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English as the Lingua Franca and the Economic Value of Other Languages: the Case of the Language of Work of Immigrants and Non-immigrants in the Montreal Labour Market [*]

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Abstract

With data from the 2006 Canadian census, we investigate the determinants and the economic values of different languages used at work in the Montreal metropolitan area. The working population is divided into three mother tongue groups: French, English and Others. Three indicators are defined: use of French at work as a second language, use of English at work as a second language, and use of an official language at work as opposed to a non-official language. One interesting result is that there is no relationship between schooling and the use of French at work for the English mother tongue group, while schooling is positively related to the use of English at work for the French mother tongue group and to the use of an official language at work for the Other mother tongues group. We look at the returns to using a second language at work by means of earnings regressions (with both OLS and IV to account for the endogeneity of the language of work). We find that for the English mother tongue group, using French at work does not pay. In contrast, there is a high payoff to using English at work for the French mother tongue group. For the Other mother tongues group, there is a high payoff to using an official language at work and a modest one to using English instead of French.

Key words: *language of work, mother tongue, immigrants, Montreal, earnings.*

JEL Classification: J20, J24.

Résumé

L'anglais en tant que Lingua Franca et la valeur économique des autres langues: le cas de la langue de travail des immigrants et des non-immigrants sur le marché du travail montréalais. Avec des données provenant du recensement canadien de 2006, nous étudions les déterminants et la valeur économique des différentes langues utilisées au travail dans la région métropolitaine de Montréal. La population active est divisée en trois groupes selon la langue maternelle : français, anglais et autres. Trois indicateurs sont définis : utilisation du français au travail comme langue seconde, utilisation de l'anglais au travail comme langue seconde, et utilisation d'une langue officielle au travail par opposition à une langue non officielle. Un résultat intéressant est qu'il n'y a pas de relation entre la scolarité et l'usage du français au travail pour le groupe de langue maternelle anglaise, tandis que la scolarité est positivement liée à l'utilisation de l'anglais au travail pour le groupe de langue maternelle française et à l'utilisation d'une langue officielle au travail pour le groupe des autres langues maternelles. Nous examinons les rendements de l'utilisation d'une langue seconde au travail au moyen de régressions de gains (avec MCO et VI pour tenir compte de l'endogénéité de la langue de travail). Nous trouvons que pour le groupe de langue maternelle anglaise, l'utilisation du français au travail ne paie pas. En revanche, il y a une forte récompense à l'utilisation de l'anglais au travail pour le groupe de langue maternelle française. Pour le groupe des autres langues maternelles, il y a une forte récompense à l'utilisation d'une langue officielle au travail et un rendement modeste à l'utilisation de l'anglais au lieu du français.

Mots clés: *langue de travail, langue maternelle, immigrants, Montréal, gains.*

Classification JEL: J20, J24.

1. Introduction

Because of economic globalization, English has increasingly become predominant around the world as the international language of communication, or the *lingua franca*. While this has some advantages for a better understanding among the people of the world, it can also be perceived as a threat to other languages, and some are resisting that trend. The province of Quebec presents an interesting case in point. In addition to the traditional Francophones and Anglophone communities, there are now many immigrants who must make language choices. While the economic status of the Francophone majority and of the French language has improved, and efforts have been made to integrate immigrants into the Francophone community, English is still extensively used in public activities, especially in the Montreal metropolitan area.

The relative economic positions of the various ethnic and language communities in Quebec have been studied for a long time. In the 1960's, the Royal Commission on Bilingualism and Biculturalism found that the average incomes of the French Canadians in Quebec were among the lowest of all the ethnic groups, only the Italians and the Aboriginals having lower incomes (Boulet and Raynauld, 1977). That provoked a lot of concern and resentment within the Quebec population and it was one of the factors that led to the founding of the Parti Québécois by René Lévesque in 1968. Further studies (Boulet, 1980; Vaillancourt, 1980) confirmed the low economic status of Quebec Francophones in the early 1970's. However, studies that looked at the decades between the 1980's and the 2000's usually found a significant improvement in the economic c1ondition of Quebec Francophones during that time period (see, for example, Boulet

and Lavallée, 1983; Bloom and Grenier 1992; Shapiro and Stelcner, 1997; Nadeau, 2010).

While the research on the economic position of Quebec Francophones generally presents an optimistic picture, some demographers reach gloomier conclusions by observing that the proportion of people speaking French has been decreasing in Montreal, mainly because too few immigrants assimilate within the Francophone community (Castonguay, 1998; Termote, 2001). It would appear, thus, that on the price side of the market, the value of the French language has been increasing, but that on the quantity side, the number of French speakers has remained stagnant as the power of attraction of the English language is still very strong.

In the past, the different economic standings of Canada's two major languages were mainly explained in the context of the unequal relative powers that resulted from the Conquest and the fact that Canada was a British colony. Nowadays, they are more associated with the status of English as the *lingua franca*. Francophones are doing well economically, but they need to use English at work to do so. The government of Quebec has had some success at having immigrants learn French by integrating their children to the French school system, but the temptation is still strong for them to switch to English.

This paper uses census data to look at the determinants and at the returns to using different languages at work in the Montreal metropolitan area. More precisely, we look at the factors that explain the use of a second language at work for individuals whose mother tongue is French, English or a non-official language. We further investigate the impact on earnings of using a second language at work.

This research is made possible by the inclusion of new questions on the languages used at work in the census since 2001. Those questions have not been used very much in the literature, but it is worth mentioning two previous studies. Christofides and Swidinsky (2010) consider the effect on earnings of the use of English at work by Canadian born Francophones in Quebec, and of the use of French at work by Canadian born Anglophones in the rest of Canada. They find that the former effect is significant but that the latter is not. Our study expands on that work, but it has important differences. First, instead of comparing two distinct labour markets, we focus on one multilingual market, the Montreal metropolitan area. Second, native born and immigrant workers with a mother tongue other than French or English are included. Third, the determinants and the effects on earnings of language of work are analyzed together. The other study that uses the language of work questions is Li and Dong (2007), who consider the use of a non-official language at work by Chinese immigrants in Canada as an indicator of participation in an enclave economy. The authors find that working in an enclave has strong negative impact on earnings. Our study also expands on that by considering other non-official languages (in addition to Chinese).

The paper proceeds as follows. In Section 2, a basic conceptual framework is proposed on how language of work is determined in a labour market where workers have different mother tongues. Section 3 introduces the data and the empirical models. Results for the determinants of the language of work are presented in Section 4. Earnings regressions that have the language of work among the explanatory variables are presented in Section 5. Those include both ordinary least squares (OLS) and instrumental variables

(IV) results, the latter in order to take into account of the fact that the use of a second language at work may be endogenous. Section 6 concludes the paper.

2. Conceptual framework: the determinants of the language of work in a multilingual society

As a starting point, it is worth introducing some basic ideas on the role of language in economic activity. There is a small body of literature that was pioneered by works by Breton (1978) and Vaillancourt (1980) among others. A good survey of the various issues is provided in Grin (2003).

The choice of which language to use in a particular economic activity can be analyzed as the outcome of rational decisions made by economic agents. Two major characteristics of a language that affect choices must be considered. First, the use of a common language makes communication possible among people. The larger the number of individuals who use a language, the more useful that language is as a tool of communication. This can be referred to as the network externality of a language. In a given working environment, individuals will be more efficient at their task if they can communicate in a language that is known to everybody. But if language was only a communication instrument, there would be no advantage in the long run to keep more than one. All the less important languages in the world would disappear to the benefit of the strongest one. Therefore, a second role of language is that it is part of cultural identity. Individuals are attached to a language, most of the time their mother tongue, and prefer using it if they can, even if it may be less efficient from a pure communication point of view. Many of the goods

produced by an economy have a cultural content. Because of that, among other things, the goal of language policies is often to preserve language diversity.

In a society where several languages are used, the languages that individuals use at work depend on the interaction between supply and demand.

On the *supply* side, we consider the behaviour of workers. Most individuals have one language that they learn in childhood and in which they are usually the most fluent, their mother tongue. If that language is also the one used in the labour market, no choice needs to be made. But if the labour market uses a language that is different from the person's mother tongue, then there may be an economic incentive to learn that other language. This can be seen as an investment in human capital (Breton, 1978), similar to an investment in general education or in a particular trade. Economic resources must be used in order to learn a second language that will allow a person to earn a higher wage. Whether or not the investment is worthwhile depends on the present values of the net benefits. The amount of resources needed to learn another language depends on the context. Exposure to a language will make it easier to learn, with or without the need of formal lessons. It will also be easier to learn a new language if someone is young or more educated (Chiswick and Miller, 1994).

On the *demand* side, we consider the behaviour of employers (Vaillancourt, 1980). Individuals usually have to work in teams, which means that they have to communicate among each other. For the employer, the mother tongue composition of the workforce is an important factor to determine the most efficient internal language of communication within a given group of workers. Technology may also affect the choice of the internal

language of communication, especially for skilled workers who need to use sophisticated equipment. Furthermore, the owners' and management's mother tongue may determine the language used at work. The managers may prefer hiring workers of their own mother tongue, even if other workers are available. There is also communication with the external world. For those who work with the public, the language of the customers who buy the product is an important determinant. In addition, for goods and services that are traded internationally, it is important to use a language that is known to both suppliers and buyers. A *lingua franca*, such as English, is often used for those international transactions.

The interaction of those supply and demand factors determines the composition of the languages used at work and their relative values. In the empirical analysis that follows, explanatory variables can be related to those factors. Mother tongue plays a crucial role and is used to separate the data. Given the relationship between language and earnings, the characteristics of workers that typically affect earnings (age, education, etc.) also affect language choices. As well, characteristics of jobs, such as industry, occupation, and geographical location, are expected to be important determinants of the language of work.

3. Data and empirical model

The data source for this research is the 2006 Census master file. For people living in the Montreal metropolitan area, we take men and women[1] who worked full time and full

[1] Men and women are combined in the analysis, with a dummy variable for gender. Some preliminary runs were done separately for men and women. Since they tended to tell the same story for both genders, we decided to combine them.

year (48 weeks or more) in 2005 in the age interval 18 to 64. The dependent variable is weekly earnings[2]. Both native born Canadians and immigrants are included. The analysis is done separately for three mother tongue groups: English, French, and Other mother tongues.[3]

Two related questions are asked in the census concerning the language of work, with the following wordings:

1) "In this job, what language did this person use most often?", with the choice of answers: • English, • French, • other (specify);

2) "Did this person use any other languages on a regular basis in this job?" with the choice of answers: • No, • Yes, English, • Yes, French, • Yes, other (specify).

In both questions, ties are allowed, meaning that a person can answer that two languages are used equally.

Based on that information, the following indices are defined for the use of a second language at work:

- **Fwork**: intensity of use of French at work for individuals of English mother tongue;

[2] Some restrictions were applied to eliminate very small and very large values of earnings. Observations with annual wages less than $1000 and more than $1,000,000 were removed.

[3] The Census allows multiple responses for the mother tongue question, such as English and French, English and a non official language, or French and a non official language. Those are reported as separate categories in the data file. To keep the number of groups to three, the multiple answers are allocated to the lowest status language, with the order from highest to lowest being English, French, and non official language. For example, a person who reports the mother tongue as being English and French is included in the French group.

- **Engwork**: intensity of use of English at work, for individuals of French mother tongue and for individuals of Other mother tongues;

- **Offwork**: intensity of use of an official language at work (English or French), as opposed to a non official language, for individuals of Other mother tongues.

These indices take values between zero and one. More precisely, the variable **Fwork** takes the value zero if English is used most often and no other language is used on a regular basis; it takes the value 0.25 if English is used most often and French is used on a regular basis; it takes the value 0.5 if both English and French are used most often; it takes the value 0.75 if French is used most often and English is used on a regular basis; and it takes the value one if French is used most often and no other language is used on a regular basis. The variable **Engwork** is defined in exactly the same way, but in reverse. For people of in the Other mother tongues group, two dimensions of the use of a second language at work are constructed: one for the use of an official language as opposed to a non-official language (**Offwork);** and, if an official language is used at work (that is, if **Offwork** is not equal to zero, in the majority of the cases) whether that official language is English instead of French (**Engwork**). Although those variables are discrete in nature, they are treated as continuous variables in the regressions.

Using those indicators, a two equation system is estimated separately for the three mother tongue groups: one equation that determines the use of a second language at work, and the other one that estimates the effect of using a second language at work on earnings:

$$WSL = X_1 \beta_1 + X_2 \beta_2 + \varepsilon_1 \qquad (1)$$

$$\text{Ln } y = X_1 \gamma_1 + \gamma_2 WSL + \varepsilon_2 \qquad (2)$$

where *WSL* (*Working in a second language*) is one of the indices defined above, ln y is the log of weekly earnings, X_1 is a vector of exogenous variables that affect both working in a second language and earnings, X_2 is a vector of exogenous variables that affect working in a second language but not earnings (to be used as identifying instruments), the β's and γ's are regression coefficients, and ε_1 and ε_2 are error terms.

The variables in X_1 are the usual ones in an earnings equation. The basic specification includes Age, Gender, Marital status, Schooling dummies, Immigrant status, Years since migration and Visible minority. An augmented specification adds industry and occupation dummies to this list of variables. In X_2 we have variables that affect working in a second language, but not earnings. For the estimation of equation (2), these are instruments that are correlated with the endogenous regressor *WSL*, but that are assumed to be unrelated to the error term of that equation. Such instruments must be taken from the information available in the census. The instruments we use are: Place of birth in Canada outside Quebec, Place of residence outside Quebec one or five years earlier, Home language and Location of work within the Montreal metropolitan area. In addition, for the Other mother tongue groups, a set of dummy variables for the individual mother tongues is added to the instruments.

To explore the kind of bias that we can expect from ignoring the endogeneity of *WSL* in the earnings regression, we can think about the problem in a way similar to the well studied *ability bias* in the education literature (see, for example, Angrist and Krueger, 1991; Card, 1995; Lemieux and Card, 2001). Here the bias arises from the misspecification of the second equation, which should be:

$$\text{Ln } y = X_1 \gamma_1 + \gamma_2 WSL + \gamma_3 ABIL + \varepsilon_2^* \quad (2a)$$

where *ABIL* (*ability*) is unobserved and omitted from the regression. If we believe that *ABIL* and *WSL* are positively related, i.e., if the more able individuals are more likely to learn and to work in a second language, then we would expect the coefficient γ_2 in an OLS regression to overestimate the true effect of working in a second language, because it accounts for both working in a second language and ability. However, as is also the case in the education literature, it will turn out that the results will not always be in that direction.

4. Results for the language of work

Table 1 presents the mean values of the indices of the use of a second language at work for the French, English and Other mother tongues groups respectively, in relation to some characteristics. For the French mother tongue group, the average value for all workers of the index of use of English as a second language at work is 0.20, compared to 0.32 for the use of French at work by workers in the English mother tongue group, and to 0.47 for the use of English at work by the Other mother tongues group. While the

English mother tongue group uses on average more French at work than the French mother tongue group uses English, it should be kept in mind that the English mother tongue group accounts for only 11 percent of the population, compared to 71 percent for the French mother tongue group and 18 percent for the Other mother tongues group. This means that the relative attractiveness of English as a language of work is much stronger than its share as a mother tongue would predict. Weighing the mean indices by the proportion of the population, we obtain that English is used at work about 30 percent of the time, almost three times the size of the English mother tongue group in the population.[4] Comparing the official and the non-official languages, we also note that the intensity of use of an official language at work is very high, taking the average index value of 0.94 for all workers.

(Table 1 about here)

Looking at the characteristics shown in Table 1, we observe that among the French mother tongue group, men use English as a second language at work slightly more than women, immigrants more than the Canadian-born, the more educated more than the less educated, and the young more than the old. For the use of French at work by members of the English mother tongue group, we note that men and the older age group use more French than women and the younger age group, which is similar to the intensity of use of English at work by the French mother tongue group. However, we get opposite results with respect to immigration status and schooling: the Canadian-born use more French at work than the immigrants, and the less educated more than the more educated. For the

[4] From the numbers in Table 1, the relative importance of English can be calculated as: $0.71 \times 0.20 + 0.11 \times (1 - 0.32) + 0.18 \times 0.47 = 0.301$.

Other mother tongues group regarding the use of English, we find the same relationships as for the French mother tongue group, with the interesting exception that immigrants use less English at work than the Canadian born. That may be a result of Quebec's immigration policy that favours immigrants who can speak French. Looking at the column for the use of an official language, we note that the Canadian born, the more educated and the younger ones tend to use more an official language at work.

The origin of immigrants matters a lot in determining which of the two official languages is used. Table 2 presents in descending order the mean index of use of English at work (as opposed to French) for detailed mother tongue groups. For historical and cultural reasons, there are clearly some mother tongue groups that are leaning towards English, such as Filipino, South Asian languages, Hebrew, Mandarin, Cantonese, Japanese and Korean. At the other extreme, the languages leaning towards French include Creoles, Khmer, Spanish, Portuguese, Vietnamese and Arabic. The role of English as the *lingua franca* is important. The mother tongues that are related to a higher use of French at work are typically associated with countries that have some historical and cultural ties with the French language. This is also the case for some mother tongues that are related to the use of English, such as South Indian languages and Filipino, but for others, such as Mandarin and Northern European languages, it is mainly because of the role of English as the *lingua franca*. Typically, those immigrants know more English than French when they arrive and presumably prefer working in English.

(Table 2 about here)

Results for selected variables in regressions where the dependent variable is the use of a second language at work are presented in Table 3, the complete regressions being in Appendix tables A.1 and A.2. This corresponds to equation (1) defined earlier, with the control variables X_1 and X_2.[5] Some of the results corroborate those of the descriptive statistics. For the French and Other mother tongues groups, women tend to use less English at work than men, but for the English mother tongue group, there is no statistically significant difference between genders when it comes to the use of French at work.

(Table 3 about here)

French speaking immigrants increase their use of English at work as they spend time in Canada. However, it is the opposite for immigrants in the Other mother tongues group. In their use of an official language at work, they seem to use first English and then, over time, gradually move to French. Many immigrants do not know French when they arrive and must often rely on English to land a first job. But as time goes by, perhaps with the help of some publicly available French lessons, they progressively use more French at work. The situation regarding immigrants is completely different for the English mother tongue group. They significantly use less French than the Canadian born, and time spent in Canada does not change anything. This is perhaps an indication that English speaking immigrants never become integrated into the Quebec Francophone culture to the extent that their native born counterparts do. Concerning the use of official languages by immigrants in the Other mother tongues group, the results show that immigrants use less

[5] Tables A.1 and A.2 include the two specifications without and with industry and occupation. Table 3 presents only the results of the specification with industry and occupation.

at arrival and continue to do so for a while, but start increasing their use of official languages afterward (after about 10 years). This reflects the presence of linguistic enclaves where immigrants tend to be predominant.

The effect of education is very strong for individuals in the French mother tongue group: the higher the education, the more likely they are to use English at work. This confirms the results of the descriptive statistics shown above. However, for individuals in the English mother tongue group, with the exception of the No certificate category, schooling has no effect at all on the language of work. This differs a bit from the descriptive statistics of Table 1, where a negative relationship was found.[6] Those results suggest that Anglophones do not learn French for the same reasons that Francophones learn English. For Francophones, because of its role as a *lingua franca*, English becomes increasingly necessary as one does a job that requires more education. For the Anglophones, while French may be an asset, it is not essential in jobs that require a lot of education. The use of English appears to be sufficient in many circumstances.

For the Other mother tongues group, the effect of education is similar to the one for the French mother tongue group, at least for the highest levels of schooling. Once they decide to use an official language, they are more likely to use English than French if they are highly educated. As expected, education also strongly affects the use of an official language at work as opposed to a non official language.

[6] However, in the regression that does not control for industry and education (see Table A1), the negative relationship still appears.

Finally, Table 3 shows that people with fewer ties to the Quebec Francophone culture, as indicated by birth or previous residence outside Quebec,[7] are more likely to work in English. This is true for all mother tongue groups.

Those results show that the different mother tongue groups do not respond to the same incentives in their choices of languages of work. In the next section, we will see if the effects of language of work on earnings also diverge.

5. Results for earnings

Table 4 provides estimated net impacts of working in a second language on earnings for the three mother tongue groups, as per the regression defined in equation (2) above. Panel A presents basic OLS estimates, ignoring the potential endogeneity of the language of work, and Panel B presents IV estimates. The complete regression results are in appendix Tables A3 and A4 for OLS, and in Tables A5 and A6 for IV. Two specifications of the earnings equation are provided, one without and one with industry and occupation dummies.

(Table 4 about here)

Let us consider first the OLS regressions. They show three interesting results. First, for the English mother tongue group, the coefficient of **Fwork** is small and not significant, which means that it does not pay to use French at work. Second, there is a large payoff to using English at work for the French mother tongue group. The earnings

[7] Previous residence outside Quebec takes the value one if a respondent reported that he/she lived in a Canadian province or territory other than Quebec one or five years prior to the census.

advantage for using only English at work, as opposed to using only French, is 32 percent or 24 percent depending on the regression specification.[8] This is quite large and reflects the importance of knowing English to be successful in the labour market. Third, for the Other mother tongues group, there is a huge earnings advantage to using an official language at work: 52 percent or 37 percent depending on the regression specification. In addition, when an official language is used at work by members of this group, there is a modest payoff, between 2 percent and 5 percent, to using English instead of French.

The IV regressions allow the language of work variables to be endogenous. As is well known, the advantages of using that approach depend on the quality of the instrument, which must be correlated with the language of work, but not with the unobserved variables that affect earnings. At first sight, the chosen instruments seem to satisfy those conditions. Being born or having resided in Canada outside Quebec should influence the use of English without affecting earnings directly. The language spoken at home is probably related to the one used at work, but not directly to earnings. Given the linguistic distribution of the population within the Montreal CMA (Anglophones are more concentrated in the West and in the Centre of the city), the location of work should be a determinant of language of work that is not related to earnings. Finally, for the Other mother tongues group, we know that some languages have more ties with English and others have more ties with French. Therefore, dummy variables for detailed mother tongues should be good predictors of language of work.

[8] Since the regression coefficients are large, we use the transformation ($r = e^{\beta} - 1$) to calculate the rates of change.

Assuming that the instruments are good, the IV regression coefficients in Panel B of Table 4 provide consistent estimates of the impact of using a second language at work on earnings. This is an advantage over OLS which is biased, but the variances of the IV coefficients are also larger than those of the OLS coefficients, so it is not obvious *a priori* which ones should be preferred. The IV results support the OLS ones to some extent, but some effects appear to be larger. However, the IV results are not all in agreement with the ability bias story previously discussed. In some cases, OLS appears to underestimate the true effect. But it should be noted that a large part of the literature on the ability bias in education finds similar results in that regard.[9]

In the IV regression for Anglophones, there is now a penalty for using French at work, but the coefficient is statistically significant in only the specification without the industry and occupation variables. Since the OLS results are not statistically different from zero, it suggests that they are overestimating the true returns to working in a second language, as the ability bias theory would predict. However, for Francophones, the estimated reward for using English at work increases substantially to 73 percent and 57 percent depending on the regression specification, when compared to the OLS results. This does not support the ability bias theory, as there is a negative correlation between working in English and the unobserved factors that determine earnings. It is not totally clear why this is happening; there are obviously other unobserved factors than ability. It may be because English is not really a choice, it is a necessity. And for the other mother tongues, the IV results show an extremely large payoff for working in an official language, more than 305 percent and 156 percent depending on the regression

[9] In estimating returns to education, Card (1995) and Lemieux and Card (2001) also estimate coefficients for schooling that are larger in IV regressions than in OLS regressions.

specification, which again does not support the ability bias theory. But if they use English, their payoff is smaller than in the OLS case, as predicted.

To determine the validity of the IV results, Table 5 reports the results of three tests.[10] The *First stage regression* test measures the strength of the relationship between the endogenous variable (that is, *WSL*) and its instruments. The statistic used for this test is the partial R-squared obtained in the regression of *WSL* on its instruments. Given our estimate of this statistic, the null hypothesis that the instruments are unrelated to *WSL* is rejected at a very high level of statistical significance. The purpose of the *Overidentification* test is to determine if the instruments are correlated or not with the error term in the earnings equation. This test cannot be performed unless an equation is overidentified, which it is in our case. Good instruments should not be correlated with the error term and we would like to accept the null hypothesis. Again, several variants of this test are available and a chi-squared score test is used here. It turns out that the null hypothesis is rejected in all cases, which suggests that the instruments are correlated with the error term in the earnings equation.[11] Finally, the *Endogeneity test* is done to determine, assuming the instruments are correct (which is doubtful in our case given the results of the previous test), whether IV and OLS yield the same results. In other words, the objective of this test is to check whether the endogenous variable (*WSL* in this instance) could be treated as exogenous. Several variants of this test exist; a robust regression F-test is reported here. The null hypothesis that WSL is exogenous is rejected for all earning regressions, except for the English mother tongue regression.

[10] See Nichols (2007) and Wooldridge (2009) for a discussion of those tests. The choice of the particular test in each of the situations did not affect the conclusions.
[11] It could also indicate that the model is misspecified and that the variables used as instruments should in fact be in the earnings regression.

(Table 5 about here)

A general feature of the IV approach is the difficulty of finding good instruments, and we are limited to the data at our disposal. There are possible drawbacks with some of our instruments. For example, home language is assumed to be exogenous with respect to language of work, but in reality both variables may be jointly determined (for example, for the individuals who meet their spouse at work, the home language can be determined after the language of work). Similarly, the detailed mother tongues may also reflect other attributes that affect earnings, such as ethnicity and quality of education in the countries of origin of immigrants. For those and other reasons, the set of instruments that we have is less than perfect. Note that we are in good company in that regard: the literature on education is still looking for good instruments to estimate the rates of return to schooling.

The IV results of Tables 4 and 5 include the full set of instruments described above. After experimenting with various subsets of instruments, it turns out that only two of them, place of birth in Canada outside Quebec, and residence in Canada outside Quebec one or five years earlier, pass the overidentification test. Table 6 presents alternative IV coefficients and tests with only those two instruments. Let us consider the tests first. For the English and French mother tongue groups, the p-values of the overidentification test are quite high, which means that those two instruments appear to be uncorrelated with the errors of the earnings equations. Unfortunately, for the other mother tongues group, the test cannot be done because there are no overidentifying restrictions. However, with only those two instruments, the first stage regression partial R-squared, although still significant, is very low, less than 1%. This means that the instruments are weak. In addition, for the English and French mother tongues groups, the endogeneity test does not

reject the null hypothesis that the OLS and IV results are the same. For the other mother tongues group, the partial R-squared's are also very small, but the IV results are significantly different from the OLS ones.

(Table 6 about here)

The results of the above tests are reflected in the regression coefficients. For the English and French mother tongue groups, the findings are similar to the OLS ones, but the coefficients are much less precise. For the other mother tongues group, the coefficients are much larger than those the OLS ones, especially the one of the Offwork variable, but that is probably due to the extreme weakness of the instruments. Other specifications were tried with various subsets of instruments and the IV results for the returns to working in a second language tend to vary a lot when the instruments are changed,[12] which makes them not reliable. On the contrary, the OLS results were more robust to small specification changes. Therefore, even if we recognize that endogeneity may be a problem, the OLS results reported in Panel A of Table 4 are the ones that we prefer at this point.

6. Conclusion

Using data from the 2006 Canadian census, we looked at the factors that determine the use of a second language at work in the Montreal metropolitan area for three mother

[12] In specifications where various subsets of instruments were used (not shown here but available from the authors), the point estimate of the coefficient associated with the variable Fwork in English mother tongue regressions varies between -0.28 and 0.08. For the variable Engwork, it varies between 0.17 and 0.87 in French mother tongue regressions and between -0.13 and 0.67 in the Other mother tongues regressions. For the variable Offwork in Other mother tongues regressions, the coefficient estimate varies between -2.6 and 9.3.

tongue groups: French, English and Other. We also analyzed for the same groups the impact on earnings of using a second language at work with both OLS and IV regressions.

It is clear that the status of English as the *lingua franca* plays an important role. The factors that determine the language of work are not the same for the three mother tongue groups. In particular, schooling is positively related to the use of English at work by members of the French and the Other mother tongues groups, but not to the use of French by members of the English mother tongue group. This suggests that English is more important than French in jobs that require advanced education. Another interesting result is that immigrants from the Other mother tongues group use English at work in large numbers, but that they tend to slightly increase their use of French as they spend more time in Canada. This is perhaps the result of government programs that offer French lessons to immigrants.

There are also important differences in the effect of using a second language on earnings. For members of the English mother tongue group, there are no advantages to using French at work. In contrast, for the French and the Other mother tongues groups, there are important economic benefits to using a second language (especially English) at work. Those results stand out in both the OLS and IV regressions, but in the latter case, they tend to be more unstable.

Put together, our findings suggest that Anglophones do not learn French mainly for economic reasons, but that economic incentives are crucial in the decision to learn English by Francophones and members of the Other mother tongues group. In other

words, English is a necessity to be successful in the labour market, but French is only an asset, perhaps a minor one. The results indicate that there is an unsatisfied demand in the market for English skills, while there is an excess supply of French skills.

Our analysis must be placed in the context of the language situation in Quebec and particularly in the Montreal metropolitan area. After heated debates that took place at various points of time in the past, there is now (at the time of writing this paper) a kind of "linguistic peace" in Quebec. However, that peace is fragile and can be disturbed by various trends that occur slowly, such as the language choices of immigrants who tend to prefer English in higher proportions than the weight of the Anglophone population would predict. This is due to a factor which is out of the control of policy makers: the role of English as the *lingua franca*. The policy dilemma is how to promote French without discouraging the use of English which is becoming increasingly necessary in a globalized economy. Many countries in the world also face the problem of having to deal with English as the *lingua franca*, while trying to prevent their national language from being threatened. Perhaps Quebec could learn from them.

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Table 1. Mean index of use of second languages at work, by mother tongue, Montreal Metropolitan Area, 2006

	French mother tongue	English mother tongue	Other mother tongues	
	(engwork)	(fwork)	Use of an official language at work (offwork)	Use of English at work as opposed to French (engwork)
All workers	0.20	0.32	0.94	0.47
Men	0.21	0.33	0.94	0.47
Women	0.19	0.30	0.94	0.46
Canadian born	0.16	0.34	0.97	0.52
Immigrants	0.37	0.23	0.94	0.45
Less than university	0.18	0.34	0.93	0.44
University	0.24	0.28	0.96	0.51
Age 18-39	0.22	0.33	0.96	0.47
Age 40-64	0.19	0.30	0.93	0.46
Sample size	145587	21901	37165	
Percentage of sample	71%	11%	18%	

Table 2. Mean index of use of English at work, mother tongues other than French and English, sorted from highest to lowest, Montreal Metropolitan Area, 2006

Mother tongue	Use of English at work as opposed to French (engwork)	Mother tongue	Use of English at work as opposed to French (engwork)
Filipino	0.84	Other African	0.54
South Asian	0.82	Armenian	0.51
Hebrew	0.72	Turkish	0.51
Mandarin	0.71	Italian	0.50
Other Asian	0.69	Romanian	0.39
Other North European	0.67	Vietnamese	0.35
Cantonese	0.66	Arabic	0.35
Japanese/Korean	0.65	Portugese	0.34
Greek	0.62	Other languages	0.33
Hungarian	0.59	Spanish	0.31
Ukrainian	0.59	Other Middle Eastern Afro Asiatic	0.30
German	0.57	Niger-Congo	0.28
Russian	0.57	Khmer	0.27
Iranian	0.56	Tai	0.24
Other East European	0.55	Creole	0.17
Polish	0.54		

Table 3. Regressions on the use of a second language at work, effect of selected variables, full-time full-year workers, Montreal Metropolitan Area, 2006 (t-statistics based on robust standard errors in parentheses)

	French mother tongue (English at work)		English mother tongue (French at work)		Other mother tongues (Official language at work)		Other mother tongues (English at work)	
	Coefficient	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**
woman	-0.0108	-7.90	-0.0063	-1.48	-0.0015	-0.87	-0.0145	-3.84
Immigrant	-0.0129	-1.62	-0.1016	-7.03	-0.0252	-6.69	0.0164	1.80
years since migration	0.0037	4.36	0.0011	0.94	-0.0003	-1.22	-0.0015	-2.37
years since migration squared	-0.000049	-2.66	0.000013	0.60	0.000017	3.06	0.000041	3.18
Schooling (ref: high school certificate)								
None	-0.0490	-24.11	-0.0363	-4.14	-0.0197	-5.71	-0.0351	-5.14
Non university diploma	0.0068	4.20	0.0084	1.55	0.0042	1.91	-0.0126	-2.53
Univ diploma below bac	0.0260	9.40	-0.0094	-1.07	0.0051	1.57	0.0050	0.68
University bachelors	0.0332	15.77	-0.0003	-0.05	0.0111	4.74	0.0147	2.60
University MA or PhD	0.0571	18.01	0.0097	1.16	0.0120	3.87	0.0415	5.32
Born in Can outside Quebec	0.0485	12.31	-0.0395	-7.02	-0.0044	-0.78	0.0549	3.40
Previous resid outside Quebec	0.0862	13.66	-0.0638	-7.29	-0.0094	-3.03	0.0337	4.52
R-squared	0.1839		0.1906		0.0754		0.3316	
Sample size	145587		21901		37165		37165	

Other control variables: age, age squared, married, nonwhite, 14 industry dummies, 8 occupation dummies, 2 home language dummies, 4 places of work within Montreal dummies, 30 mother tongue dummies (for the other mother tongues group). The complete results are in Appendix Tables A1 and A2.

Table 4. Effect of the use of a second language at work on log earnings, odinary Least squares and Instrumental variables regressions ,full-time full-year workers, Montreal Metropolitan Area, 2006 (t-statistics based on robust standard errors in parentheses)

A. Ordinary least squares			
	Fwork	***Engwork***	***Offwork***
Without industry and occupation			
English mother tongue	-0.006 (-0.38)		
French mother tongue		0.283 (37.64)	
Non official mother tongues		0.048 (4.75)	0.428 (15.53)
With industry and occupation			
English mother tongue	0.008 (0.52)		
French mother tongue		0.217 (28.79)	
Non official mother tongues		0.024 (2.39)	0.3182 (11.64)

B. Instrumental variables			
	Fwork	***Engwork***	***Offwork***
Without industry and occupation			
English mother tongue	-0.110 (-2.6)		
French mother tongue		0.553 (22.52)	
Non official mother tongues		-0.0087 (-0.45)	1.399 (9.77)
With industry and occupation	***Fwork***	***Engwork***	***Offwork***
English mother tongue	-0.063 (-1.54)		
French mother tongue		0.448 (17.13)	
Non official mother tongues		-0.0214 (-1.14)	0.939 (6.81)

The complete OLS regressions are in appendix Tables A3 and A4**.** The other control variables are: age, age squared, woman, married, 5 schooling dummies, nonwhite, immigrant, years since migration, years since migration squared, (14 industry dummies, 8 occupation dummies)

The complete instrumental variables regressions are in appendix Tables A5 and A6. The instruments are: born in Canada outside Quebec, residence outside Quebec 1 or 5 years earlier, home language, location of work in Montreal, detailed mother tongues (for the other mother tongues group). First stage regressions are in Tables A1 and A2.

Table 5. Tests for instrumental variables.

	Test for first stage regression: partial R-squared	*Test of overidentification: score chi2 (with force weight)*	*Test of endogeneity: Robust regression F-test*
Without industry and occupation			
English	0.1297 (p= 0.0000)	60.9615 (p = 0.0000)	6.74565 (p = 0.0094)
French	0.0933 (p= 0.0000)	532.018 (p = 0.0000)	136.354 (p = 0.0000)
Non-official (engwork and offwork)	Shea's partial R-squared: engwork 0.2841 offwork 0.041	628.921 (p = 0.0000)	37.0085 (p = 0.0000)
With industry and occupation			
English (fwork)	0.1258 (p=0.0000)	44.9326 (p = 0.0000)	3.33618 (p = 0.0678)
French (engwork)	0.0817 (p= 0.0000)	417.072 (p = 0.0000)	86.9762 (p = 0.0000)
Non-official (engwork and offwork)	Shea's partial R-squared: engwork 0.277 offwork 0.040	532.436 (p = 0.0000)	17.2976 (p = 0.0000)

Note on the tests:

First stage regression: to determine how strongly correlated the endogenous regressor is with the insruments. If reject, they are strongly correlated.

Test of overidentification: to determine if instruments are correlated with the error. If reject, they are not good instruments.

Test of endogeneity: to determine whether OLS and IV are the same. If reject, regressor is endogenous.

Table 6. Effect of the use of a second language at work on log earnings, instrumental variables regressions with a limited set of instruments (born in Canada outside Quebec, and residence in Canada outside Quebec 1 or 5 years ealier), full-time full-year workers, Montreal Metropolitan Area, 2006 (t-statistisc based on robust standard errors in parentheses)

	Fwork	***Engwork***	***Offwork***
Without industry and occupation			
English mother tongue	0.0796 (0.38)		
French mother tongue		0.375 (4.49)	
Non official mother tongues		0.544 (0.75)	9.268 (3.09)
With industry and occupation	***Fwork***	***Engwork***	***Offwork***
English mother tongue	0.078 (0.39)		
French mother tongue		0.288 (3.22)	
Non official mother tongues		0.673 (0.97)	8.302 (2.88)

Tests for instrumental variables.

	Test for first stage regression: partial R-squared	***Test of overidentification: score chi2 (with force weight)***	***Test of endogeneity: Robust regression F-test***
Without industry and occupation			
English	0.0075 (p=0.0000)	0.104 (p = 0.7479)	0.1661 (p =0.6630)
French	0.0093 (p=0.0000)	0.740 (p =0.3896)	1.218 (p =0.2697)
Non-official (engwork and offwork)	Shea's partial R-squared: engwork 0.0005 offwork 0.0003	No overid restriction	19.065 (p = 0.0000)
With industry and occupation			
English (fwork)	0.0076 (p=0.0000)	0.1965 (p = 0.6575)	0.122 (p =0.7265)
French (engwork)	0.0079 (p=0.0000)	0.852 (p = 0.3561)	0.637 (p = 0.4247)
Non-official (engwork and offwork)	Shea's partial R-squared: engwork 0.0005 offwork 0.0003	No overid restriction	14.157 (p =0.0000)

The complete regressions are available from the authors.

Table A1. OLS Regressions for Second Language at Work, French and English Mother Tongues, Montreal Metropolitan Area, 2006 Census

	French Mother tongue (Use of English at work)				English Mother tongue (Use of French at work)			
	Coefficient	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**
age	0.0006	1.50	-0.0003	-0.69	0.0004	0.28	0.0006	0.42
age2	-0.000021	-4.31	-0.000008	-1.63	-0.000026	-1.61	-0.000024	-1.48
married	-0.0036	-2.76	-0.0063	-5.05	-0.0071	-1.67	-0.0064	-1.51
woman	-0.0143	-11.85	-0.0108	-7.90	-0.0197	-4.96	-0.0063	-1.48
Immigrant	-0.0006	-0.08	-0.0129	-1.62	-0.1067	-7.46	-0.1016	-7.03
ysm	0.0034	3.82	0.0037	4.36	0.0014	1.25	0.0011	0.94
ysm2	-0.000048	-2.48	-0.000049	-2.66	0.000008	0.37	0.000013	0.60
nonwhite	0.0291	5.73	0.0305	6.14	-0.0441	-6.45	-0.0487	-7.16
Schooling (ref: high school certificate)								
None	-0.0620	-30.69	-0.0490	-24.11	-0.0256	-2.94	-0.0363	-4.14
Non university diploma	-0.0036	-2.20	0.0068	4.20	0.0056	1.03	0.0084	1.55
Univ dipl below bacc	0.0270	9.66	0.0260	9.40	-0.0225	-2.56	-0.0094	-1.07
University bacc	0.0213	10.89	0.0332	15.77	-0.0299	-5.34	-0.0003	-0.05
University MA or PhD	0.0384	12.32	0.0571	18.01	-0.0410	-5.15	0.0097	1.16
Industry (ref: manufacturing)								
Agriculture, mines, utility			-0.1156	-31.66			0.0683	1.95
Construction			-0.0745	-25.71			0.0621	3.89
Wholesale trade			0.0186	6.00			-0.0012	-0.16
Retail trade			-0.0428	-16.52			0.0668	7.49
Transportation			0.0229	6.61			0.0023	0.26
Information and cultural			-0.0069	-1.83			0.0077	0.74
Finance and insurance			-0.0278	-8.31			0.0256	2.66
Real estate, rental			-0.0195	-3.47			0.0351	2.41
Professional services			-0.0079	-2.54			-0.0083	-1.02
Management and admin			-0.0281	-7.20			-0.0024	-0.20
Education			-0.1351	-42.14			-0.0941	-10.50
Health			-0.1044	-35.09			0.0079	0.81
Arts and accomodation			-0.0435	-12.69			0.0610	5.57
Other services			-0.0691	-21.35			-0.0154	-1.35
Public administration			-0.0850	-32.18			0.1598	10.38
Occupation (ref: primary and manuf)								
Management			0.1299	41.04			-0.0341	-2.77
Business			0.1012	34.42			-0.0414	-3.43
Science			0.1078	31.54			-0.0592	-4.54
Health			0.1251	30.40			-0.0066	-0.41
Social science, education			0.0768	20.85			-0.0501	-3.54
Recreation, arts			0.0620	13.58			-0.0646	-4.17
Sales and services			0.1031	34.09			-0.0238	-1.89
Trades and transport			0.0289	10.19			0.0247	1.78
Born in Can outside Que	0.0550	13.50	0.0485	12.31	-0.0430	-7.51	-0.0395	-7.02
Previous res outside Que	0.0979	15.14	0.0862	13.66	-0.0612	-6.91	-0.0638	-7.29
Home language (ref: English)								
French	-0.2915	-54.52	-0.2726	-50.72	0.2886	40.87	0.2771	39.20
Non official	-0.2327	-17.01	-0.2116	-15.56	0.0760	4.13	0.0748	4.13
Location of work In Mtl (ref: Centre)								
South	-0.0461	-29.43	-0.0419	-27.36	0.0789	8.96	0.0822	9.45
West	0.1276	35.11	0.1101	30.67	-0.0446	-8.95	-0.0452	-9.00
North	-0.0659	-46.00	-0.0579	-41.28	0.1076	11.11	0.1053	11.15
Other	-0.0483	-14.32	-0.0375	-11.34	-0.0021	-0.12	-0.0124	-0.70
Constant	0.4830	50.17	0.4224	43.60	0.3706	13.46	0.3658	12.37
R-squared	0.1213		0.1839		0.1606		0.1906	
Sample size	145587		145587		21901		21901	

Table A2. OLS Regressions for Second Language at Work, Other Mother Tongues, Montreal Metropolitan Area, 2006 Census

	Official language at work				English at work			
	Coefficient	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**
age	0.0012	2.05	0.0010	1.68	0.0035	2.69	0.0027	2.08
age2	-0.000022	-3.12	-0.000019	-2.62	-0.000051	-3.23	-0.000039	-2.49
married	0.0007	0.42	0.0006	0.35	-0.0097	-2.45	-0.0098	-2.53
woman	-0.0021	-1.43	-0.0015	-0.87	-0.0154	-4.44	-0.0145	-3.84
Immigrant	-0.0275	-7.32	-0.0252	-6.69	0.0164	1.80	0.0164	1.80
ysm	-0.0003	-1.24	-0.0003	-1.22	-0.0018	-2.78	-0.0015	-2.37
ysm2	0.000019	3.37	0.000017	3.06	0.000048	3.66	0.000041	3.18
nonwhite	-0.0031	-1.06	-0.0025	-0.86	-0.0177	-2.63	-0.0126	-1.89
Schooling (ref: high school certificate)								
None	-0.0225	-6.48	-0.0197	-5.71	-0.0421	-6.22	-0.0351	-5.14
Non university diploma	0.0076	3.46	0.0042	1.91	-0.0129	-2.58	-0.0126	-2.53
Univ dipl below bacc	0.0100	3.12	0.0051	1.57	0.0105	1.43	0.0050	0.68
University bacc	0.0187	8.33	0.0111	4.74	0.0286	5.28	0.0147	2.60
University MA or PhD	0.0216	7.41	0.0120	3.87	0.0604	8.19	0.0415	5.32
Industry (ref: manufacturing)								
Agriculture, mines, utility			0.0175	2.96			-0.1045	-4.60
Construction			-0.0035	-0.76			-0.0829	-7.14
Wholesale trade			-0.0045	-1.41			0.0357	4.91
Retail trade			-0.0009	-0.26			-0.0511	-7.08
Transportation			0.0009	0.26			0.0357	4.11
Information and cultural			0.0074	2.18			-0.0051	-0.49
Finance and insurance			0.0008	0.25			-0.0361	-4.30
Real estate, rental			0.0071	1.25			-0.0272	-1.88
Professional services			0.0032	1.19			0.0244	3.29
Management and admin			0.0038	0.96			-0.0283	-3.07
Education			0.0095	2.24			0.0441	4.05
Health			0.0056	1.49			-0.0633	-6.94
Arts and accomodation			-0.0244	-5.72			-0.0499	-6.10
Other services			-0.0282	-5.74			0.0016	0.17
Public administration			0.0034	0.91			-0.1416	-13.55
Occupation (ref: primary and manuf)								
Management			0.0037	0.98			0.0488	5.87
Business			0.0153	4.53			0.0634	8.02
Science			0.0279	8.35			0.0603	6.96
Health			-0.0005	-0.10			0.0339	2.85
Social science, education			-0.0003	-0.07			0.0075	0.67
Recreation, arts			0.0107	1.73			0.0492	3.28
Sales and services			0.0016	0.42			0.0303	3.76
Trades and transport			0.0161	4.37			0.0007	0.08
Born in Can outside Que	-0.0073	-1.27	-0.0044	-0.78	0.0573	3.44	0.0549	3.40
Previous res outside Que	-0.0101	-3.26	-0.0094	-3.03	0.0320	4.24	0.0337	4.52
Home language (ref: English)								
French	-0.0071	-3.70	-0.0064	-3.30	-0.2401	-45.47	-0.2297	-43.88
Non official	-0.0304	-15.38	-0.0300	-15.19	-0.1289	-26.67	-0.1211	-25.27
Location of work In Mtl (ref: Centre)								
South	0.0086	2.70	0.0097	3.04	-0.0881	-11.51	-0.0880	-11.56
West	0.0170	7.81	0.0158	7.17	0.0760	13.10	0.0651	11.15
North	0.0114	4.69	0.0134	5.47	-0.0917	-14.84	-0.0847	-13.73
Other	0.0056	0.82	0.0056	0.84	-0.0214	-1.33	-0.0091	-0.56

Mother tongue (ref: Italian)								
German	0.0169	3.61	0.0168	3.58	0.0850	5.40	0.0804	5.27
Other North Europe	0.0225	3.79	0.0216	3.63	0.1790	9.88	0.1614	9.17
Portuguese	0.0219	6.14	0.0220	6.16	-0.0752	-9.26	-0.0724	-8.98
Spanish	0.0058	1.48	0.0049	1.25	-0.0908	-10.11	-0.0919	-10.36
Romanian	0.0547	13.57	0.0506	12.54	-0.0642	-5.59	-0.0705	-6.16
Greek	-0.0126	-3.44	-0.0073	-1.98	0.1318	16.84	0.1343	17.30
Armenian	0.0246	4.53	0.0243	4.48	0.0594	5.00	0.0530	4.45
Russian	0.0364	6.65	0.0327	6.00	0.0986	6.18	0.0945	6.06
Hungarian	0.0277	3.53	0.0262	3.37	0.0843	3.98	0.0841	4.03
Polish	0.0146	2.70	0.0130	2.41	0.0647	4.92	0.0633	4.89
Ukrainian	-0.0014	-0.13	-0.0026	-0.25	0.0706	3.12	0.0652	2.91
Other East Europe	0.0402	9.52	0.0376	8.91	0.0720	5.01	0.0676	4.76
Iranian	0.0471	6.39	0.0468	6.30	0.1270	6.50	0.1284	6.57
South Asian	0.0490	11.00	0.0504	11.26	0.3647	32.74	0.3610	32.55
Tai	0.0534	6.65	0.0517	6.35	-0.1256	-6.65	-0.1266	-6.74
Cantonese	-0.0389	-3.06	-0.0390	-3.16	0.2229	10.08	0.2106	9.70
Other Asia	-0.0168	-2.58	-0.0164	-2.56	0.2435	19.50	0.2362	19.21
vietnamese	0.0347	6.02	0.0339	6.00	-0.0482	-3.48	-0.0505	-3.71
Khmer	0.0431	4.72	0.0432	4.75	-0.0821	-4.11	-0.0815	-4.02
Filipino	0.0436	8.46	0.0467	9.00	0.3630	28.03	0.3653	28.32
Arabic	0.0326	8.59	0.0321	8.46	-0.0510	-5.55	-0.0541	-5.97
Hebrew	0.0124	1.05	0.0125	1.06	0.2073	9.79	0.1996	9.66
Other Middle East	0.0586	12.71	0.0564	11.87	-0.1128	-6.64	-0.1075	-6.36
Turk	0.0580	6.92	0.0605	7.05	0.0857	2.93	0.0829	2.79
Niger Congo	0.0668	16.44	0.0640	15.42	-0.1039	-5.04	-0.1015	-4.89
Other African	0.0626	12.15	0.0625	12.02	0.1094	3.96	0.1138	4.15
Creole	0.0588	14.53	0.0582	14.30	-0.1688	-16.78	-0.1643	-16.38
Japanese-Korean	0.0038	0.26	0.0089	0.62	0.2011	6.79	0.1998	6.75
Mandarin	0.0161	1.58	0.0133	1.29	0.2455	8.63	0.2327	8.53
Other languages	-0.0123	-0.69	-0.0152	-0.84	-0.0932	-2.71	-0.0904	-2.66
Constant	0.9550	82.46	0.9516	79.19	0.5211	19.36	0.5101	18.48
R-squared	0.0647		0.0754		0.3144		0.3316	
Sample size	37165		37165		37165		37165	

Table A3. OLS earnings regressions, French and English Mother Tongues, Montreal Metropolitan Area, 2006 Census

	French mother tongue				English mother tongue			
	Coefficient	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**
engwork	0.2834	37.64	0.2175	28.79				
fwork					-0.0060	-0.38	0.0082	0.52
age	0.0885	79.08	0.0761	70.03	0.0936	30.67	0.0809	27.70
age2	-0.000918	-66.95	-0.000778	-58.62	-0.000936	-25.25	-0.000794	-22.39
married	0.1071	32.60	0.0815	26.00	0.1703	18.60	0.1263	14.67
woman	-0.2801	-91.01	-0.2229	-64.60	-0.2530	-28.50	-0.1942	-20.48
Immigrant	-0.2339	-11.53	-0.2195	-11.43	-0.1166	-3.13	-0.1090	-3.12
ysm	0.0054	2.50	0.0067	3.26	0.0033	1.11	0.0048	1.74
ysm2	-0.000011	-0.23	-0.000044	-0.98	-0.000009	-0.15	-0.000049	-0.93
nonwhite	-0.1718	-13.79	-0.1690	-14.18	-0.1776	-11.63	-0.1471	-9.99
Schooling (ref: high school certificate)								
None	-0.1996	-33.97	-0.1614	-28.06	-0.2196	-12.17	-0.1424	-8.17
Non university diploma	0.0994	24.00	0.0775	19.26	0.0883	7.80	0.0790	7.26
Univ dipl below bacc	0.3117	43.88	0.2422	35.38	0.2586	12.70	0.1924	10.02
University bacc	0.4564	93.10	0.3765	71.34	0.4441	33.51	0.3568	26.29
University MA or PhD	0.6305	79.98	0.5316	65.59	0.6025	30.46	0.5474	25.63
Industry (ref: manufacturing)								
Agriculture, mines, utility			0.1696	17.06			-0.0083	-0.10
Construction			-0.0737	-8.48			-0.0725	-2.29
Wholesale trade			-0.0341	-4.69			-0.0643	-3.79
Retail trade			-0.2659	-39.59			-0.2964	-15.06
Transportation			-0.0279	-3.72			-0.0262	-1.43
Information and cultural			0.0687	8.02			0.0354	1.58
Finance and insurance			0.0398	5.44			0.0616	2.88
Real estate, rental			-0.1830	-11.87			-0.0953	-2.59
Professional services			-0.0679	-9.14			-0.0278	-1.44
Management and admin			-0.2649	-26.89			-0.2473	-8.93
Education			-0.1663	-22.10			-0.2863	-14.53
Health			-0.2379	-33.68			-0.2997	-15.48
Arts and accomodation			-0.3830	-40.08			-0.4648	-19.65
Other services			-0.2972	-32.10			-0.3511	-13.58
Public administration			0.0762	12.43			0.0305	1.14
Occupation (ref: primary and manuf)								
Management			0.3433	38.31			0.5641	22.28
Business			0.0478	6.04			0.1985	8.48
Science			0.2008	23.56			0.3976	15.99
Health			0.2859	26.26			0.4586	13.85
Social science, education			0.1305	13.14			0.3406	11.62
Recreation, arts			0.0239	1.96			0.1045	3.10
Sales and services			0.0103	1.21			0.1794	7.19
Trades and transport			0.0964	12.05			0.1629	6.45
Constant	4.5454	210.10	4.8197	219.70	4.4035	73.76	4.5213	73.63
R-squared	0.3027		0.3707		0.2924		0.3753	
Sample size	145587		145587		21901		21901	

Table A4. OLS earnings regressions, Other Mother Tongues, Montreal Metropolitan

	Coefficient	t-value	Coefficient	t-value
engwork	0.0482	4.75	0.0237	2.39
offwork	0.4279	15.53	0.3182	11.64
age	0.0699	25.87	0.0623	23.98
age2	-0.000766	-23.78	-0.000667	-21.50
woman	-0.2125	-30.33	-0.1922	-26.17
married	0.0699	8.79	0.0593	7.82
Immigrant	-0.4864	-35.83	-0.4285	-32.86
ysm	0.0229	20.40	0.0201	18.90
ysm2	-0.000217	-9.15	-0.000198	-8.78
nonwhite	-0.1252	-15.00	-0.1090	-13.57
Schooling (ref: high school certificate)				
None	-0.1272	-10.24	-0.0830	-6.79
Non university diploma	0.1500	14.56	0.0995	9.89
Univ dipl below bacc	0.3220	21.59	0.2127	14.75
University bacc	0.4662	42.41	0.3051	27.01
University MA or PhD	0.6841	42.68	0.4707	28.12
Industry (ref: manufacturing)				
Agriculture, mines, utility			0.1049	2.39
Construction			-0.1319	-4.78
Wholesale trade			-0.0240	-1.66
Retail trade			-0.2949	-19.72
Transportation			-0.0207	-1.20
Information and cultural			0.1024	4.94
Finance and insurance			0.0852	5.13
Real estate, rental			-0.0858	-2.73
Professional services			0.0156	1.05
Management and admin			-0.1922	-10.73
Education			-0.0614	-3.24
Health			-0.2177	-13.01
Arts and accomodation			-0.3776	-21.45
Other services			-0.3013	-16.68
Public administration			0.1089	6.02
Occupation (ref: primary and manuf)				
Management			0.3928	22.94
Business			0.1515	10.65
Science			0.3813	23.89
Health			0.4730	19.75
Social science, education			0.2062	9.96
Recreation, arts			0.0514	1.68
Sales and services			0.0975	6.38
Trades and transport			0.1331	8.87
constant	4.5424	74.77	4.7416	79.35
R-squared	0.2504		0.3211	
Sample size	37165		37165	

Table A5. IV earnings regressions, French and English Mother Tongues, Montreal Metropolitan Area, 200

	French mother tongue				English mother tongue			
	Coefficient	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**
engwork	0.5526	22.52	0.4482	17.13				
fwork					-0.1103	-2.60	-0.0629	-1.54
age	0.0882	78.20	0.0761	69.77	-0.1267	-3.38	0.0811	27.74
age2	-0.000911	-65.87	-0.000775	-58.22	0.0034	1.14	-0.000798	-22.47
married	0.1085	32.76	0.0833	26.37	0.0000	-0.12	0.1269	14.70
woman	-0.2751	-87.90	-0.2199	-63.12	-0.1841	-11.83	-0.1948	-20.53
Immigrant	-0.2453	-11.99	-0.2248	-11.61	0.0938	30.67	-0.1157	-3.29
ysm	0.0054	2.46	0.0065	3.13	-0.0009	-25.33	0.0049	1.76
ysm2	-0.000020	-0.43	-0.000049	-1.09	0.1711	18.61	-0.000048	-0.90
nonwhite	-0.1844	-14.65	-0.1796	-14.94	-0.2555	-28.59	-0.1518	-10.11
Schooling (ref: high school certificate)								
None	-0.1808	-29.38	-0.1489	-25.07	-0.2195	-12.11	-0.1434	-8.21
Non university diploma	0.1005	24.11	0.0759	18.76	0.0894	7.88	0.0799	7.33
Univ dipl below bacc	0.3033	42.22	0.2354	34.03	0.2561	12.55	0.1917	9.98
University bacc	0.4490	90.52	0.3673	68.11	0.4395	33.02	0.3559	26.24
University MA or PhD	0.6172	77.08	0.5155	61.92	0.5955	29.89	0.5466	25.62
Industry (ref: manufacturing)								
Agriculture, mines, utility			0.1984	19.02			-0.0011	-0.01
Construction			-0.0550	-6.14			-0.0675	-2.13
Wholesale trade			-0.0400	-5.48			-0.0651	-3.83
Retail trade			-0.2535	-36.88			-0.2914	-14.72
Transportation			-0.0372	-4.86			-0.0278	-1.52
Information and cultural			0.0681	7.94			0.0356	1.58
Finance and insurance			0.0458	6.21			0.0634	2.97
Real estate, rental			-0.1794	-11.64			-0.0933	-2.53
Professional services			-0.0664	-8.93			-0.0289	-1.50
Management and admin			-0.2593	-26.26			-0.2482	-8.95
Education			-0.1325	-15.61			-0.2934	-14.64
Health			-0.2116	-27.54			-0.2995	-15.47
Arts and accomodation			-0.3716	-38.43			-0.4607	-19.41
Other services			-0.2798	-29.53			-0.3525	-13.63
Public administration			0.0975	14.79			0.0433	1.57
Occupation (ref: primary and manuf)								
Management			0.3115	32.48			0.5608	22.08
Business			0.0223	2.66			0.1951	8.28
Science			0.1731	19.16			0.3924	15.66
Health			0.2549	22.26			0.4574	13.78
Social science, education			0.1122	11.04			0.3363	11.44
Recreation, arts			0.0080	0.64			0.0987	2.92
Sales and services			-0.0153	-1.72			0.1773	7.08
Trades and transport			0.0895	11.12			0.1651	6.49
Constant	4.4972	203.03	4.7876	214.75	4.4399	71.83	4.5463	71.92
R-squared	0.2942		0.3650		0.2907		0.3745	
Sample size	145587		145587		21901		21901	

First stage regressions for engwork and fwork are in Table A1. The instruments are: born in Canada outside Quebec, residence outside Quebec 1 or 5 years earlier, home language, location of work within Montreal.

Table A6. IV earnings regressions, Other Mother Tongues, Montreal Metropolitan Area, 2006 Census

	Coefficient	t-value	Coefficient	t-value
engwork |	-0.0087	-0.45	-0.0214	-1.14
offwork	1.3998	9.77	0.9396	6.81
age	0.0689	24.83	0.0619	23.52
age2	-0.000747	-22.45	-0.000657	-20.86
married	0.0692	8.53	0.0589	7.69
woman	-0.2102	-29.32	-0.1903	-25.64
Immigrant	-0.4675	-33.15	-0.4173	-31.12
ysm	0.0224	19.48	0.0198	18.31
ysm2	-0.000214	-8.80	-0.000194	-8.49
nonwhite	-0.1260	-14.75	-0.1097	-13.52
Schooling (ref: high school certificate)				
None	-0.1043	-7.57	-0.0708	-5.40
Non university diploma	0.1365	12.91	0.0935	9.20
Univ dipl below bacc	0.3073	20.06	0.2072	14.22
University bacc	0.4469	38.64	0.2984	25.98
University MA or PhD	0.6656	40.30	0.4667	27.64
Industry (ref: manufacturing)				
Agriculture, mines, utility			0.0861	1.93
Construction			-0.1316	-4.71
Wholesale trade			-0.0169	-1.15
Retail trade			-0.2953	-19.53
Transportation			-0.0198	-1.14
Information and cultural			0.0972	4.67
Finance and insurance			0.0844	5.04
Real estate, rental			-0.0919	-2.89
Professional services			0.0169	1.13
Management and admin			-0.1950	-10.76
Education			-0.0650	-3.42
Health			-0.2248	-13.26
Arts and accomodation			-0.3604	-19.68
Other services			-0.2819	-14.99
Public administration			0.0960	5.18
Occupation (ref: primary and manuf)				
Management			0.3920	22.78
Business			0.1444	9.93
Science			0.3668	22.17
Health			0.4684	19.38
Social science, education			0.2028	9.73
Recreation, arts			0.0484	1.56
Sales and services			0.0983	6.38
Trades and transport			0.1227	8.00
Constant	3.6437	24.41	4.1689	28.96
R-squared	0.2168		0.3073	
Sample size	37165		37165	

First stage regressions for engwork and offwork are in Table A2. The instruments are: born in Canada outside Quebec, residence outside Quebec 1 or 5 years earlier, home language, location of work within Montreal, and detailed mother tongues dummies .