector (see the Appendix), two sets of variables that appear frequently in earnings functions, are contentious. The effect of bilingual language skills may be embodied not only in wage structures within occupation and industry but in choices of occupation and industrial sector as well. Accordingly, we present results from model specifications which alternatively exclude and include industry and occupation; these alternative results enable us to differentiate between the intra and inter-industry earnings effects of second language skills.

III ECONOMETRIC RESULTS AND DISCUSSION

The regression results for the ROC are presented in Table 2. We focus initially on equation (1), the estimated log earnings equation for men, from which controls for industry and

occupation are excluded. The estimated coefficients on the control variables have the expected signs, and almost all are significantly different from zero at the 1 percent level. Earnings in Ontario are higher than in other regions in the ROC, except the West. Labour market experience has a positive, but non-linear (note that experience squared has been scaled so that the coefficients in our tables are more readable) effect on earnings, males living in Census Metropolitan Areas have significantly higher earnings, as do males who are married or divorced. The estimates also show that the earnings associated with schooling increase as men progress from high school certification to the completion of a post-graduate degree. In general, these controls have a similar influence in the other regression equations reported in Tables 2 and 3; because these effects are relatively standard in ln earnings equations in the literature, we focus on the estimated coefficients associated with the main variables of interest, namely language knowledge and language use.

The estimated work-language coefficients in equation (1), Table 2, show that both language knowledge and language at work have an effect on earnings. Compared with men who are fluent only in English, the earnings of men who are bilingual but work exclusively in English are 3.8 percent higher, the earnings of bilingual men who frequently use French at work are 5.4 percent higher, but the earnings of the very small number of bilingual men who work equally, mostly or exclusively in French are 8.4 percent lower. However, only the BIL/MEFE and BIL/MEFF coefficients are significantly different from zero at the 5 percent level. These results suggest that men who acquire French as a second language, but are otherwise indistinguishable from those who are fluent only in English, earn significantly higher wages. This premium, however, may incorporate the interplay between acquired language skills and certain unobserved characteristics such as assertiveness and ability, or family characteristics, which are also known to

yield a labour market advantage; unfortunately, there is no easy method to distinguish between these two alternative interpretations.

The net effect of actually using French in the workplace is given by the difference between the estimated BIL/MEFF and BIL/MEFE coefficients; this effect is equal to 1.6 percent. However, a test of the statistical significance of this differential indicates that the actual use of French at work does not contribute additionally and significantly to the earnings of those who have French second-language skills.⁵ The implication of this result is that the use of French as a second official language may have no discernible additional effect on the labour market earnings of bilingual men in the ROC.

In equation (2) the list of control variables is augmented by seven occupational and six industrial sector variables. Relative to individuals in trades (the omitted category), individuals in managerial, professional and administrative occupations have the highest earnings; only individuals in semi-skilled and other manual occupations earn less. The industry effects show that earnings in the financial sector (the omitted category) are higher than earnings in all other sectors, except government services. These patterns generally hold for similarly estimated equations

⁵ To test whether the net earnings effects of actually using French at work are statistically significant we re-estimate the text equation (1), using the fully equivalent specification for the three language-at-work variables

$$\ln E = \alpha + \beta_1 \text{Bilingual} + \beta_2 \text{BIL/WORK} + \beta_3 \text{BIL/FRENCH} + \gamma Z + \varepsilon$$

where BILINGUAL is defined as (BIL/MEFE + BIL/MEFF + BIL/FRENCH) and BIL/WORK as (BIL/MEFF + BIL/FRENCH). The set of control variables, Z, remains unchanged. The estimated coefficient β_1 captures the earnings effect of being bilingual, β_2 the added effect of using French in the workplace, and β_3 the added effect of using French mostly or exclusively. The partial results obtained from this regression are given below. All remaining coefficients remain unchanged from those reported in equation (1), Table 2.

BILINGUAL .038 (2.48)

BIL/WORK .016 (0.55)

BIL/FRENCH -.137 (1.93)

The BIL/WORK coefficient shows that the 1.6 percent additional earnings effect of using French at work is not significantly different from zero at the 5 percent level. The estimated BIL/FRENCH coefficient shows that working mostly or exclusively in French lowers the earnings of bilingual men using French by 13.7 percent; however, this effect, which is based on a very small number of observations, is not significantly different from zero at the 5 percent level. It should be noted that the sum of β_1 and β_2 is .054, while the sum of β_1 , β_2 , and β_3 is -.084. Allowing for rounding, these are the coefficients for BIL/MEFF and BIL/FRENCH, respectively, reported in equation (1), Table 2. Note that, because of the small size of the coefficients involved, we refer to them as percentage effects.

reported in Tables 2 and 3. The additional industry and occupation variables change the estimated coefficients and corresponding t-scores of the remaining control variables only marginally. However, not only do the estimated coefficients on the language variables fall sharply, but they all become not significantly different from zero at the 5 percent level. It thus appears that language has an effect not so much on wages within industry and occupation as on the choice of industry and occupation.

Indeed, men who have French second-language skills tend to be disproportionately employed in the higher-paying occupations and industrial sectors. As the Appendix Table 1a shows, 22.7 percent of all men in the BIL/MEFE work-language group, 29.3 percent in the BIL/MEFF group, and 16.5 percent in the BIL/FRENCH group are employed as managers; an additional 34.7, 30.6 and 42.6 percent, respectively, are employed as professionals. Annual earnings in these two occupations are well above the overall mean of \$52,737 (not shown in Table 1a). By contrast, only 17.1 percent of all men in the UNIL/ENGLISH group are employed as managers and 21.2 percent are employed as professionals. As well, bilingual men tend to be over-represented in the public and semi-public sectors. Bilingual men in the BIL/MEFF group are especially over-represented in the public sector (33.2 percent compared with 8.8 percent for the UNIL/ENGLISH group), while those in the BIL/FRENCH group are vastly over-represented in the semi-public sector (31.1 percent compared with 8.6 percent in the UNIL/ENGLISH group). However, the impact of this unbalanced sector employment pattern is somewhat mitigated by the small earnings differentials that prevail between the public, semi-public and private sectors.

Language appears to have a stronger influence on the earnings of women in the ROC. Equation (3), Table 2, which captures both the inter- and intra-industry and occupation language effects, shows that women who are fluent in French but use only English at work earn 6.6 percent

more than women who are fluent only in English. Those who additionally use French frequently at work earn 9.3 percent more, but those for whom French is the primary work language earn 7.3 percent less. However, the latter coefficient is based on a very small number of observations and is not significantly different from zero at the 5 percent level. The difference between the estimated BIL/MEFF and BIL/MEFE coefficients, which indicates the net earnings value of using French at work, is 2.7 percent. However, a test of significance, using the methodology described in footnote 5 above, shows that the increased earnings associated with the frequent use of French at work is not statistically significantly different from zero at the 5 percent level.⁶ On the other hand, extensive use of French at work is associated with a significant reduction in the annual earnings of bilingual women; the estimated BIL/FRENCH coefficient is -16.7 percent, with an absolute t-value of 3.19. Overall, a bilingual woman who uses French extensively at work earns 7.3 percent less ($6.6 + 2.7 - 16.7$) than a unilingual woman but, as shown in Table 2, this effect is not significantly different from zero. These results show that the economic rewards (if any) to women in the ROC who invest in French second-language training are not embedded in language use if one controls for knowledge of this second language.

Equation (4), which includes controls for sector and occupation, shows substantial earnings effects for women within specific industries and occupations. Adding controls for sector and occupation reduces the BIL/MEFE coefficient to .046, and the BIL/MEFF coefficient to .065, but both remain significantly different from zero at the 5 percent level. This result suggests that bilingual women who use French sparingly, or not at all, have access to better-paying jobs, and, as the occupational and industrial distribution of employment presented in Appendix Table 1a

⁶ The estimated coefficients and |t| values for the language variables derived from the re-estimated earnings equation are as follows:

BILINGUAL .066 (4.28); BIL/WORK .027 (0.96); BIL/FRENCH -.167 (3.19)

shows, they maximize their labour market advantage by also gravitating to managerial/professional occupations and the public sector. On the other hand, the choices of sector and occupation appear not to be significant determinants of the earnings of bilingual women who work in jobs where the work-language is predominantly French; the estimated BIL/FRENCH coefficient remains essentially unchanged and statistically not significantly different from zero. One plausible explanation of this latter result is the industrial concentration of the women in this work-language group. Data (not shown in Table 1a) indicate that nearly half (49.0 percent) are employed in the (semi-public) education sector, almost exclusively as teachers. By comparison, only 11.4 percent of women in the UNIL/ENGLISH group, 17.3 percent in the BIL/MEFE group and 21.3 percent in the BIL/MEFF group are employed in this sector. In the latter three work-language groups, women employed in education also tend to have higher annual earnings than women in the BIL/FRENCH group. Commitment to a profession may be one reason why bilingual women in the ROC accept jobs that require the exclusive use of French in the face of viable, higher-paying, alternatives.

The regression results for paid workers in Quebec whose mother tongue is French are presented in Table 3. The control variables perform as expected in all four regressions; almost all the estimated coefficients are significantly different from zero at the 5 percent level. The estimated coefficients on the work-language variables in equation (1), Table 3, show that language capital has a strong, positive, effect on the earnings of Francophone men. The earnings of men who acquire English as a second language but work exclusively in French are 7.0 percent higher than the earnings of men in the unilingual French control group. However, the earnings of bilingual men who use English frequently at work are 20.9 percent higher and the earnings of

those who use English exclusively or predominantly are 18.2 percent higher than those of unilingual men. The net earnings differential associated with using English frequently at work is 13.9 percent; using English exclusively or extensively increases net earnings by 11.2 percent. In contrast to the results in the ROC earnings estimates (see fn. 5), the BIL/WORK coefficient is significantly different from zero at the 1 percent level, indicating that using English at work has an additional significant positive effect (14.0 percent) on earnings.⁷ However, there is no significant *further* impact on earnings when English is used mostly or exclusively in the workplace – BIL/ENGLISH has a coefficient which is not significantly different from zero.

The estimated effects of language on the earnings of Francophone men in Quebec remain statistically significant even when industry and occupation are added to the list of controls. Equation (2), Table 3, shows that the estimated BIL/MFFF, BIL/MFFE, and BIL/ENGLISH work-language coefficients fall by less than a third (to 4.8, 15.7 and 12.7 percent, respectively); all three coefficients remain significantly different from zero at the 1 percent level. The coefficient on BIL/WORK also retains significance. This result is not unexpected, given that the distribution of employment among industrial sectors and occupations is fairly consistent among the four work-language groups (see Appendix Table 1b). While bilingual Francophone men are over-represented in the public sector and in the manager/professional occupations, they are, generally, under-represented in the semi-public sector; however, the unilingual-bilingual imbalance is not as striking as it is among Anglophone men in the ROC.

How much of the estimated returns can we attribute to language capital and its use? In Section I, we considered the possibility that the additional earnings associated with language *knowledge* may be due to ability and unobservable characteristics, rather than language capital. Is

⁷ The language coefficients and |t| values derived from the re-estimated earnings equation are as follows:

it possible that the additional earnings associated with language *use* may also be due to ability and unobservable characteristics? It seems reasonable to assume that second-language proficiency among bilinguals is not uniform and that, for a given level of demand for bilingual services, it is the most proficiently bilingual men who will get the highest-paying bilingual jobs.⁸ The estimated coefficients for BIL/MFFE and BIL/ENGLISH may then overstate the rewards associated with the general use of English at work.

However, it is unlikely that the estimated difference in the additional returns to language use in the ROC and Quebec (0.016 and 0.140, respectively; see, fn. 5 and fn. 7) can be entirely due to relatively superior ability and relatively superior second-language skills in Quebec - as the above arguments would imply. Suppose that the 0.016 additional return to French language use in the ROC is *entirely* due to the superior ability/fluency of second-language users in the ROC, and suppose, additionally, that this is an accurate reflection of the effect of ability/fluency on returns in Quebec, then an 'adjusted' return of 0.124 (0.140-0.016) would still remain for bilingual language *users* in Quebec. Admittedly, the reward for superior ability/fluency in Quebec may be higher than the 1.6 percentage points in the ROC, in which case the adjusted return to language

BILINGUAL .070 (4.64); BIL/WORK .140 (8.66); BIL/ENGLISH -.027 (1.24)

⁸ Although the data needed to rigorously test this hypothesis is not available, one can surmise that Francophone men who speak English or both English and French at home are likely to be linguistically more proficient in the use of English than those who speak only French. In our sample of bilingual Francophone men only 226 (2.4 percent) use English or both English and French as a home language. Most of these men (77.4 percent) work in jobs that require the frequent or extensive use of English; by comparison, only 59.1 percent of all bilingual men work in similar jobs. The mean annual earnings of all bilingual Francophone men for whom English is a home language is \$51,558; by comparison, the mean earnings of all bilingual men who use only French as a home language is \$50,601. However, conditional on working in a job requiring the use of English, the mean earnings are \$52,902 and \$53,830, respectively. As an additional test, we augmented equation (1) with a home language variable; the results show that the use of English as a home language has a positive but insignificant effect on earnings (0.036 with $|t| = 0.75$).

use in Quebec would be lower; however, doubling or tripling the ROC effect of 0.016 would still leave a very substantial additional return for the *use* of English by Quebec bilingual men.⁹

The estimated work-language effects for Francophone women in Quebec are more moderate. Relative to unilingual women, fluency in English increases the earnings of women who use only French at work by 8.1 percent (equation 3, Table 3); the earnings of those who use English frequently increase by 14.9 percent, while the earnings of women who use English exclusively or extensively increase by 16.2 percent. The use of English at work contributes significant, additional, earnings to bilingual women; the BIL/WORK coefficient is significantly different from zero at the 1 percent level.¹⁰ However, as in the case of Quebec men, the BIL/ENGLISH coefficient is not significantly different from zero. The adjusted return to language use for bilingual women in Quebec is 0.041 (0.068-0.027), smaller than that for Quebec men.

A comparison of the work-language coefficients estimated from Equations (3) and (4) shows that the inclusion of industry and occupation effects does not alter the work-language coefficients to any noteworthy extent. This may be largely the result of several divergent relative employment patterns. First, women who use English at work are moderately over-represented in the high-earnings public sector, but they are severely under-represented in the equally high-earnings semi-public sector. While 37.5 percent of unilingual Francophone women work in the

⁹ It is possible that additional earnings for bilingualism may result from characteristics of the job. Some employers may pay higher wages for language-unrelated reasons (e.g. a general public-private sector pay differential), and they may also prefer to employ more bilingual workers. This argument can be specialised to explain the greater rewards for applied bilingualism in Quebec. If the high-paying sector uses second-language knowledge as an ability, or quality, screening device, then the additional rewards for bilingualism knowledge reflect the ability bias discussed earlier. If the job description specifies use of the second language, then any measured differences in earnings would be a reward for the skill use that we are attempting to measure.

¹⁰ The significance test is based on the language coefficients and respective $|t|$ values derived from the re-specified earnings equation. The partial results are given below.

semi-public sector, only 5.5 and 15.1 percent of women from the BIL/MFFE and BIL/ENGLISH bilingual groups, respectively, are employed in such jobs (Appendix Table 1b). This employment pattern suggests that the demand for English language skills may be limited in sectors such as health care and education. Second, while bilingual women who use English at work are twice as likely as unilingual Francophone women to occupy managerial positions, they are only half as likely to work in professional occupations. They are also more likely to work in the relatively lower-paying white-collar occupations. However, bilingual women who use only French at work exploit their earnings advantage by gravitating disproportionately to jobs in the higher-paying public and semi-public sectors and the managerial/professional occupations.

IV ANGLOPHONES IN QUEBEC AND FRANCOPHONES IN THE ROC

As noted in section I, our analysis focuses on two major linguistic groups, Anglophones in the ROC and Francophones in Quebec. This enables us to achieve considerable homogeneity in our working samples, but at the cost of ignoring groups whose behaviour may also shed some light on the relationship between language knowledge, language use and labour market earnings. In this section we compensate for this shortcoming by exploring the relation between official language skills and earnings for two such groups; Francophones in the ROC and Anglophones in Quebec. Although there is the disadvantage of small sample size, the justification for extending the analysis to these two groups is that they are easily manageable and that they complete the picture depicting the impact of bilingual language skills on Canada's dominant linguistic groups.

We retain observations of all Francophones in the ROC and all Anglophones in Quebec who meet the restrictions applied to the main linguistic groups as outlined in Section II above. In

the ROC, the Francophone sample contains 2,492 men and 2,159 women; 98.3 percent of all men and 97.5 percent of all women are bilingual. However, 7.5 percent of all bilingual men use only French at work (BIL/MFFF), 16.7 percent use English frequently (BIL/MFFE), and 75.8 percent use English mostly or exclusively (BIL/ENGLISH). The unadjusted mean annual earnings of unilingual Francophone men are the lowest (\$35,414); bilingual men who use French exclusively at work earn \$43,597, men who use English frequently earn \$44,427, while men who use English mostly or exclusively earn considerably more, \$51,561. The overall pattern is very similar for Francophone women in the ROC, with one exception. The 8.5 percent of bilingual women who use French exclusively at work have the highest unadjusted mean annual earnings, \$38,025. The earnings of women who use English frequently or mostly are \$36,367 and \$37,956, respectively.

In Quebec, the Anglophone sample contains 1,252 men and 963 women; 86.8 percent of the men and 86.5 of the women are bilingual. Within the bilingual group of men, 18.7 percent use only English at work (BIL/MEFE), 43.8 percent use French frequently (BIL/MEFF), and 37.5 percent use French mostly or exclusively (BIL/FRENCH). The latter group of Anglophone men has the lowest unadjusted mean earnings (\$47,513), while men who frequently use French have the highest earnings (\$57,810); Men who work exclusively in English, whether unilingual or bilingual, have roughly the same unadjusted mean earnings (\$52,188 and \$53,023, respectively). The work-language profile of Anglophone women is only marginally different. Women who are bilingual but use French mostly or exclusively at work have the lowest unadjusted mean earnings (\$36,085); the mean earnings of unilingual Anglophone women are slightly higher (\$36,970). Bilingual women who use only English at work have the highest mean earnings (\$40,874).

We test for the adjusted effects of work-language for Francophones in the ROC by merging the ROC Anglophone and Francophone samples and adding four dummy variables

representing unilingual Francophones (UNIL/FRENCH) and bilingual Francophones with work-language designations BIL/MFFF, BIL/MFFE, and BIL/ENGLISH to the ROC log earnings Equations (2, 4), Table 2. Unilingual Anglophones are the control group. Because of the relatively small additional number of observations in the aggregated sample, the estimated language coefficients for Anglophone men and women are almost identical to those reported in Table 2.¹¹ Most of the estimated coefficients on the language variables for Francophone men and women are negative but not significantly different from zero at the 5 percent level; the two exceptions, both of which are negative and significant, are bilingual Francophone men who use only French at work and unilingual Francophone women (see fn. 11). Aside from these exceptions, our results suggest that the labour market in the ROC rewards bilingual Francophone men in much the same manner as it does bilingual Anglophone men, but bilingual Anglophone women appear to enjoy an advantage not extended to bilingual Francophone women. However, this finding should be treated with caution since it is based on rather small sample sizes.

In the Quebec analysis, equations (2, 4), Table 3, are augmented with four Anglophone work-language classifications (UNIL/ENGLISH, BIL/MEFE, BIL/MEFF, and BIL/FRENCH) and re-estimated on the combined Francophone and Anglophone samples. As in the ROC, the estimated coefficients for the Francophone work-language groups are essentially unaffected by the data and model modifications.¹² Our results show that the earnings of Anglophones who do

¹¹ We do not present the complete estimated equations in this paper, but readers can obtain them upon request. However, we present below the estimated work-language coefficients and corresponding $|t|$ scores for Francophone men and women.

	Men	Women
UNIL/FRENCH	-0.087 (0.85)	-0.226 (2.60)
BIL/MFFF	-0.166 (3.38)	-0.006 (0.12)
BIL/MFFE	-0.059 (1.81)	0.018 (0.64)
BIL/ENGLISH	-0.030 (1.88)	0.003 (0.19)

¹² The complete estimated equations will be provided upon request. Here, we present only the critical Anglophone

not use French at work (the UNIL/ENGLISH and BIL/MEFE groups) are not significantly different from the earnings of the unilingual Francophone control group (see fn. 12). However, bilingual Anglophone men and women who use French frequently, mostly or exclusively at work earn a substantial language premium. In Quebec, in contrast to learning English as a second language, learning French as a second language conveys an economic reward only if that language is put to use in the marketplace. However, bilingual Anglophones who use French at work generally earn a language premium which is very similar to the premium earned by bilingual Francophones who use English at work. For example, Anglophone women who frequently use French earn a 12.2 percent language premium; the premium for Francophone women who frequently use English is 13.7 percent. For bilingual Anglophone and Francophone men, the BIL/MEFF and BIL/MFFE premiums are 16.5 and 15.7 percent, respectively. It thus appears that the labour market does not distinguish between Francophone and Anglophone bilinguals who *use* their respectively acquired official language at work.

V SUMMARY AND CONCLUDING OBSERVATIONS

In this study, we estimate the labour market rewards to an investment in English second-language skills by Francophones in Quebec and French second-language skills by Anglophones in the Rest-of-Canada. Unlike earlier studies, which focus on the rewards to language *knowledge*, we estimate the additional rewards flowing to those who *use* second language skills, having

work-language estimated coefficients and |t| scores.

	Men	Women
UNIL/ENGLISH	0.090 (1.63)	0.048 (0.79)
BIL/MEFE	-0.079 (1.57)	0.118 (1.90)
BIL/MEFF	0.165 (4.85)	0.122 (3.41)
BIL/FRENCH	0.076 (2.11)	0.131 (3.24)

conditioned on language knowledge. The econometric analysis is based on log earnings equations that utilize individual data from the 2001 Census. Language skills in the ROC are categorized as unilingual English, bilingual/work language English only, bilingual/work language English frequently French, and bilingual/work language mostly or exclusively French; in Quebec, the corresponding categories are unilingual French, bilingual/work language French only, bilingual/work language French frequently English, and bilingual/work language mostly or exclusively English.

Our analysis shows that in the ROC the earnings of men who are bilingual but work exclusively in English are 3.8 percentage points higher than the earnings of the comparison group of men who are fluent only in English; the earnings of bilingual men who frequently use French at work are 5.4 percentage points higher. However, the difference between these two premiums, which reflects the market value of using French over and above being fluent in it, is not significantly different from zero. The findings for Anglophone women in the ROC are very similar; the main differences are that the earnings premium associated with knowledge of the French language is considerably larger (6.6 percentage points) and the earnings premium of bilingual women who frequently use French at work even larger (9.3 percentage points). As in the case of men, the difference between these premiums, which is a reflection of the value of using a second language, is not significantly different from zero. The number of men and women who use French mostly or exclusively is too small for reliable inference.

Our findings for Quebec are very different. Compared with unilingual Francophones, the earnings of men who are bilingual but work exclusively in French are 7 percentage points higher, and those who frequently use English at work are 20.9 percentage points higher. The difference

between these premiums is statistically significant; it shows that the premium associated with the frequent use of English at work is 13.9 percentage points. For women, the general patterns are similar. Relative to unilingual Francophones, the earnings of bilingual women are 8.1 percentage points higher and those of bilingual women who frequently use English at work are 14.9 percentage points higher. The difference between these premiums is statistically significant, indicating a 6.8 percentage point 'return' to the use of English language skills. Francophone men and women who make extensive use of English at work also earn considerably more than unilingual Francophones. However, their earnings are not significantly higher than the earnings of bilingual Francophones who use English frequently at work.

Our results suggest that in the ROC the economic effect of French second-language skills is contained essentially in language *knowledge* rather than language *use* in market-related activities. A plausible interpretation of these findings, in light of the limited demand for French in the marketplace, is that these skills may merely signal unobservable labour market characteristics such as ability, cognition, perseverance, and quality of education ('ability' for short), all of which have a bearing on labour productivity. There may be no additional return to language capital. In Quebec as well, a substantial component of the total rewards for English second-language skills is derived from language *knowledge*; as in the ROC, this component may reflect nothing more than the effect of unobservable labour market characteristics. However, because of the substantial demand for English in the Quebec and international workplaces, a more substantial component of the overall return, especially for Francophone men, is associated with the actual *use* of language in the workplace. It thus appears that, to realize the full benefits of an investment in English, Francophone men and women must not only know the English language but they must also use it in market-related activities.

This interpretation of our results must, however, be viewed with caution. Only the very able may have the requisite English second-language skills to compete for bilingual jobs. Since information on ability or language fluency is not available, it is not certain that the entire language use-language knowledge earnings differential is attributable to language capital. However, the additional earnings of bilingual users of the second language in the ROC may capture this additional ability/fluency. If bilingual users of the second language in the ROC are equally able/fluent as those in Quebec, then subtracting their differential from that of their Quebec counterparts still leaves an adjusted return to the use of English in Quebec which is very substantial. For men, this adjusted effect is 12.3 percentage points while that for women is 4.1 percentage points. These refinements were, due to data limitations, not possible in earlier studies of the value of bilingualism in Canada.

In an extended sample, where Francophones in the ROC and Anglophones in Quebec are also considered, our findings suggest that, in Quebec, bilingual individuals, who actually use both languages at work, have additional earnings which are similar whether their mother tongue is French or English. At the other extreme of linguistic attainment, unilingual Francophones and Anglophones have earnings which are not significantly different from each other. In the ROC, where the English language dominates, unilingual Francophone women and bilingual Francophone men who do not use English at work, have a significant earnings disadvantage relative to the unilingual English control group. Francophones who use English at work have earnings which are comparable to those of the Unilingual English. These findings are not surprising given the linguistic realities in Quebec and the ROC.

Our findings have implications for the future of bilingual policy in Canada. As stated in the introduction, there are many reasons why an individual with English or French as a mother

tongue may choose to invest in Canada's second official language. Given the dominance of English in North America and internationally, the non-economic incentives to acquire a second official language are stronger for Francophones than Anglophones. Our findings suggest that, in addition to any social/cultural/political benefits to be derived from learning English, Francophones in Quebec who are bilingual have a 7 to 8 percentage point earnings advantage which increases substantially and significantly if they actually use English in their work. This economic incentive reinforces the social/cultural/political reasons for learning English. In the ROC, during 2002-2003, 7 percent of all children in elementary, intermediate and secondary schools were enrolled in French Immersion programmes and, in addition, many children were enrolled in Core French programmes (the proportion of bilinguals in our ROC sample in Table 1a is, roughly, 8 percent). Our findings suggest that enrolment in these important programmes may be motivated by social/cultural/political reasons and may reflect superior ability and a commitment on the part of parents to education and knowledge. While *knowledge* of both official languages carries a modest earnings advantage, no significant additional earnings advantage can be discerned for those who actually *use* French in the ROC. Efforts to promote French in the ROC should be continued not so much because of the earnings advantage that they confer but because they result in many social/cultural/political benefits, strengthening the fabric of Canadian society, and serving as an example to countries torn by ethnic/religious/linguistic divisions.

REFERENCES

- Allen, Mary. 2004. "Reading Achievements of Students in French Immersion Programs." *Educational Quarterly Review* 9(4): 25-30.
- Albouy, David. 2006. "The Earnings Gap between Francophones and Anglophones: A Canadian Perspective, 1970 to 2000." Mimeo, University of California, Berkeley, January.
- Card, David. 1999. "The Causal Effect of Education on Earnings", In *Handbook of Labor Economics*, Vol. 3, Edited by O. Ashenfelter and D. Card, Chapter 10, pp. 1801-1863. Elsevier Science B.V.
- Chiswick, Barry R., and Paul W. Miller. 1988. "Earnings in Canada: The Roles of Immigrant Generations, French Ethnicity, and Language." In *Research in Population Economics*, ed. T. Paul Schultz, pp. 163-182. Greenwich, Connecticut: JAI Press Inc.
- Chorney, Harold. 1998. "Bilingualism in Employee Recruitment and the Role of Symbolic Analysts in Leading Export-Oriented Firms." In *New Canadian Perspectives: Economic Approaches to Language and Bilingualism*, ed. Albert Breton, pp. 185-222. Ottawa, Canadian Heritage: Department of Public Works and Government Services Canada.
- Christofides, Louis N., and Robert Swidinsky. 1998. "Bilingualism and Earnings: A Study Based on 1971, 1981 and 1991 Census Data." In *New Canadian Perspectives: Economic Approaches to Language and Bilingualism*, ed. Albert Breton, pp. 123-186. Ottawa, Canadian Heritage: Department of Public Works and Government Services Canada.
- CPF (Canadian Parents for French). 2004. *The State of French Second Language Education in Canada 2004*. Ottawa: Canadian Parents for French.
- Currie, J., and D. Thomas. 2001. "Early Test Scores, Socioeconomic Status, School Quality and Future Outcomes." In *Research in Labor Economics*, Vol. 20: 103-132.
- Edwards, John. 2003. "The Importance of Being Bilingual." In *Bilingualism: Beyond Basic Principles*, eds. Jean-Marc Dewaele, Alex Housen and Li Wei, pp. 28-42. Clevedon: Multilingual Matters Ltd.
- Grenier, Gilles. 1987. "Earnings by Language Group in Quebec in 1980 and Emigration from Quebec between 1978 and 1981." *Canadian Journal of Economics* XX (November): 774-791.
- Husum, R., and R. Bryce. 1991. "A Survey of Graduates from a Saskatchewan French Immersion High School." *Canadian Modern Languages Review* 48 (October): 135-143.
- Lambert, Wallace E. 1977. "The Effects of Bilingualism on the Individual: Cognitive and Sociocultural Consequences." In *Bilingualism Psychological, Social, and Educational Implications*, ed. Peter A. Hornby, pp. 15-27. New York: Academic Press, Inc.

MacFarlane, Alina, and Marjorie Bingham Wesche. 1995. "Immersion Outcomes: Beyond Language Proficiency." *Canadian Modern Languages Review* 51 (January): 250-274.

Murmane, Richard J., John B. Willett, and Frank Levy. 1995. "The Growing Importance of Cognitive Skills in Wage Determination." *Review of Economics and Statistics*, 77 (May): 251-266.

Savoie, Ghislain. 1997. "The Comparative Advantages of Bilingualism on the Job Market: Survey of Studies." In *New Canadian Perspectives: Official Languages and the Economy*, pp. 65-88. Ottawa, Canadian Heritage: Minister of Public Works and Government Services Canada.

Shapiro, D.M., and M. Stelcner. 1987. "Earnings Disparities among Linguistic Groups in Quebec, 1970-1980." *Canadian Public Policy/Analyse de Politiques* XIII (March): 97-104.

Shapiro, Daniel M., and Morton Stelcner. 1997. "Language and Earnings in Quebec: Trends over Twenty Years, 1979-1990." *Canadian Public Policy/Analyse de Politiques* XXIII (June):115-140.

Turnbull, Miles, Sharon Lapkin, and Doug Hart. 2001. "Grade 3 Immersion Students= Performance in Literacy and Mathematics: Province-Wide Results from Ontario (1998-99)." *Canadian Modern Languages Review* 58 (September): 9-26.

Vaillancourt, François. 1992. "An Economic Perspective on Language and Public Policy in Canada and the United States." In *Immigration, Language, and Ethnicity, Canada and the United States*, ed. Barry R. Chiswick, pp. 179-228. Washington, D.C.: The AEI Press.

Vaillancourt, François. 1997. "Economic Costs and Benefits of the Official Languages: Some Observations." In *New Canadian Perspectives: Official Languages and the Economy*, pp. 103-118. Ottawa, Canadian Heritage: Minister of Public Works and Government Services Canada.

APPENDIX: DATA AND CONSTRUCTION OF VARIABLES

All data are taken from the 2001 Census Public Use Microdata File. Variable sources are identified by mnemonic, field, and code (in parenthesis).

lnE: WAGESP-Field 126; Natural log of gross annual wages and salaries.

Region: PROV-Field 1; Atlantic (1-13), Quebec (24), Ontario (35), Prairie (46, 47), West (48, 49).

Resident in CMA: CMAP-Field 2.

Marital Status: MARSTHP-Field 24; Married (2), Divorced/Separated (1, 3, 5), Single (4).

Experience: Age (AGEP-Field 21) - Years of Schooling (TOTSCHP-Field 99) - 6.

Schooling: HLOSP-Field 93; High School (4), Trade/College (5 - 10), Undergraduate Degree (11, 12), Graduate Degree (13, 14).

Language: Work-language variables are constructed from four Census questions:

- (a) Mother tongue (MTNP-Field 68), with possible responses (codes): English single responses (1), French single responses (2), English and French (3), Aboriginal languages (4), Other (5).
- (b) Knowledge of official languages (OLNP-Field 67), with possible responses: English only (1), French only (2), Both English and French (3) Neither English nor French (4).
- (c) Language used most often at work (WLNAP-Field 88), with possible responses: English (1), French (2), Non-official language (3), English and French (4), Other multiple responses (5).
- (d) Other languages frequently used at work (WLNBP-Field 89), with possible responses: No other language used (1), English (2), French (3), Non-official language (4), English and French (5), Other multiple responses (6).

For ROC, only individuals whose mother tongue is English (code 1, MTNP-Field 68) and whose official language is English only (code 1, OLNO-Field 67) or both English and French (code 3, OLNP-Field 67) are included in the working sample. The work-language group is defined as unilingual English (UNIL/ENGLISH) if the response to OLNP-Field 67 is coded 1 and if the responses to both WLNAP-Field 88 and WLNBP-Field 89 are coded 1.

If the response to OLNP-Field 67 is coded 3, the definition of work language depends on the responses to questions WLNAP-Field 88 and WLNBP-Field 89.

- i) Mostly English, frequently English (BIL/MEFE) if coded 1 and 1, respectively.
- ii) Mostly English, frequently French (BIL/MEFF) if coded 1 and 3, respectively.
- iii) Mostly French, frequently English (BIL/MFFE) if coded 2 and 2, respectively.
- iv) Mostly French, Frequently French (BIL/MFFF) if coded 2 and 1, respectively.
- v) Mostly Bilingual, frequently bilingual (BIL/MBFB) if coded 4 and 1, respectively.
- vi) Mostly French (BIL/FRENCH) if BIL/MFFE = 1 or BIL/MFFF = 1 or BIL/MBFB=1.

Analogous work-language groupings are constructed for Quebec from responses to the above four Census questions. Only individuals whose mother tongue is French (code 2, MTNP-Field 68) and whose official language is French only (code 2, OLNP-Field 67) or both English and French (code 3, OLNP-Field 67) are included in the Quebec sample. If the response to OLNP-Field 67 is coded 2, the work-language group is defined as unilingual French (UNIL/FRENCH) if the response to WLNAP-Field88 is coded 2 and the response to WLNBP-Field 89 is coded 1.

If the response to OLNP-Field 67 is coded 3, the definition of work-language group depends on responses to questions WLNAP-Field 88 and WLNBP-Field 89.

- i) Mostly French, frequently French (BIL/MFFF) if coded 2 and 1, respectively.
- ii) Mostly French, frequently English (BIL/MFFE) if coded 2 and 2, respectively.
- iii) Mostly English, frequently French (BIL/MEFF) if coded 1 and 3, respectively.
- iv) Mostly English, frequently English (BIL/MEFE) if coded 1 and 1, respectively.
- v) Mostly bilingual, frequently bilingual (BIL/MBFB) if coded 4 and 1, respectively.
- vi) Mostly English (BIL/ENGLISH) if BIL/MEFF = 1 or BIL/MEFE = 1 or BIL/MBFB = 1.

Occupation: NOCSO1P-Field 114; Managerial (1, 2), Professional and Related (3-5), Health and Science (6-8), Administrative, Educational and Related (9-11), Sales and Services (12-17), Trades, the omitted category in regression equations (18-22), Semi-skilled and Other Manual (23-25). For Appendix Table 1a, the above occupations are broadly aggregated into Managerial (1, 2), Professional and Related (3-11), White Collar (12-17), Blue Collar (18-25).

Industry: IND80P-Field 115; Primary, Secondary and Construction (1-6), Trade (7-8), Financial and related Services, the omitted category in regression equations (9, 10), Government Services (11, 12), Education and Health Services (13, 14), Accommodation and Other Services (15, 16). For Appendix Table 1a, these industries are aggregated into Public sector (11, 12), Semi-public sector (13, 14), Private sector (1-10, 15-16).

TABLE 1a
Sample Size and Average Annual Earnings (\$) for the Rest-of-Canada (ROC)

	Sample Size	Percent of Total Sample	Percent of Bilingual	Annual Earnings	Percent Differential
Men					
Total Sample	44,557	100.0	-	52,739	-
Unilingual	41,580	93.3	-	52,223	-
Bilingual	2,977	6.7	100.0	59,922	14.7
BIL/MEFE	2,137	4.8	71.8	60,178	15.2
BIL/MEFF	737	1.6	24.7	60,914	16.6
BIL/FRENCH	103	0.2	3.5	47,49	- 9.1
Women					
Total Sample	33,944	100.0	-	37,154	-
Unilingual	30,990	91.3	-	36,567	-
Bilingual	2,954	8.7	100.0	43,319	18.5
BIL/MEFE	2,030	6.0	68.7	43,269	18.3
BIL/MEFF	718	2.1	24.3	44,971	23.0
BIL/FRENCH	206	0.6	7.0	38,063	4.1

Table 1b
Sample Size and Average Annual Earnings for Quebec

	Sample Size	Percent of Total Sample	Percent of Bilingual	Annual Earnings	Percent Differential
Men					
Total Sample	15,836	100.0	-	46,071	-
Unilingual	6,454	40.8	-	39,559	-
Bilingual	9,382	59.2	100.0	50,559	27.9
BIL/MFFF	3,837	24.2	40.9	46,036	16.4
BIL/MFFE	4,095	25.8	43.6	53,641	35.6
BIL/ENGLISH	1,450	9.2	15.5	54,256	37.1
Women					
Total Sample	12,448	100.0	-	34,352	-
Unilingual	5,917	47.5	-	30,804	-
Bilingual	6,531	52.5	100.0	37,563	21.9
BIL/MFFF	2,673	21.5	40.9	37,430	21.5
BIL/MFFE	2,823	22.7	43.2	37,580	22.0
BIL/ENGLISH	1,035	8.3	15.9	37,859	22.9

TABLE 2
Ln Earnings Regression Results for Men and Women in ROC Sample (|t|-statistics)

	Men		Women	
	(1)	(2)	(3)	(4)
Constant	9.774 (711.16)	9.819 (549.66)	9.508 (601.74)	9.610 (288.91)
Region (Ontario)				
Atlantic	-0.218 (19.41)	-0.206 (18.80)	-0.183 (15.04)	-0.183 (15.52)
Prairie	-0.163 (13.97)	-0.149 (13.08)	-0.169 (13.30)	-0.163 (13.35)
West	- 0.012 (1.65)	-0.006 (0.92)	-0.032 (3.88)	-0.027 (3.45)
CMA Resident	0.012 (15.71)	0.089 (12.99)	0.162 (20.77)	0.134 (17.70)
Marital Status (Single)				
Married	0.287 (31.76)	0.252 (28.56)	0.067 (6.67)	0.040 (4.21)
Divorced/Separated	0.142 (9.61)	0.126 (8.71)	0.047 (3.40)	0.035 (2.67)
Experience	0.043 (35.51)	0.039 (33.82)	0.046 (35.79)	0.039 (31.88)
Experience Squared/1000	-0.763 (27.42)	-0.715 (26.31)	-0.845 (27.62)	-0.727 (24.63)
Schooling (High School)				
Trade/College	0.148 (17.44)	0.119 (14.20)	0.178 (18.77)	0.111 (11.87)
Undergraduate Degree	0.490 (45.63)	0.409 (35.67)	0.609 (52.12)	0.464 (37.14)
Graduate Degree	0.561 (34.00)	0.508 (29.29)	0.755 (37.84)	0.595 (29.16)
Language (UNIL/ENGLISH)				
BIL/MEFE	0.038 (2.48)	0.024 (1.64)	0.066 (4.28)	0.046 (3.14)
BIL/MEFF	0.054 (2.12)	0.030 (1.21)	0.093 (3.71)	0.065 (2.69)
BIL/FRENCH	-0.084 (1.26)	-0.066 (1.02)	-0.073 (1.58)	-0.071 (1.60)
Occupation (Trades)				
Managerial	-	0.323 (30.16)	-	0.369 (12.14)
Professional and Related	-	0.048 (3.97)	-	0.109 (3.97)
Health and Science	-	0.211 (18.58)	-	0.343 (11.22)
Admin. Educ. and Related	-	0.105 (6.71)	-	0.214 (6.95)
Sales and Services	-	0.038 (3.37)	-	-0.019 (0.66)
Semi-skilled and Other Manual	-	-0.013 (1.11)	-	-0.072 (2.14)
Industry (Financial and Related)				
Primary, Second. and Constr.	-	0.042 (3.95)	-	0.028 (2.34)
Trade	-	-0.154 (12.92)	-	-0.207 (16.27)
Government Services	-	-0.004 (0.32)	-	0.111 (7.65)
Education and Health Services	-	-0.207 (14.07)	-	-0.126 (11.03)
Accomm. and Other Services	-	-0.336 (21.43)	-	-0.354 (24.06)
Adj. R Squared	0.168	0.212	0.169	0.234
# Sample Observations	44,557		33,944	

TABLE 3
Ln Earnings Regression Results for Men and Women in Quebec Sample (|t|-statistics)

	Men		Women	
	(1)	(2)	(3)	(4)
Constant	9.604 (396.65)	9.668 (299.26)	9.343 (330.13)	9.442 (157.84)
CMA Resident	0.057 (4.63)	0.057 (4.64)	0.128 (8.99)	0.111 (7.88)
Marital Status (Single)				
Married	0.209 (13.51)	0.178 (11.66)	0.027 (1.63)	0.008 (0.47)
Divorced/Separated	0.083 (3.09)	0.063 (2.36)	0.018 (0.76)	0.004 (0.16)
Experience	0.039 (19.77)	0.036 (18.68)	0.039 (18.41)	0.033 (15.55)
Experience Squared/1000	-0.660 (14.61)	-0.613 (13.81)	-0.662 (12.70)	-0.546 (10.70)
Schooling (High School)				
Trade/College	0.183 (12.51)	0.146 (10.19)	0.248 (15.16)	0.175 (10.67)
Undergraduate Degree	0.547 (28.64)	0.438 (20.95)	0.711 (34.76)	0.550 (24.16)
Graduate Degree	0.651 (21.74)	0.538 (17.04)	0.889 (23.76)	0.683 (17.78)
Language (UNIL/FRENCH)				
BIL/MFFF	0.070 (4.64)	0.048 (3.24)	0.081 (4.77)	0.061 (3.66)
BIL/MFFE	0.209 (13.87)	0.157 (10.25)	0.149 (8.84)	0.137 (8.11)
BIL/ENGLISH	0.182 (8.51)	0.127 (5.98)	0.162 (6.66)	0.135 (5.61)
Occupation (Trades)				
Managerial	-	0.317 (15.00)	-	0.320 (5.77)
Professional and Related	-	-0.001 (0.01)	-	0.082 (1.59)
Health and Science	-	0.176 (8.70)	-	0.271 (4.96)
Admin. Educ. and Related	-	0.142 (5.16)	-	0.175 (3.17)
Sales and Services	-	0.005 (0.26)	-	-0.026 (0.48)
Semi-skilled and Other Manual	-	-0.016 (0.80)	-	-0.179 (3.10)
Industry (Financial and Related)				
Primary, Second. and Constr.	-	0.057 (2.79)	-	0.061 (2.71)
Trade	-	-0.157 (6.99)	-	-0.187 (7.82)
Government Services	-	0.088 (3.67)	-	0.147 (6.07)
Education and Health Services	-	-0.130 (5.02)	-	-0.021 (0.98)
Accomm. and Other Services	-	-0.343 (11.42)	-	0.260 (9.38)
Adj. R Squared	.146	.184	.155	.201
# Sample Observations	15,836		12,448	

APPENDIX TABLE 1a
 Employment Distribution by Sector, Occupation and Work-Language
 (Rest of Canada)

	Average Earnings \$	UNIL/ ENGLISH %	BIL/ MEFE %	BIL/ MEFF %	BIL/ FRENCH %
Men					
Sector					
Public	54,965	8.8	12.8	33.2	14.6
Semi Public	51,908	8.6	13.5	12.8	31.1
Private	52,574	82.6	73.7	54.0	54.3
Occupation					
Managerial	71,190	17.1	22.7	29.3	16.5
Professional	57,630	21.2	34.7	30.6	42.6
White Collar	46,667	26.3	25.5	31.5	19.3
Blue Collar	44,731	35.3	16.8	8.4	21.3
Women					
Sector					
Public	44,372	8.0	9.7	22.6	8.3
Semi-Public	39,827	31.8	33.7	34.0	59.7
Private	34,689	60.2	56.6	43.4	32.0
Occupation					
Managerial	48,121	11.9	16.8	16.7	5.3
Professional	43,274	29.7	40.8	38.9	61.5
White Collar	31,577	53.2	39.1	42.8	32.5
Blue Collar	30,214	4.9	3.1	1.3	0.4

APPENDIX TABLE 1b
 Employment Distribution by Sector, Occupation and Work-Language
 (Quebec)

	Average Earnings \$	UNIL/ FRENCH %	BIL/ MFFF %	BIL/ MFFE %	BIL/ ENGLISH %
Men					
Sector					
Public	53,566	8.6	13.1	11.8	11.2
Semi-Public	47,229	11.5	17.0	5.5	4.8
Private	44,947	79.9	69.9	82.7	83.9
Occupation					
Managerial	65,997	7.1	12.6	22.5	18.7
Professional	51,314	17.4	31.2	27.3	27.7
White Collar	40,534	24.5	25.1	31.4	31.2
Blue Collar	39,215	51.0	31.0	18.9	22.3
Women					
Sector					
Public	41,656	9.5	12.5	11.8	16.4
Semi-Public	38,081	37.5	39.5	5.5	15.1
Private	30,867	53.0	48.0	82.7	68.5
Occupation					
Managerial	45,441	5.9	8.7	12.8	11.7
Professional	40,851	32.7	43.2	24.6	22.8
White Collar	29,676	52.4	43.1	60.2	62.0
Blue Collar	25,008	9.0	4.9	2.3	3.5