

312 Final Project

Wage Premiums for Allophones and Multilinguals across Large Canadian Cities

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Background & Literature Review:

Our research follows from Daniel Shapiro and Morton Stelcner's 1982, 1987, and 1997 papers, which examine earnings differentials for speakers of French and English in Quebec, Canada. In their 1982 paper, Shapiro and Stelcner expand upon Vaillancourt's 1980 research by including females in their analysis of wage differentials for anglophones and francophones in Quebec in the 1960s. Shapiro and Stelcner find that "knowledge of English was more highly rewarded in Quebec than was knowledge of French in the case of males." (110) However, for females, only unilingual francophones earned less: "Our results clearly suggest that the magnitude of the earnings disadvantage of francophones is overstated by the reliance on male data." Shapiro and Stelcner followed up their 1982 paper with another in 1987, which used the same methodology with 1981 Canadian census data to continue their analysis for 1970-1980. They found that since the passage of *La Charte de la langue française* (Bill 101) in 1977, which made French the official language of Quebec, the previously observed earnings differentials between anglophones and francophones had been "substantially reduced", and that "major gains accrued to francophone males". In 1997 Shapiro and Stelcner used data from the 1991 Canadian census with the same methodology as their previous papers, finding that the earnings gap between anglophones and bilingual francophones in Quebec had further diminished, but that the gap for allophones and unilingual francophones had worsened.

Kristin Munro's 2006 thesis, *Wage Differentials by Language Group in Quebec*, replicated Shapiro & Stelcner's analysis using data from the 2001 census, providing data for 1990-2000. Munro 2006 finds that "workers in Quebec fluent in both English and French have higher wages than those individuals who speak only one or no official language, holding all else constant and across occupations, genders, native language and language used at home and work. Yet workers who actually use both languages in the workforce earn less than those who primarily use only one." (39)

Questions:

The findings of Munro and Shapiro & Stelcner have motivated two questions which we will address:

1. Do Allophones earn less in major cities in Canada *in general*? Munro found that, all things else held constant, allophone wages suffered in Quebec. Is this true in other major cities?
2. Is being a bilingual (speaking a non-official language in addition to one of the official languages) valuable in the major cities in Canada? Is there a wage premium for bilingualism in the major cities? If so, how do these wage premiums vary across these cities?

Data:

For this project we use an adaptation of Munro's datafile Canada.dta. This datafile contains data transferred from the official 2001 Census Public Use Microdata File published by Statistics Canada. That dataset includes 139 variables, of which Munro selected a subset. The dataset includes 801,055 individuals (2.7% percent of the population of Canada).

In many cases, data for certain variables is missing for many individuals. To prepare our data for analysis, many variables had to be recoded. The STATA .do file used for this process, as well as the summary statistics for the variables we use, are available in Appendix A.

Model:

In order to ensure that our results are comparable to those of the previously established literature, our analyses are based upon Shapiro and Stelcner's (1987) model, ordinary least squares regressions with log annual gross wages ($\ln Y_i$) as the dependent variable and a matrix of explanatory variables (bX_i) and an individual error term (U_i):

$$\ln Y_i = bX_i + U_i$$

Shapiro and Stelcner estimate two separate regressions, one for males and one for females, because for females they include an explanatory variable for the number of babies born. We were unable to determine how exactly this variable had been constructed from the census data, but we utilized the variable KIDS constructed in the Canada extract.do to serve this function. 'KIDS' is the dummy variable that indicates whether or not there is any child currently living in the census household. Because this variable was not relevant only to women, we did not use separate regressions for males and females. Instead, we included a 'female' dummy variable and a number of relevant interaction terms to capture socioeconomic factors related to childbearing, motherhood, and discrimination.

Shapiro and Stelcner also restrict their observations to those individuals that worked at least 35 hours per week and 40 weeks per year. We did not use this restriction, but we did restrict our sample to only those people with positive non-zero wage values. To control for the effects of part-time and full-time work, we included the number of hours worked per week and the number of weeks worked per year as explanatory variables. The full list of explanatory variables used in our model, and their descriptions, are available in

Appendix A.

Though we adopt Shapiro & Stelcner's model, we are concerned with their use of OLS because selection bias may be an issue. Wages are only observed for individuals that are employed, so the dependent variable is truncated to values greater than zero. We think it is unlikely that unemployment is truly random; thus, the data sampling process is not really random. This could cause regression errors to stop being normally distributed, and it could bias coefficient estimates. This is a textbook example of a sample selection problem. Shapiro & Stelcner 1987 "recognize that selection bias may be an issue in the regression analysis" (101) and they note that "most studies of linguistic earnings differentials ignore the possibility of selection bias". In their 1997 paper, they added a Heckit regression to their analysis, a technique created by James Heckman in 1977 to overcome selection bias. However, they find that the effect of selection bias is minimal.

To see for ourselves, we will extend our analysis by using a 'Heckit' regression. Unfortunately the analytical and mathematical complexity of this technique has likely contributed to its relative obscurity in econometric research. We suspect that this may be why Munro did not choose to use this technique and why Shapiro & Stelcner only used it as a brief part of their 1997 paper. Nonetheless, we will attempt to use this technique to determine if there is evidence of a sample-selection problem and to compare our OLS results to the Heckman results. Following the advice of Hill, Griffiths, and Lim, we will use a maximum-likelihood Heckit regression instead of a two-stage Heckit regression.

Two sets of explanatory variables must be specified in a Heckit regression, one set for the wage regression and another for the selection (whether or not respondents enter the labor market) probit regression. For our analysis, the purpose of using a Heckit regression is to test for the presence of selection bias and to compare the signs and magnitudes of coefficient estimates with our own OLS estimates and those of Munro 2006 and Shapiro & Stelcner. As our computers are sufficiently fast to calculate maximum-likelihood Heckit regressions in less than a minute, we have the luxury of being able to include all the same variables we included in our OLS regressions. However, this opens the door for theoretical difficulties in the choice of explanatory variables for the wage and selection models. In their 1997 paper, Shapiro & Stelcner utilize a Heckit model, but they note that "concerns have been expressed about its reliability because it may be prone to underidentification, as well as sensitivity to specification and to assumptions about the underlying error distribution that underlies the model" (pp. 129). This is an especially troubling problem for us, because we have a very large number of possible explanatory variables at our disposal. Therefore, we have attempted to keep our OLS and Heckit wage models very similar in their specification. Our choices for the selection model explanatory variables follow from Shapiro & Stelcner 1997. The model we have chosen is shown below:

Dependent variable: LNWAGE

Wage Regression explanatory variables: EXPER* educexp YOSCHOOLING
tradecert MARRIED_DUMMY KIDS weeks hours ALLOPHONE
FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL

senior_management management business financial clerical science health
technical social teaching art_sports sales supervisors food protective childcare
travel transportation construction trade operators primary female femalekids
citizen immigrant YRIMMIG* i.majorcities

Selection model explanatory variables: AGEP YOSCHOOLING mtenglish
mtfrench immigrant NEITHER_OFFICIAL FRENCH_ONLY ENGLISH_ONLY
movedprodvine movedcddiv female KIDS femalekids unpaid vsblmnrty

Restrictions: if city==1 & MOB5P!=9 & KIDS!=.

The explanatory variables for the wage regression contain two interaction variables educexp and femalekids as we believe that there might be some additional effects on wage when respondents have fairly good educational level and some experience or when they are female with kids to take care of. We also included a large quantity of occupation dummies to control for wage differences due to different levels of payment in various career fields. For the occupation dummies, we decide to leave out the category of laborers so that it can serve as the function of reference group. Due to the nature of the data collected and the question we try to ask, we restrict the regression to observations that are applicable to mobility status and children status and are in the major nine cities of Canada: Toronto, Montreal, Vancouver, Ottawa, Calgary, Edmonton, Quebec City, Winnipeg, and Hamilton.

Justification of the Assumptions of our Methodology:

When using OLS, we make all the regular assumptions of multiple regression. First, we assume that our specification is correct. As previously noted, our specification is inspired by Shapiro & Stelcner's model, which was also used by Munro for 1990-2000 data. These authors found results that had the expected signs. Though we haven't copied exactly their specification, we are relatively confident that we have included the majority of the same kinds of explanatory variables, and that we have used well the data provided. As usual, we assume that the expected value of the individual error term will be zero and that it will have a constant variance and zero covariance between errors. We have attempted to deal with any possible covariance issues by including numerous explanatory variables, including geographic dummy variables and socioeconomic variables.

There is a possibility that some of our explanatory variables are endogenous. For example, BOTH_OFFICIAL could be endogenous with LNWAGE; if individuals felt their wages were too low, they might want to become fluent in another official language, which would increase their wage. However, this process would certainly take some time, and it may be that speaking both official languages does not have such a positive effect on wages as we are hypothesizing. Therefore, we are not too concerned about endogeneity problems. However, we will test for them in our analysis.

Following Shapiro & Stelcner, we did not use panel regressions. There are two reasons for this. First, the questions that we want to answer are non-temporal; we are not trying to look at trends over time, just one point in time. Second, we assume that our numerous

restrictions and explanatory variables (especially our city dummy variables) will be able to capture the omitted variables that geographic panels would in a panel-data model.

Our use of Heckit is motivated by the concern that, because the dependent variable (log of yearly wages) in our OLS regressions is restricted to positive non-zero values, there may be selection-bias because our sample is non-random.

Results and Interpretation

(a) First, we extended the model that Munro used to nine top major cities in Canada and run the regressions separately conditional on different cities so we can examine whether or not the wage gap between Allophones and non-Allophones also exists in major cities outside Quebec and whether or not respondents who speak both English and French are in a more advantageous position. After using OLS estimation, we found that there is evidence for heteroskedasticity, so all of the results include robust standard errors. The output of the regressions is shown below (the cities from left to right columns are ranked in size from first to ninth):

VARIABLES	Toronto LNWAGE	Montreal LNWAGE	Vancouver LNWAGE	Ottawa LNWAGE	Calgary LNWAGE	Edmonton LNWAGE	Quebec City LNWAGE	Winnipeg LNWAGE	Hamilton LNWAGE
EXPERIENCE	0.0950*** (0.00265)	0.0705*** (0.00350)	0.0973*** (0.00429)	0.108*** (0.00633)	0.0999*** (0.00588)	0.105*** (0.00547)	0.0955*** (0.00920)	0.0867*** (0.00665)	0.109*** (0.00706)
EXPER2	-0.000935*** (3.35e-05)	-0.000744*** (4.55e-05)	-0.000994*** (5.33e-05)	-0.00108*** (9.46e-05)	-0.00109*** (7.55e-05)	-0.00110*** (7.34e-05)	-0.000960*** (0.000112)	-0.000884*** (8.27e-05)	-0.000957*** (8.66e-05)
educexp	-0.00290*** (0.000110)	-0.00173*** (0.000144)	-0.00281*** (0.000183)	-0.00314*** (0.000281)	-0.00286*** (0.000257)	-0.00308*** (0.000240)	-0.00258*** (0.000387)	-0.00243*** (0.000305)	-0.00365*** (0.000306)
YOSCHOOLING	0.115*** (0.00289)	0.0920*** (0.00356)	0.110*** (0.00474)	0.126*** (0.00665)	0.107*** (0.00610)	0.111*** (0.00603)	0.115*** (0.00855)	0.112*** (0.00718)	0.141*** (0.00746)
tradedcert	-0.0264** (0.0117)	-0.0394*** (0.0144)	-0.0200 (0.0174)	-0.0542** (0.0256)	-0.0360* (0.0214)	0.0210 (0.0234)	-0.0696** (0.0303)	0.0156 (0.0266)	-0.00558 (0.0283)
MARRIED_DUMMY	0.182*** (0.0116)	0.142*** (0.0138)	0.165*** (0.0185)	0.181*** (0.0252)	0.177*** (0.0262)	0.155*** (0.0247)	0.126*** (0.0289)	0.200*** (0.0295)	0.128*** (0.0308)
KIDS	0.0133 (0.0123)	0.0834*** (0.0148)	0.0530*** (0.0190)	0.0680*** (0.0258)	0.0611** (0.0238)	0.122*** (0.0257)	0.0217 (0.0311)	0.0698** (0.0291)	0.127*** (0.0296)
weeks	0.0315*** (0.000430)	0.0316*** (0.000532)	0.0338*** (0.000662)	0.0317*** (0.000904)	0.0351*** (0.000967)	0.0358*** (0.000904)	0.0284*** (0.00122)	0.0321*** (0.00113)	0.0325*** (0.00111)
hours	0.00759*** (0.000286)	0.00773*** (0.000377)	0.00766*** (0.000420)	0.00789*** (0.000624)	0.00730*** (0.000594)	0.00712*** (0.000554)	0.00748*** (0.000872)	0.00886*** (0.000712)	0.00811*** (0.000716)
ALLOPHONE	-0.0504*** (0.0102)	-0.0765*** (0.0182)	-0.122*** (0.0197)	-0.0816** (0.0353)	-0.145*** (0.0304)	-0.0241 (0.0290)	-0.180* (0.109)	-0.0379 (0.0311)	-0.0235 (0.0365)
FRENCH_ONLY	-0.113 (0.190)	0.0573** (0.0280)	0.157 (0.575)	-0.0547 (0.0433)	0.177 (0.237)	0.503 (0.351)	0.416 (0.629)	0.111 (0.371)	
BOTH_OFFICIAL	0.0299** (0.0139)	0.126*** (0.0268)	-0.0298 (0.0247)	0.0739*** (0.0171)	-0.00694 (0.0288)	0.0138 (0.0327)	0.494 (0.629)	-0.0128 (0.0337)	-0.0389 (0.0404)
NEITHER_OFFICIAL	-0.141*** (0.0391)	0.123 (0.0803)	-0.143*** (0.0514)	-0.0396 (0.157)	-0.108 (0.139)	-0.146 (0.125)	0.372 (0.698)	-0.517* (0.314)	-0.209 (0.262)
female	-0.167*** (0.0124)	-0.159*** (0.0153)	-0.109*** (0.0194)	-0.0964*** (0.0261)	-0.214*** (0.0257)	-0.223*** (0.0280)	-0.234*** (0.0327)	-0.251*** (0.0318)	-0.207*** (0.0336)
femalekids	-0.0579*** (0.0160)	-0.0964*** (0.0193)	-0.154*** (0.0250)	-0.129*** (0.0329)	-0.141*** (0.0328)	-0.175*** (0.0339)	-0.0352 (0.0412)	-0.0573 (0.0405)	-0.248*** (0.0408)
citizen	0.0311* (0.0175)	0.0165 (0.0393)	-0.0131 (0.0313)	-0.0372 (0.0700)	-0.00970 (0.0530)	-0.0783 (0.0549)	0.197 (0.169)	-0.0355 (0.0722)	0.0236 (0.0636)
immigrant	-0.239*** (0.0668)	-0.269*** (0.0966)	-0.172* (0.100)	-0.352** (0.169)	-0.0728 (0.185)	-0.460*** (0.145)	-0.125 (0.291)	-0.311* (0.167)	-0.230 (0.229)
YRIMMIG61	0.290***	0.272**	0.286***	0.348*	0.292	0.552***	0.264	0.263	0.258

	(0.0700)	(0.106)	(0.106)	(0.186)	(0.193)	(0.157)	(0.445)	(0.187)	(0.232)
YRIMMIG70	0.235***	0.228**	0.207**	0.341**	0.109	0.449***	0.129	0.357**	0.239
	(0.0678)	(0.0997)	(0.104)	(0.173)	(0.192)	(0.152)	(0.313)	(0.170)	(0.228)
YRIMMIG80	0.169**	0.181*	0.164	0.353**	0.0790	0.399***	0.0734	0.214	0.197
	(0.0670)	(0.0982)	(0.100)	(0.171)	(0.186)	(0.143)	(0.319)	(0.167)	(0.228)
YRIMMIG90	0.0837	0.0916	0.0536	0.235	0.0455	0.283*	0.284	0.106	0.0543
	(0.0668)	(0.0980)	(0.100)	(0.167)	(0.188)	(0.145)	(0.292)	(0.170)	(0.229)
YRIMMIG95	-0.0383	0.0331	-0.0468	0.146	-0.0549	0.148	0.0757	-0.0150	-0.0345
	(0.0671)	(0.0986)	(0.100)	(0.172)	(0.189)	(0.147)	(0.305)	(0.176)	(0.235)
YRIMMIG01	-0.147**	-0.114	-0.179*	0.0340	-0.133	-0.0457	-0.280	-0.0180	-0.128
	(0.0661)	(0.0965)	(0.0974)	(0.162)	(0.189)	(0.151)	(0.302)	(0.178)	(0.230)
Constant	6.247***	6.369***	6.242***	5.967***	6.097***	6.089***	5.514***	6.122***	5.804***
	(0.0515)	(0.0764)	(0.0866)	(0.135)	(0.111)	(0.113)	(0.645)	(0.134)	(0.137)
Observations	55,024	36,142	21,408	12,161	11,759	11,331	7,301	7,910	7,693
R-squared	0.490	0.469	0.517	0.544	0.570	0.576	0.495	0.538	0.550

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Looking at the coefficients for ALLOPHONE across the cities, we found that except for Edmonton, Winnipeg, and Hamilton, all other estimates are significant. From these significant estimates, we observed a trend of the coefficients to be increasingly negative as the size of the city decreases. While being an Allophone has a negative effect on wage in all these cities, such effect ranges from earning 5% less in Toronto to earning 18% less in Hamilton, indicating that having English or French as mother language is increasingly important in smaller cities. This makes sense because we would expect larger cities to have more international firms or human capital networks, which would lead to knowing languages other than English or French being a little more valuable than in smaller cities. Using ENGLISH_ONLY as the reference group, we also found that estimates for knowledge of both official languages (English and French) are significantly positive in Toronto, Montreal, and Ottawa. Moreover, in Montreal, an Allophone who knows how to speak French only is better off than an Allophone who knows how to speak English only, and an Allophone with proficiency in both English and French is compensated for the disadvantage of the Allophone identity. Keep in mind however, that an Allophone who speaks French only is still worse off than a non-Allophone who speaks English only.

Turning to other explanatory variables, as we might expect, females tend to earn less than males, and being a female with kids has a negative impact on wage. However, the KIDS variable in most cities is positive, and that's logical given that employers might take into account of the employees' family condition and need when determining their wages. Or, it could be that those who choose to have children work harder to support their children. We can also see that being an immigrant has a negative impact on wage in most major cities. However, looking at the statistically significant estimates of years since immigration (YRIMMIG95, etc.) in Toronto, Montreal, Vancouver, Ottawa, and Edmonton, we find that there is a trend of increasing positivity as we move further back in the years immigrated. This indicates that the earlier the immigrants immigrated to the city, the higher their earnings, which seems reasonable because the longer the immigrants stay in the city, the more integrated they might be into the society, resulting in better jobs or wages.

(b) Considering the fact that French was made into an official language in Quebec 1977,

we suspect that there might be an endogeneity issue due to simultaneity of wage and knowledge of official language in Montreal and Quebec City because the wage condition might motivate respondents to acquire knowledge of French. Either because low wages motivate respondents to learn official languages or because high wages require respondents to acquire another official language, we suspect the variable BOTH_OFFICIAL to be endogenous. Therefore we performed a Hausman test:

Montreal

Source	SS	df	MS	Number of obs = 36142		
Model	26088.6285	46	567.144097	F(46, 36095)	=	695.66
Residual	29427.0229	36095	.815265906	Prob > F	=	0.0000
Total	55515.6513	36141	1.53608509	R-squared	=	0.4699
				Adj R-squared	=	0.4693
				Root MSE	=	.90292

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
vhat	-.1226078	.0182487	-6.72	0.000	-.1583757	-.0868399
_cons	6.361115	.0618488	102.85	0.000	6.239889	6.48234

Quebec City

Source	SS	df	MS	Number of obs = 7301		
Model	5243.71759	46	113.993861	F(46, 7254)	=	155.17
Residual	5329.23259	7254	.734661234	Prob > F	=	0.0000
Total	10572.9502	7300	1.44834934	R-squared	=	0.4960
				Adj R-squared	=	0.4928
				Root MSE	=	.85712

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
vhat	-.1799005	.059181	-3.04	0.002	-.2959124	-.0638886
_cons	5.509217	.4328407	12.73	0.000	4.660723	6.35771

Using instruments such as immigrant status and how frequently respondents speak official languages at work or at home to estimate the potentially endogenous variable BOTH_OFFICIAL, we performed the Hausman test and obtain the result that vhat is statistically significant. Thus we rejected the null hypothesis that there is no correlation between BOTH_OFFICIAL and the random error. Therefore, we need to use 2SLS to obtain IV estimates for BOTH_OFFICIAL in both Montreal and Quebec City. For the full regression output and result of Hausman, please see Appendix B.

After performing the 2SLS estimation, we obtain the following coefficients and significance of BOTH_OFFICIAL for Montreal and Quebec City:

Montreal

Instrumental variables (2SLS) regression

Source	SS	df	MS	Number of obs = 36142
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-----+-----					F(45, 36096) =	708.63
Model		26016.2477	45	578.138838	Prob > F	= 0.0000
Residual		29499.4036	36096	.817248549	R-squared	= 0.4686
-----+-----					Adj R-squared	= 0.4680
Total		55515.6513	36141	1.53608509	Root MSE	= .90402
-----+-----						
LNWAGE		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
-----+-----						
BOTH_OFFICIAL		.2742367	.0422465	6.49	0.000	.1914324 .357041

F(54, 334235) = 4985.84
 Prob > F = 0.0000
 R-squared = 0.5111
 Root MSE = .92412

	LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ALLOPHONE		-.0627668	.0059259	-10.59	0.000	-.0743814	-.0511522
FRENCH_ONLY		-.0758738	.0062853	-12.07	0.000	-.0881927	-.0635548
BOTH_OFFICIAL		.0040188	.0048894	0.82	0.411	-.0055643	.0136018
NEITHER_OFFICIAL		-.1091227	.0257276	-4.24	0.000	-.159548	-.0586973

From the above regression, we find that after taking into account for all the various conditions of the different major cities in Canada, Allophones are still in a disadvantaged position, earning 6.3% less than non-Allophones. People who know French only in general are penalized by earning 7.6% less than those who know English only, and people who know neither English nor French are in a even worse situation in which they earn 10.9% less. Again, due to the statistical insignificance, we cannot be certain about any effect that being bilingual in English and French has on wage.

(d) Knowing that we cannot say for sure what effect knowledge of French in addition to English has on wage, we were further interested in examining whether there is any effect of knowledge of languages other than French in addition to English on wage. To do this, we created a dummy variable bilingual to capture knowledge of other languages in addition to English.

VARIABLES	Toronto LNWAGE	Montreal LNWAGE	Vancouver LNWAGE	Ottawa LNWAGE	Calgary LNWAGE	Edmonton LNWAGE	Quebec City LNWAGE	Winnipeg LNWAGE	Hamilton LNWAGE
ALLOPHONE	-0.0230 (0.0160)	-0.0233 (0.0238)	-0.0474* (0.0268)	-0.0484 (0.0444)	-0.119*** (0.0427)	0.00357 (0.0415)	-0.156 (0.149)	-0.00627 (0.0477)	0.0130 (0.0511)
BOTH_OFFICIAL	0.0329** (0.0142)	0.142*** (0.0228)	-0.0214 (0.0235)	0.0751*** (0.0175)	-0.00479 (0.0303)	0.0154 (0.0318)	0.670 (0.422)	-0.0116 (0.0316)	-0.0354 (0.0390)
NEITHER_OFFICIAL	-0.174*** (0.0354)	0.0753 (0.0770)	-0.243*** (0.0494)	-0.0613 (0.143)	-0.140 (0.0931)	-0.180 (0.124)	0.353 (0.944)	-0.555*** (0.154)	-0.252 (0.154)
bilingual	-0.0345** (0.0154)	-0.0525** (0.0207)	-0.100*** (0.0257)	-0.0316 (0.0367)	-0.0329 (0.0393)	-0.0344 (0.0377)	-0.0279 (0.0587)	-0.0402 (0.0433)	-0.0429 (0.0455)
Constant	6.248*** (0.0427)	6.212*** (0.0726)	6.241*** (0.0679)	5.983*** (0.108)	6.096*** (0.0950)	6.085*** (0.0982)	5.295*** (0.514)	6.120*** (0.121)	5.800*** (0.116)
Observations	54,992	25,661	21,403	11,643	11,756	11,329	3,005	7,906	7,693
R-squared	0.490	0.483	0.517	0.543	0.570	0.576	0.569	0.538	0.550

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

From the above regression output, though only bilingual estimates in Toronto, Montreal, and Vancouver are statistically significant, we can already observe a negative impact of being bilingual in English and another language other than French in these major cities. In comparison to being bilingual in English and French, which has positively significant values in Toronto and Montreal, being bilingual in English and a non-French language is actually penalized and worse off than knowing English alone. This tells us that, at least in both Toronto and Montreal, being bilingual is only beneficial if your second language is

French, for being unilingual in English gives you higher earning than bilingual in English and another non-French language.

(e) Now, to extend a bit further on our analysis, we controlled the characteristics of the cities again through the inclusion of city dummies. This time, however, we included the interaction variables between the cities and the bilingual dummy to capture the marginal return on bilingualism in different cities. A simplified version of the regression result is shown below:

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours ALLOPHONE NEITHER_OFFICIAL senior_management management business
financial clerical science health technical social teaching art_sports sales
supervisors food protective childcare travel transportation construction trade
operators primary female femalekids citizen immigrant YRIMMIG*
majorcities##bilingual majorcities##BOTH_OFFICIAL if MOB5P!=9 & KIDS!=. &
EXPERIENCE>=0, robust
```

Linear regression

Number of obs =	298531
F(72,298458) =	3466.82
Prob > F	= 0.0000
R-squared	= 0.5216
Root MSE	= .91886

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
majorcities						
1	.1942555	.0062724	30.97	0.000	.1819617	.2065494
2	-.0504539	.0250878	-2.01	0.044	-.0996254	-.0012825
3	.1854067	.0083153	22.30	0.000	.1691089	.2017044
4	.1002958	.0135073	7.43	0.000	.0738218	.1267697
5	.1120295	.0097617	11.48	0.000	.0928969	.1311622
6	.051454	.0100627	5.11	0.000	.0317313	.0711767
7	-.4797632	.59109	-0.81	0.417	-1.638283	.6787567
8	.0086724	.0120294	0.72	0.471	-.0149049	.0322496
9	.1039287	.0117488	8.85	0.000	.0809014	.126956
1.bilingual	.0095178	.0104855	0.91	0.364	-.0110335	.0300692
majorcities#bilingual						
1 1	-.0687375	.0117571	-5.85	0.000	-.091781	-.0456939
2 1	-.0773916	.0156115	-4.96	0.000	-.1079896	-.0467936
3 1	-.1025463	.0157467	-6.51	0.000	-.1334092	-.0716833
4 1	-.0404746	.0235383	-1.72	0.086	-.086609	.0056599
5 1	-.0709755	.0224117	-3.17	0.002	-.1149018	-.0270493
6 1	-.0512378	.0222363	-2.30	0.021	-.0948204	-.0076552
7 1	-.0318288	.053935	-0.59	0.555	-.13754	.0738823
8 1	-.0665119	.0264591	-2.51	0.012	-.118371	-.0146529
9 1	-.0156544	.027495	-0.57	0.569	-.0695439	.0382351
1.BOTH_OFFICIAL	-.0133654	.006644	-2.01	0.044	-.0263874	-.0003434
majorcities#BOTH_OFFICIAL						
1 1	.0671276	.0150308	4.47	0.000	.0376676	.0965875
2 1	.1624746	.0258467	6.29	0.000	.1118157	.2131335
3 1	-.0176423	.0252916	-0.70	0.485	-.067213	.0319285
4 1	.0865482	.018013	4.80	0.000	.0512432	.1218532
5 1	.0059215	.0297035	0.20	0.842	-.0522964	.0641395

6	1		.0011964	.0327222	0.04	0.971	-.0629382	.065331
7	1		.5401302	.5913135	0.91	0.361	-.6188277	1.699088
8	1		.0097895	.0330773	0.30	0.767	-.0550411	.07462
9	1		-.0295447	.0403648	-0.73	0.464	-.1086585	.0495691
_cons			5.989414	.0232158	257.99	0.000	5.943912	6.034917

First of all, note that bilingual has a positive sign here, but it becomes statistically insignificant after our inclusion of its interaction variables with the city dummies. Also, the variable BOTH_OFFICIAL indicating bilingual in English and French becomes positive and statistically significant here. Now, looking at the estimates of the interaction variables between bilingual and the cities, we found that other than Ottawa, Quebec City, and Hamilton, most major cities have statistical significant results. Different from part (d), where we examine and compare the effects of being bilingual in individual cities separately, in this regression we are examining the effect of being bilingual in addition to being in individual cities, and this way we would be able to conduct t-tests and obtain p-values for basis of comparison across cities. Therefore, while being in Toronto alone has an effect of having 19.4% higher wage on average, being a bilingual in Toronto reduces that wage by 6.9%, resulting in only $19.4 - 6.9 = 12.5\%$ higher wage. However, being bilingual in English and French in Toronto increases your wage by 6.7% on top of your 19.4% higher wage, resulting in $19.4 + (-1.3) + 6.7 = 24.8\%$ higher wage. From here, we can see how big a discrepancy there is in the value of French as second language versus other languages as second language in Toronto. Since we constructed the variable bilingual to contain not only respondents who speak English only but also those who speak both English and French, there is a possibility that a respondent might be trilingual or multilingual in English, French, and other languages. In such cases, we can see that knowing French as second or third language almost fully compensates for the loss of wage due to knowledge of another non-French language in Toronto.

Following the same logic of analysis, we found Vancouver to be the city to penalize bilingualism in English and non-French language the most, where bilingual respondents earn 10.3% less than respondents who are unilingual in English, and that estimate is not far from our individual comparisons above in part (d). Unfortunately, we did not obtain a significant estimate for being bilingual in English and French in Vancouver, so we were not able to do further analysis on such comparison. On the other hand, we found Edmonton to be relatively the best city out of these major cities that bilinguals in English and non-French languages can live in, as they are penalized least in their wages. Again, we were not able to compare bilingual in English and French versus bilingual in English and non-French in this case due to insignificance of the former coefficient estimate. Note also if we have a significance level of 10%, Ottawa would become the city that penalizes bilinguals the least. However, since the bilingual coefficients in most cities are closely around 5, 6 or 7%, it's possible that such difference in wage differentials is not huge.

Due to the insignificance of the variable bilingual, we might not be able to measure the most accurate gap between value of French and other languages as second language, but through the statistically significant estimates in interaction variables and BOTH_OFFICIAL, we can get a sense of how valuable French is in comparison to other languages in different cities. After simple calculations, we found that in Toronto French

as a second language is 13.6% more valuable in wage differentials than other languages; in Montreal French is 23.9% more valuable than languages; and in Ottawa 12.6%. Such result concurs with our expectation since Montreal is the main city in Quebec, and we expect the passage of the bill that made French an official language to increase the value of French.

We also found Toronto to be the city with highest intercept, followed closely by Vancouver, indicating due to either economic condition or any other characteristic that we did not account for Toronto and Vancouver are the two cities with higher wage level in general. Interestingly, we found the city intercept for Montreal to be negative and statistically significant. However, if we look at the estimate for interaction variable between BOTH_OFFICIAL and Vancouver, we find a 16.2% increase in wage, compensating the disadvantage of being in Montreal alone and knowing both English and French alone ($16.2 + (-5) + (-1.3) = 9.9\%$). This means that being on Montreal is only beneficial in terms of earning if you know how to speak both English and French.

(f) Knowing the results from OLS estimation, we attempted to utilize Heckit method and compare the results. For full results of Heckit regression, please see Appendix C. In general, the coefficients for the explanatory variables in the Heckit regression have the expected signs and similar magnitudes to those of the OLS regression. The most important difference is that the ALLOPHONE variable has a positive (and significant) coefficient estimate in the Heckit regression and a negative (and significant) coefficient estimate in the OLS regression. The same is true of the NEITHER_OFFICIAL (individual is proficient in neither official language of Canada) variable in these regressions. However, note that the coefficient for NEITHER_OFFICIAL is negative and significant in the selection regression, which follows from the expectation that individuals who cannot speak either official language of Canada will be less likely to be employed. We did not include the allophone variable in the select process, as we believed that language proficiency (in the form of the NEITHER_OFFICIAL, BOTH_OFFICIAL, FRENCH_ONLY, and ENGLISH_ONLY variables) would be a better predictor of labor force participation than which language was learned first (recorded in mother-tongue variables such as ALLOPHONE). The estimated coefficients for rho and sigma are significant and non-zero, indicating that selection bias is present in the model. However, with the exception of the variables noted above, most of the coefficient estimates are similar to those found using OLS. Given the theoretical and practical difficulties associated with Heckit analysis, we do not feel confident enough in our understanding of this model and our specification to completely reject the use of OLS regression for addressing our questions. Therefore, the conclusions we draw from the results of our Heckit regression are these: first, that this data does have a selection bias problem, and second, that more research in regard to the sensitivity of the Heckit regression to changes in specification is necessary before OLS should be completely abandoned in the field of linguistic economics.

Conclusion and Validity Assessment

From the OLS estimation and Heckit method, we conclude that while there is a

selection bias issue in the regression, we do not have enough evidence and comprehension of Heckit to counter our results obtained from OLS, and further research using Heckit is needed. However, from the results of OLS, we conclude that Allophones do earn lower wages in general across the nine major cities of Canada. We also conclude that while knowing both French in addition to English in general decreases your wage by 1.3%, depends on which city you are in, the value that the city places on French could compensate the loss of wage to varied degrees. The marginal return rate on bilingualism in English and French is highest in Montreal and lowest in Toronto, but many cities have insignificant results. However, being a bilingual in other non-French languages in addition to English is devalued and penalized in most cities, with the marginal rate of return on bilingualism in English and non-French second language highest in Edmonton and lowest in Vancouver.

One note that we would like to mention here is also that most of the estimates we obtained were quite small in comparison to the standard deviation of our dependent variable LNWAGE (3.03). Most estimates are around 0.06-0.16, and that's about 2% to 5% impact on the change of the dependent variable, which could be either fair or small. This suggests that while the differences and effects of mother tongue and language status on wage are statistically significant, they might not be greatly significant in the economic sense.

Some internal validity includes:

- **Functional form:** Due the large number of variables we need to include to serve the function of controlling, we did not examine most variables regarding the possibility of having log, squared, polynomial or other forms.
- **Endogeneity:** We might potentially have the problem of endogeneity with other non-language variables such as years of schooling, since we decided to assume all other variables to be exogenous.

There are some external validity issues regarding the regression variables. First, we do not have specific information regarding whether or not the options for each question are mutually exclusive, so we might have respondents providing more than one answers to some question asked, and that could cause some potential problems in language status determination. Also, the reduced categories of occupations might not accurately capture and control the effect on wage since many respondents with varied wages might be within the same category (ex: doctors and nurses).

Appendix A: Do Files, Variable Descriptions, and Summary Statistics

Our .do file (using Munro's canada.dat file, which is itself adapted from the official public data release using the do file MUNRO program 03.30.10.do):

```
*generating city dummies below:*
gen toronto=0
gen montreal=0
gen vancouver=0
gen ottawa=0
gen calgary=0
gen edmonton=0
gen quebeccity=0
```

```

gen winnipeg=0
gen hamilton=0

replace toronto=1 if CMAP==535
replace montreal=1 if CMAP==462
replace vancouver=1 if CMAP==933
replace ottawa=1 if CMAP==505
replace calgary=1 if CMAP==825
replace edmonton=1 if CMAP==835
replace quebeccity=1 if CMAP==421
replace winnipeg=1 if CMAP==602
replace hamilton=1 if CMAP==537

*generate city category dummy:*
gen city=0
replace city=1 if toronto==1 | montreal==1 | vancouver==1 | ottawa==1 | calgary==1 |
edmonton==1 | quebeccity==1 | winnipeg==1 | hamilton==1

*generate experience*education interaction variable:*
gen educexp = YOSCHOOLING*EXPERIENCE

*generate foreign language knowledge dummies:*
gen aboriginal=0
gen arabic=0
gen chinese=0
gen german=0
gen greek=0
gen indoiranian=0
gen italian=0
gen dutch=0
gen polish=0
gen portugeuse=0
gen punjabi=0
gen spanish=0
gen ukrainian=0
gen austroasiatic=0

replace aboriginal = 1 if NOLABOP==1
replace arabic = 1 if NOLARAP==1
replace chinese = 1 if NOLCHIP==1
replace german = 1 if NOLGERP==1
replace greek = 1 if NOLGREP==1
replace indoiranian = 1 if NOLIRAP==1
replace italian = 1 if NOLITAP==1
replace dutch = 1 if NOLNETP==1
replace polish = 1 if NOLPOLP==1
replace portugeuse = 1 if NOLPORP==1
replace punjabi = 1 if NOLPUNP==1
replace spanish = 1 if NOLSPAP==1
replace ukrainian = 1 if NOLUKRP==1
replace austroasiatic = 1 if NOLVIEP==1

*generate language used most often at work from WLNAP*
gen woftenenglish=0
replace woftenenglish=1 if WLNAP==1

gen woftenfrench=0
replace woftenfrench=1 if WLNAP==2

gen woftenboth=0
replace woftenboth=1 if WLNAP==4

*generate languages used on regular basis from WLNBP*

```

```

gen wregularenglish=0
replace wregularenglish=1 if WLNBP==2

gen wregularfrench=0
replace wregularfrench=1 if WLNBP==3

gen wregularboth=0
replace wregularboth=1 if WLNBP==5

*generate language used most often at home from HLNP*
gen hoftenenglish=0
replace hoftenenglish=1 if HLNP==1

gen hoftenfrench=0
replace hoftenfrench=1 if HLNP==2

gen hoftenboth=0
replace hoftenboth=1 if HLNP==3

*generate language used on regular basis from HLNBP*
gen hregularenglish=0
replace hregularenglish=1 if HLNBP==2

gen hregularfrench=0
replace hregularfrench=1 if HLNBP==3

gen hregularboth=0
replace hregularboth=1 if HLNBP==4

*generate occupations dummies*
gen senior_management=0
gen management=0
gen business=0
gen financial=0
gen clerical=0
gen science=0
gen health=0
gen technical=0
gen social=0
gen teaching=0
gen art_sports=0
gen sales=0
gen supervisors=0
gen food=0
gen protective=0
gen childcare=0
gen travel=0
gen transportation=0
gen construction=0
gen trade=0
gen operators=0
gen laborers=0
gen primary=0

replace senior_management=1 if NOCS01P==1
replace management=1 if NOCS01P==2
replace business=1 if NOCS01P==3
replace financial=1 if NOCS01P==4
replace clerical=1 if NOCS01P==5
replace science=1 if NOCS01P==6
replace health=1 if NOCS01P==7
replace technical=1 if NOCS01P==8

```

```

replace social=1 if NOCS01P==9
replace teaching=1 if NOCS01P==10
replace art_sports=1 if NOCS01P==11
replace sales=1 if NOCS01P==12
replace supervisors=1 if NOCS01P==13
replace food=1 if NOCS01P==14
replace protective=1 if NOCS01P==15
replace childcare=1 if NOCS01P==16
replace travel=1 if NOCS01P==17
replace transportation=1 if NOCS01P==18
replace construction=1 if NOCS01P==19
replace trade=1 if NOCS01P==20
replace operators=1 if NOCS01P==21
replace operators=1 if NOCS01P==24
replace laborers=1 if NOCS01P==22
replace laborers=1 if NOCS01P==25
replace primary=1 if NOCS01P==23

*recode visible minority*
gen vsblmnrty=0
replace vsblmnrty=1 if VISMINP==1
replace vsblmnrty=1 if VISMINP==2
replace vsblmnrty=1 if VISMINP==3
replace vsblmnrty=1 if VISMINP==4

*recode citizenship dummy*
gen citizen=0
replace citizen=1 if CITIZENP==1
replace citizen=1 if CITIZENP==2

*recode training dummy*
gen tradecert=0
replace tradecert=1 if TRNUCP==2
replace tradecert=1 if TRNUCP==4
replace tradecert=1 if TRNUCP==5
replace tradecert=1 if TRNUCP==7

*recode weeks worked variable*
gen weeks = WKSWKP
replace weeks=0 if WKSWKP==99

*recode hours worked per week (in reference week)*
gen hours = HRSWKP
replace hours=0 if HRSWKP==999

*Mobility variable: whether or not person lived in the same province 5 years ago*
gen movedprovince = 0
replace movedprovince = 1 if PROV5P!=99

*Mobility variable: have you moved to a different census division in the last 5 years?*
gen movedcddiv = 0
replace movedcddiv = 1 if MOB5P!=1
replace movedcddiv = 0 if MOB5P==2
replace movedcddiv = 0 if MOB5P==9

*Mobility variable: resided outside of Canada*
gen extrnlmgrnt = 0
replace extrnlmgrnt = 1 if MOB5P==6

*mother tongue dummies. We already have an allophone dummy from Munro's do file*
gen mtenglish = 0
replace mtenglish = 1 if MTNP==1
replace mtenglish = 1 if MTNP==3

```

```

gen mtfrench = 0
replace mtfrench = 1 if MTNP==2
replace mtfrench = 1 if MTNP==3

*Unpaid work variable: Hours spent doing either housework, childcare, or senior care*
gen unpaid=UPHWKP+UPKIDP+UPSRP

*female dummy variable*
gen female=0
replace female = 1 if SEXP==1

*generate female*kids interaction variable*
gen femalekids=female*KIDS

*generate immigrant dummy*
gen immigrant=0
replace immigrant = 1 if IMMPOPP==2
replace immigrant = 1 if IMMPOPP==3

*generate bilingual in English and languages other than French from NOLP*
gen bilingual=0
replace bilingual=1 if NOLP==1 & OLNP==1
replace bilingual=1 if NOLP==1 & OLNP==3
replace bilingual=1 if NOLP==2 & OLNP==1
replace bilingual=1 if NOLP==2 & OLNP==3
replace bilingual=1 if NOLP==3 & OLNP==1
replace bilingual=1 if NOLP==3 & OLNP==3
replace bilingual=. if NOLP==8
replace bilingual=. if OLNP==2

*generate major cities to use majorcities##bilingual*
gen majorcities=0
replace majorcities=1 if toronto==1
replace majorcities=2 if montreal==1
replace majorcities=3 if vancouver==1
replace majorcities=4 if ottawa==1
replace majorcities=5 if calgary==1
replace majorcities=6 if edmonton==1
replace majorcities=7 if quebeccity==1
replace majorcities=8 if winnipeg==1
replace majorcities=9 if hamilton==1

```

Description and Summary of Variables (for more info, see 2001 Census description materials):

LNWAGE - natural log of yearly gross wages
 EXPERIENCE - attempted measure of experience, generated from AGE - YOSCHOOLING - 5
 EXPER2 - square of EXPERIENCE
 educexp - interaction variable of YOSCHOOLING and EXPERIENCE
 YOSCHOOLING - years of schooling, recoded from census TOTSCHP variable
 tradecert - if i holds a trade certificate
 MARRIED_DUMMY - if i is married
 KIDS - Number of children (below 18) in Census household
 weeks - Number of weeks worked in 2000
 hours - Number of hours worked in reference week
 unpaid - Number of hours worked without pay in reference week
 ALLOPHONE - 1 if mother language was neither French nor English
 FRENCH_ONLY - i is fluent in French, but not English
 BOTH_OFFICIAL - i is fluent in both French and English
 NEITHER_OFFICIAL - i isn't fluent in French or English

Foreign language knowledge dummies (1 if i has knowledge of this language):
 aboriginal, arabic, chinese, german, greek, indoiranian, italian, dutch, polish,
 portugeuse, punjabi, spanish, ukrainian, austroasiatic

Employment sector variables (dummies):
 senior_management, management, business, financial, clerical, science, health,
 technical social, teaching, art_sports, sales, supervisors, food, protective,
 childcare, travel, transportation, construction, trade, operators, primary

woftenenglish - 1 if language used most often at work is English
 woftenfrench - . . . is French
 woftenboth - both French and English are used often at work

wregularenglish - English is used on a regular basis at work
 wregularfrench - French is used on a regular basis at work
 wregularboth - both French and English are used on a regular basis at work

hoftenenglish - 1 if language used most often at home is English
 hoftenfrench - 1 if language used most often at home is French
 hoftenboth - Both French and English are used often at home

hregularenglish - 1 if English is used on a regular basis at home
 hregularfrench - 1 if French is used on a regular basis at home
 hregularboth - 1 if both French and English are used on a regular basis at home

female - 1 if i is female
 femalekids - interaction term for female and kids
 citizen - 1 if i is a citizen of Canada
 immigrant - 1 if i is an immigrant to Canada
 AGEP - age in years
 mtenglish - mother tongue is english
 mtfrench - mother tongue is french
 vsblmnrty - 1 if i is a visible minority (Chinese, South Asian, Black, or 'Other')

movedprovince - Mobility measure, 1 if i moved to a different province between 1996 and
 2001
 movedcddiv - Another mobility measure, 1 if i moved to a different census division
 between 1996 and 2001

YRIMMIG61 - 1 if i immigrated to Canada before 1961
 YRIMMIG70 - . . . between 1961 and 1970
 YRIMMIG80 - . . . between 1971 and 1980
 YRIMMIG90 - . . . between 1981 and 1990
 YRIMMIG95 - . . . between 1991 and 1995
 YRIMMIG01 - . . . between 1996 and 2001

city - 1 if i lives in the CMA of Toronto, Montreal, Vancouver, Ottawa, Calgary,
 Edmonton, Quebec City, Winnipeg, or Hamilton
 city dummies: toronto, montreal, vancouver, ottawa, calgary, edmonton, quebeccity,
 winnipeg, hamilton

Summary Statistics of Variables:

Variable	Obs	Mean	Std. Dev.	Min	Max
LNWAGE	567462	11.52595	3.032762	.6931472	16.1181
EXPERIENCE	645961	25.55297	18.9839	-9	75
EXPER2	645961	1013.342	1207.971	0	5625
educexp	645961	312.7116	219.9327	-225	1375

YOSCHOOLING	645961	13.33039	3.685994	5	25
tradecert	801055	.1194887	.3243629	0	1
MARRIED_DU~Y	801055	.4816823	.4996647	0	1
KIDS	521944	.4320463	.4953613	0	1
weeks	801055	23.8645	23.83785	0	52
hours	801055	18.38849	21.71717	0	100
unpaid	801055	7.97633	9.609593	0	27
ALLOPHONE	801055	.1843219	.3877467	0	1
FRENCH_ONLY	801055	.1337124	.3403433	0	1
BOTH_OFFIC~L	801055	.1758506	.3806932	0	1
NEITHER_OF~L	801055	.0149366	.1212991	0	1
aboriginal	801055	.0078921	.0884863	0	1
arabic	801055	.0096261	.0976392	0	1
chinese	801055	.0314311	.1744797	0	1
german	801055	.0208812	.1429868	0	1
greek	801055	.0053579	.0730016	0	1
indoiranian	801055	.0182771	.1339519	0	1
italian	801055	.0228386	.1493889	0	1
dutch	801055	.0053667	.0730608	0	1
polish	801055	.0082042	.0902047	0	1
portugeuse	801055	.0089182	.0940144	0	1
punjabi	801055	.0112651	.1055379	0	1
spanish	801055	.019935	.1397769	0	1
ukrainian	801055	.0068148	.0822699	0	1
austronesia~c	801055	.0061856	.078405	0	1
senior_man~t	801055	.0072579	.0848838	0	1
management	801055	.05026	.218481	0	1
business	801055	.0132088	.1141682	0	1
financial	801055	.0306396	.1723393	0	1
clerical	801055	.0572183	.2322594	0	1
science	801055	.0359376	.1861347	0	1
health	801055	.0146195	.120024	0	1
technical	801055	.0142912	.1186884	0	1
social	801055	.0224991	.1483	0	1
teaching	801055	.0217775	.1459565	0	1
art_sports	801055	.0166256	.1278639	0	1
sales	801055	.0120591	.1091499	0	1
supervisors	801055	.0351511	.1841618	0	1
food	801055	.0199375	.1397855	0	1
protective	801055	.0088334	.0935699	0	1
childcare	801055	.0105299	.1020735	0	1
travel	801055	.0534882	.2250051	0	1
transporta~n	801055	.0045265	.0671271	0	1
construction	801055	.0126109	.1115879	0	1
trade	801055	.0308393	.1728823	0	1
operators	801055	.0510539	.2201079	0	1
primary	801055	.0254352	.157443	0	1
female	801055	.5083234	.499931	0	1
femalekids	521944	.2325824	.4224786	0	1
citizen	801055	.9474031	.2232275	0	1
immigrant	801055	.190173	.3924378	0	1

AGEP	801055	36.80461	21.65025	0	85
mtenglish	801055	.5220528	.4995137	0	1
mtfrench	801055	.2205829	.4146399	0	1
vsblmnrty	801055	.1338984	.3405434	0	1
movedprovi~e	801055	.1506039	.3576626	0	1
movedcdiv	801055	.1833207	.3869295	0	1
YRIMMIG61	801055	.0303662	.1715929	0	1
YRIMMIG70	801055	.0250457	.1562641	0	1
YRIMMIG80	801055	.0313125	.1741609	0	1
YRIMMIG95	801055	.0293813	.1688728	0	1
YRIMMIG01	801055	.0324697	.177244	0	1
city	801055	.5041139	.4999834	0	1
toronto	801055	.1568469	.3636566	0	1
montreal	801055	.1141545	.317999	0	1
vancouver	801055	.0664361	.2490431	0	1
ottawa	801055	.0354245	.1848504	0	1
calgary	801055	.0319142	.1757717	0	1
edmonton	801055	.031682	.1751521	0	1
quebeccity	801055	.0227213	.1490136	0	1
winnipeg	801055	.0228099	.1492972	0	1
hamilton	801055	.0221246	.1470888	0	1

Appendix B: Full regression outputs and test results

Regression outputs for individual cities (include detection of heteroskedasticity)

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruccion trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f toronto==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0
```

Source	SS	df	MS	Number of obs = 55024		
Model	45312.8338	45	1006.95186	F(45, 54978) = 1175.29		
Residual	47103.4068	54978	.856768285	Prob > F = 0.0000		
Total	92416.2406	55023	1.67959291	R-squared = 0.4903		
				Adj R-squared = 0.4899		
				Root MSE = .92562		

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0949821	.0022126	42.93	0.000	.0906453	.0993189
EXPER2	-.0009351	.0000275	-34.02	0.000	-.0009889	-.0008812
educexp	-.0029001	.0000948	-30.60	0.000	-.0030858	-.0027143
YOSCHOOLING	.1154818	.002522	45.79	0.000	.1105387	.1204249
tradecert	-.0263528	.0119823	-2.20	0.028	-.0498381	-.0028675
MARRIED_DUMMY	.1821467	.0114573	15.90	0.000	.1596902	.2046031
KIDS	.0133279	.0126875	1.05	0.294	-.0115398	.0381955
weeks	.031453	.0003222	97.63	0.000	.0308216	.0320845

hours		.0075881	.000254	29.87	0.000	.0070902	.008086
ALLOPHONE		-.0503722	.0101416	-4.97	0.000	-.0702497	-.0304946
FRENCH_ONLY		-.1127128	.1638469	-0.69	0.492	-.4338538	.2084282
BOTH_OFFICIAL		.0299004	.0141864	2.11	0.035	.0020948	.0577059
NEITHER_OFFICIAL		-.140754	.0320655	-4.39	0.000	-.2036026	-.0779053
senior_management		.5274227	.0344917	15.29	0.000	.4598186	.5950267
management		.1757838	.0215532	8.16	0.000	.1335394	.2180281
business		.2603829	.0278756	9.34	0.000	.2057464	.3150194
financial		-.0257439	.024344	-1.06	0.290	-.0734582	.0219704
clerical		-.1327538	.0205746	-6.45	0.000	-.1730802	-.0924275
science		.2057365	.0228468	9.01	0.000	.1609566	.2505164
health		.05795	.0337982	1.71	0.086	-.0082947	.1241947
technical		-.148357	.0346163	-4.29	0.000	-.2162051	-.0805089
social		-.1189499	.0277378	-4.29	0.000	-.1733161	-.0645837
teaching		-.0232898	.0281558	-0.83	0.408	-.0784754	.0318959
art_sports		-.2061804	.0295104	-6.99	0.000	-.2640211	-.1483397
sales		.0295106	.0296639	0.99	0.320	-.0286309	.087652
supervisors		-.4114901	.0235876	-17.45	0.000	-.4577219	-.3652583
food		-.4505809	.030308	-14.87	0.000	-.5099848	-.391177
protective		-.072241	.0389926	-1.85	0.064	-.1486668	.0041848
childcare		-.6129106	.0390778	-15.68	0.000	-.6895033	-.5363179
travel		-.4425261	.0220254	-20.09	0.000	-.485696	-.3993562
transportation		.1808917	.0502393	3.60	0.000	.0824224	.279361
construction		.0015389	.0372216	0.04	0.967	-.0714157	.0744935
trade		.0373697	.0258487	1.45	0.148	-.0132939	.0880334
operators		-.1090605	.021398	-5.10	0.000	-.1510008	-.0671203
primary		-.289305	.0487458	-5.93	0.000	-.3848472	-.1937628
female		-.1668757	.0121081	-13.78	0.000	-.1906077	-.1431438
femalekids		-.0578552	.0160559	-3.60	0.000	-.0893248	-.0263856
citizen		.0311267	.0158534	1.96	0.050	.0000539	.0621994
immigrant		-.2388946	.0513091	-4.66	0.000	-.3394608	-.1383284
YRIMMIG61		.2904224	.055549	5.23	0.000	.181546	.3992989
YRIMMIG70		.2352521	.0528266	4.45	0.000	.1317116	.3387926
YRIMMIG80		.1685637	.0516499	3.26	0.001	.0673296	.2697979
YRIMMIG90		.0836993	.0512683	1.63	0.103	-.0167869	.1841856
YRIMMIG95		-.0383368	.0512443	-0.75	0.454	-.138776	.0621023
YRIMMIG01		-.1469187	.0501329	-2.93	0.003	-.2451795	-.048658
_cons		6.247429	.0426595	146.45	0.000	6.163816	6.331042

. estat hettest, iid

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of LNWAGE

chi2(1) = 632.39

Prob > chi2 = 0.0000

Toronto

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f toronto==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression

Number of obs = 55024

F(45, 54978) = 853.99
 Prob > F = 0.0000
 R-squared = 0.4903
 Root MSE = .92562

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0949821	.0026504	35.84	0.000	.0897873	.1001769
EXPER2	-.0009351	.0000335	-27.92	0.000	-.0010007	-.0008694
educexp	-.0029001	.0001097	-26.43	0.000	-.0031152	-.002685
YOSCHOOLING	.1154818	.0028911	39.94	0.000	.1098152	.1211484
tradecert	-.0263528	.0116587	-2.26	0.024	-.0492038	-.0035017
MARRIED_DUMMY	.1821467	.0116227	15.67	0.000	.1593661	.2049273
KIDS	.0133279	.0123343	1.08	0.280	-.0108475	.0375032
weeks	.031453	.0004296	73.22	0.000	.0306111	.0322949
hours	.0075881	.000286	26.53	0.000	.0070275	.0081487
ALLOPHONE	-.0503722	.0101663	-4.95	0.000	-.0702982	-.0304461
FRENCH_ONLY	-.1127128	.1897139	-0.59	0.552	-.4845534	.2591279
BOTH_OFFICIAL	.0299004	.0138546	2.16	0.031	.0027452	.0570555
NEITHER_OFF~L	-.140754	.0391438	-3.60	0.000	-.2174761	-.0640318
senior_mana~t	.5274227	.0349272	15.10	0.000	.4589651	.5958803
management	.1757838	.0262235	6.70	0.000	.1243856	.2271819
business	.2603829	.0295212	8.82	0.000	.2025211	.3182447
financial	-.0257439	.0278255	-0.93	0.355	-.0802821	.0287943
clerical	-.1327538	.0258832	-5.13	0.000	-.183485	-.0820226
science	.2057365	.0270899	7.59	0.000	.1526402	.2588328
health	.05795	.0364657	1.59	0.112	-.0135231	.1294231
technical	-.148357	.0386725	-3.84	0.000	-.2241553	-.0725586
social	-.1189499	.0326544	-3.64	0.000	-.1829526	-.0549471
teaching	-.0232898	.0317143	-0.73	0.463	-.0854501	.0388705
art_sports	-.2061804	.0349401	-5.90	0.000	-.2746632	-.1376976
sales	.0295106	.0330947	0.89	0.373	-.0353553	.0943765
supervisors	-.4114901	.0294171	-13.99	0.000	-.4691478	-.3538324
food	-.4505809	.0348336	-12.94	0.000	-.518855	-.3823068
protective	-.072241	.0399666	-1.81	0.071	-.1505758	.0060939
childcare	-.6129106	.0479723	-12.78	0.000	-.7069366	-.5188846
travel	-.4425261	.0282507	-15.66	0.000	-.4978976	-.3871545
transportat~n	.1808917	.0451464	4.01	0.000	.0924044	.269379
construction	.0015389	.0401545	0.04	0.969	-.0771643	.0802421
trade	.0373697	.0293433	1.27	0.203	-.0201434	.0948829
operators	-.1090605	.0267368	-4.08	0.000	-.1614649	-.0566561
primary	-.289305	.0549024	-5.27	0.000	-.3969142	-.1816958
female	-.1668757	.0124453	-13.41	0.000	-.1912686	-.1424829
femalekids	-.0578552	.015986	-3.62	0.000	-.0891879	-.0265224
citizen	.0311267	.0175159	1.78	0.076	-.0032046	.065458
immigrant	-.2388946	.0667968	-3.58	0.000	-.3698167	-.1079725
YRIMMIG61	.2904224	.0700364	4.15	0.000	.1531506	.4276942
YRIMMIG70	.2352521	.0677701	3.47	0.001	.1024222	.368082
YRIMMIG80	.1685637	.0669588	2.52	0.012	.037324	.2998034
YRIMMIG90	.0836993	.066834	1.25	0.210	-.0472958	.2146944
YRIMMIG95	-.0383368	.0670679	-0.57	0.568	-.1697905	.0931168
YRIMMIG01	-.1469187	.0661226	-2.22	0.026	-.2765194	-.017318
_cons	6.247429	.0515041	121.30	0.000	6.146481	6.348378

Montreal

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
```

```
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruuction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f montreal==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression

```
Number of obs = 36142
F( 45, 36096) = 536.71
Prob > F      = 0.0000
R-squared     = 0.4693
Root MSE     = .90347
```

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0705433	.0034961	20.18	0.000	.0636908	.0773958
EXPER2	-.0007437	.0000455	-16.36	0.000	-.0008328	-.0006546
educexp	-.0017294	.0001439	-12.02	0.000	-.0020113	-.0014474
YOSCHOOLING	.0920337	.0035579	25.87	0.000	.08506	.0990073
tradecert	-.0393555	.0144369	-2.73	0.006	-.0676522	-.0110588
MARRIED_DUMMY	.142152	.0137847	10.31	0.000	.1151335	.1691705
KIDS	.0834133	.0147981	5.64	0.000	.0544085	.1124181
weeks	.0315686	.0005319	59.35	0.000	.030526	.0326112
hours	.0077348	.0003774	20.49	0.000	.006995	.0084746
ALLOPHONE	-.0764968	.0182336	-4.20	0.000	-.1122352	-.0407584
FRENCH_ONLY	.0573359	.0280074	2.05	0.041	.0024406	.1122312
BOTH_OFFICIAL	.1257763	.0268252	4.69	0.000	.0731981	.1783545
NEITHER_OFF~L	.1232348	.0803404	1.53	0.125	-.0342349	.2807044
senior_mana~t	.4450957	.0468995	9.49	0.000	.3531713	.53702
management	.2287467	.0343785	6.65	0.000	.1613638	.2961297
business	.2776131	.0400666	6.93	0.000	.1990813	.3561449
financial	-.0361186	.0361339	-1.00	0.318	-.1069422	.034705
clerical	-.0873026	.0333642	-2.62	0.009	-.1526975	-.0219077
science	.2551895	.034391	7.42	0.000	.1877822	.3225968
health	.2203336	.0419981	5.25	0.000	.1380161	.302651
technical	-.1049122	.0414919	-2.53	0.011	-.1862375	-.0235868
social	.0271062	.0387748	0.70	0.485	-.0488935	.1031058
teaching	.1711584	.0372854	4.59	0.000	.0980779	.2442389
art_sports	-.1488292	.042846	-3.47	0.001	-.2328086	-.0648497
sales	.0838219	.0402499	2.08	0.037	.0049309	.162713
supervisors	-.3240807	.0366714	-8.84	0.000	-.3959578	-.2522037
food	-.3612631	.0431056	-8.38	0.000	-.4457514	-.2767748
protective	.1000169	.0448106	2.23	0.026	.0121868	.1878469
childcare	-.6603259	.0631904	-10.45	0.000	-.7841809	-.5364708
travel	-.3777405	.0360535	-10.48	0.000	-.4484063	-.3070746
transportat~n	.2110836	.0529756	3.98	0.000	.1072499	.3149173
construction	.0579003	.0485986	1.19	0.234	-.0373545	.153155
trade	.0609542	.0376842	1.62	0.106	-.0129081	.1348164
operators	-.075395	.0343687	-2.19	0.028	-.1427587	-.0080313
primary	-.2634858	.0741751	-3.55	0.000	-.4088712	-.1181004
female	-.159194	.0153385	-10.38	0.000	-.1892579	-.12913
femalekids	-.0963994	.0193018	-4.99	0.000	-.1342315	-.0585673
citizen	.0165059	.039253	0.42	0.674	-.0604312	.093443
immigrant	-.2689589	.0965959	-2.78	0.005	-.4582898	-.0796281
YRIMMIG61	.2715985	.1059214	2.56	0.010	.0639894	.4792077
YRIMMIG70	.2284369	.0996773	2.29	0.022	.0330664	.4238074
YRIMMIG80	.1812462	.098225	1.85	0.065	-.0112778	.3737702
YRIMMIG90	.0916201	.0979624	0.94	0.350	-.1003891	.2836293
YRIMMIG95	.0331256	.0985721	0.34	0.737	-.1600786	.2263298
YRIMMIG01	-.1139331	.0965276	-1.18	0.238	-.30313	.0752638

```

      _cons |   6.368881   .0764325   83.33   0.000   6.219071   6.518691
-----+-----

```

Vancouver

```

. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f vancouver==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust

```

Linear regression

```

Number of obs =   21408
F( 45, 21362) =   348.27
Prob > F       =   0.0000
R-squared      =   0.5168
Root MSE      =   .90609

```

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0973354	.0042864	22.71	0.000	.0889337	.105737
EXPER2	-.0009943	.0000533	-18.65	0.000	-.0010988	-.0008897
educexp	-.0028128	.0001826	-15.41	0.000	-.0031707	-.0024549
YOSCHOOLING	.1095509	.004742	23.10	0.000	.1002561	.1188456
tradecert	-.020013	.0174103	-1.15	0.250	-.0541385	.0141126
MARRIED_DUMMY	.1654292	.0185445	8.92	0.000	.1290805	.2017778
KIDS	.0530467	.0189919	2.79	0.005	.0158212	.0902723
weeks	.0338227	.0006619	51.10	0.000	.0325253	.0351201
hours	.007658	.0004203	18.22	0.000	.0068341	.0084819
ALLOPHONE	-.1220793	.0197142	-6.19	0.000	-.1607207	-.083438
FRENCH_ONLY	.1567549	.5752898	0.27	0.785	-.9708562	1.284366
BOTH_OFFICIAL	-.0297934	.024697	-1.21	0.228	-.0782014	.0186147
NEITHER_OFF~L	-.1434493	.0513734	-2.79	0.005	-.244145	-.0427535
senior_mana~t	.3277698	.0594457	5.51	0.000	.2112518	.4442878
management	.0351075	.0440715	0.80	0.426	-.051276	.121491
business	.16475	.052222	3.15	0.002	.0623909	.267109
financial	-.1099417	.0474189	-2.32	0.020	-.2028863	-.016997
clerical	-.1981446	.044677	-4.44	0.000	-.2857149	-.1105742
science	.1421612	.0460002	3.09	0.002	.0519973	.2323251
health	.0682872	.0550063	1.24	0.214	-.0395292	.1761036
technical	-.0891154	.0567866	-1.57	0.117	-.2004214	.0221905
social	-.2946626	.0558245	-5.28	0.000	-.4040827	-.1852425
teaching	-.0067049	.050389	-0.13	0.894	-.1054711	.0920614
art_sports	-.2898779	.0576217	-5.03	0.000	-.4028209	-.176935
sales	-.0662919	.0536486	-1.24	0.217	-.1714471	.0388633
supervisors	-.4114698	.0480808	-8.56	0.000	-.5057118	-.3172279
food	-.4022756	.0521973	-7.71	0.000	-.5045863	-.2999649
protective	-.0514777	.0598791	-0.86	0.390	-.1688452	.0658898
childcare	-.5683602	.0667533	-8.51	0.000	-.6992016	-.4375187
travel	-.374469	.0461038	-8.12	0.000	-.4648359	-.2841021
transportat~n	.0533356	.0903139	0.59	0.555	-.1236865	.2303577
construction	-.256391	.0721391	-3.55	0.000	-.3977891	-.1149929
trade	-.0470997	.0507879	-0.93	0.354	-.1466478	.0524485
operators	-.0546772	.0456651	-1.20	0.231	-.1441842	.0348297
primary	-.1570598	.0623968	-2.52	0.012	-.2793623	-.0347574
female	-.1094916	.0194065	-5.64	0.000	-.1475298	-.0714534
femalekids	-.154256	.0249869	-6.17	0.000	-.2032323	-.1052798

citizen	-.0130812	.0313221	-0.42	0.676	-.074475	.0483125
immigrant	-.1716372	.1002394	-1.71	0.087	-.3681139	.0248395
YRIMMIG61	.2860127	.1062161	2.69	0.007	.0778211	.4942042
YRIMMIG70	.2068243	.1038209	1.99	0.046	.0033276	.410321
YRIMMIG80	.1644757	.1000082	1.64	0.100	-.0315479	.3604994
YRIMMIG90	.0536331	.1002754	0.53	0.593	-.1429142	.2501804
YRIMMIG95	-.0467916	.1000886	-0.47	0.640	-.2429728	.1493896
YRIMMIG01	-.1786088	.097405	-1.83	0.067	-.36953	.0123123
_cons	6.242304	.086564	72.11	0.000	6.072632	6.411976

Ottawa

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f ottawa==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression

Number of obs = 12161
F(45, 12115) = 256.12
Prob > F = 0.0000
R-squared = 0.5436
Root MSE = .89815

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.1082853	.0063279	17.11	0.000	.0958816	.1206889
EXPER2	-.0010798	.0000946	-11.42	0.000	-.0012652	-.0008944
educexp	-.0031372	.0002806	-11.18	0.000	-.0036873	-.0025871
YOSCHOOLING	.1261713	.0066528	18.97	0.000	.1131307	.139212
tradecert	-.0541867	.0255617	-2.12	0.034	-.1042918	-.0040816
MARRIED_DUMMY	.1809645	.0252121	7.18	0.000	.1315448	.2303842
KIDS	.068021	.025792	2.64	0.008	.0174646	.1185775
weeks	.0317043	.0009036	35.09	0.000	.0299331	.0334756
hours	.0078863	.0006243	12.63	0.000	.0066626	.0091099
ALLOPHONE	-.0816236	.0352738	-2.31	0.021	-.1507659	-.0124814
FRENCH_ONLY	-.0546738	.0433344	-1.26	0.207	-.1396162	.0302685
BOTH_OFFICIAL	.0739077	.0170922	4.32	0.000	.0404043	.1074111
NEITHER_OFF~L	-.0396278	.157273	-0.25	0.801	-.3479079	.2686524
senior_mana~t	.2285413	.0896244	2.55	0.011	.052863	.4042195
management	.1240728	.0731179	1.70	0.090	-.0192501	.2673956
business	.0785289	.0897441	0.88	0.382	-.0973839	.2544417
financial	-.1457122	.0783742	-1.86	0.063	-.2993382	.0079139
clerical	-.2321908	.0743978	-3.12	0.002	-.3780223	-.0863593
science	.1906992	.0726419	2.63	0.009	.0483095	.3330889
health	-.0382034	.0854315	-0.45	0.655	-.2056627	.1292559
technical	-.4047156	.1088649	-3.72	0.000	-.6181082	-.191323
social	-.0600537	.0794956	-0.76	0.450	-.2158777	.0957704
teaching	-.0970092	.0792684	-1.22	0.221	-.2523879	.0583695
art_sports	-.2985754	.0883497	-3.38	0.001	-.4717549	-.1253959
sales	.074408	.0867963	0.86	0.391	-.0957265	.2445426
supervisors	-.4900881	.0768566	-6.38	0.000	-.6407393	-.3394369
food	-.4700943	.0825255	-5.70	0.000	-.6318574	-.3083312
protective	-.0036681	.0859731	-0.04	0.966	-.1721891	.1648528
childcare	-.9295306	.1316167	-7.06	0.000	-1.18752	-.6715408

travel	-.5674828	.0762737	-7.44	0.000	-.7169914	-.4179742
transportation	-.1553552	.122568	-1.27	0.205	-.3956081	.0848977
construction	-.2737404	.108903	-2.51	0.012	-.4872076	-.0602732
trade	-.1290105	.0813369	-1.59	0.113	-.2884438	.0304228
operators	-.2498763	.0781732	-3.20	0.001	-.4031082	-.0966443
primary	-.5788827	.1428617	-4.05	0.000	-.8589145	-.2988509
female	-.0964408	.0261097	-3.69	0.000	-.1476199	-.0452617
femalekids	-.1286181	.0328795	-3.91	0.000	-.1930672	-.0641691
citizen	-.0372077	.0699611	-0.53	0.595	-.1743427	.0999274
immigrant	-.3523627	.1687764	-2.09	0.037	-.6831915	-.021534
YRIMMIG61	.3475949	.186495	1.86	0.062	-.0179651	.7131549
YRIMMIG70	.3411464	.1725333	1.98	0.048	.0029536	.6793393
YRIMMIG80	.3534156	.1707719	2.07	0.039	.0186754	.6881557
YRIMMIG90	.2354232	.1668526	1.41	0.158	-.0916347	.562481
YRIMMIG95	.1461169	.171803	0.85	0.395	-.1906445	.4828783
YRIMMIG01	.0339582	.1620711	0.21	0.834	-.283727	.3516435
_cons	5.966984	.1350755	44.18	0.000	5.702214	6.231753

Calgary

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruption trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f calgary==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression	Number of obs =	11759
	F(45, 11713) =	249.45
	Prob > F	= 0.0000
	R-squared	= 0.5698
	Root MSE	= .88211

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0999458	.0058843	16.99	0.000	.0884117	.11148
EXPER2	-.0010931	.0000755	-14.48	0.000	-.0012411	-.0009451
educexp	-.0028624	.0002568	-11.14	0.000	-.0033659	-.002359
YOSCHOOLING	.1074112	.0060957	17.62	0.000	.0954625	.1193598
tradecert	-.0360092	.0213713	-1.68	0.092	-.0779006	.0058822
MARRIED_DUMMY	.1765588	.0261963	6.74	0.000	.1252096	.227908
KIDS	.0611449	.0237529	2.57	0.010	.0145852	.1077045
weeks	.0351158	.0009673	36.30	0.000	.0332197	.037012
hours	.0072991	.0005941	12.29	0.000	.0061345	.0084637
ALLOPHONE	-.1448432	.0303661	-4.77	0.000	-.2043658	-.0853207
FRENCH_ONLY	.1765055	.236903	0.75	0.456	-.2878638	.6408747
BOTH_OFFICIAL	-.0069361	.028832	-0.24	0.810	-.0634517	.0495794
NEITHER_OFFICIAL	-.1084612	.1386604	-0.78	0.434	-.3802587	.1633364
senior_management	.5296546	.0789132	6.71	0.000	.3749716	.6843375
management	.2313693	.0617485	3.75	0.000	.110332	.3524066
business	.3380213	.0678529	4.98	0.000	.2050183	.4710242
financial	.109976	.0641507	1.71	0.086	-.0157701	.2357221
clerical	-.0627724	.0619367	-1.01	0.311	-.1841786	.0586338
science	.339227	.0615129	5.51	0.000	.2186516	.4598025
health	.1951491	.0787423	2.48	0.013	.040801	.3494971
technical	-.0277427	.0713931	-0.39	0.698	-.1676851	.1121996

social	-.0245954	.0734595	-0.33	0.738	-.1685883	.1193976
teaching	.1365607	.067958	2.01	0.045	.0033516	.2697698
art_sports	-.1572908	.0759882	-2.07	0.038	-.3062402	-.0083413
sales	.1818176	.0718483	2.53	0.011	.0409831	.3226522
supervisors	-.3150259	.0671941	-4.69	0.000	-.4467375	-.1833143
food	-.4810817	.0725146	-6.63	0.000	-.6232224	-.3389411
protective	-.0287823	.0908966	-0.32	0.752	-.2069547	.1493901
childcare	-.6532846	.098839	-6.61	0.000	-.8470255	-.4595436
travel	-.4394426	.065208	-6.74	0.000	-.5672612	-.3116241
transportation	.1368213	.0941366	1.45	0.146	-.0477021	.3213447
construction	.0220771	.0692291	0.32	0.750	-.1136236	.1577777
trade	.0323076	.064618	0.50	0.617	-.0943546	.1589697
operators	-.1581887	.0674993	-2.34	0.019	-.2904986	-.0258787
primary	-.2244383	.094684	-2.37	0.018	-.4100348	-.0388419
female	-.2142615	.0257452	-8.32	0.000	-.2647263	-.1637967
femalekids	-.1409703	.03283	-4.29	0.000	-.2053225	-.076618
citizen	-.0096982	.0530074	-0.18	0.855	-.1136015	.094205
immigrant	-.0727843	.1852669	-0.39	0.694	-.4359382	.2903696
YRIMMIG61	.2919411	.1932694	1.51	0.131	-.0868991	.6707812
YRIMMIG70	.1086084	.1920964	0.57	0.572	-.2679326	.4851495
YRIMMIG80	.0790419	.185674	0.43	0.670	-.28491	.4429939
YRIMMIG90	.0455153	.1880648	0.24	0.809	-.3231231	.4141537
YRIMMIG95	-.0548625	.188514	-0.29	0.771	-.4243813	.3146562
YRIMMIG01	-.1332974	.1893995	-0.70	0.482	-.5045519	.2379571
_cons	6.097081	.1114024	54.73	0.000	5.878713	6.315448

Edmonton

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f edmonton==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression

Number of obs = 11331
F(45, 11285) = 250.41
Prob > F = 0.0000
R-squared = 0.5757
Root MSE = .88542

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.1045727	.0054688	19.12	0.000	.0938528	.1152925
EXPER2	-.0010957	.0000734	-14.94	0.000	-.0012395	-.0009519
educexp	-.0030766	.0002399	-12.82	0.000	-.0035468	-.0026063
YOSCHOOLING	.111479	.0060328	18.48	0.000	.0996536	.1233044
tradecert	.0210293	.0233523	0.90	0.368	-.0247453	.0668039
MARRIED_DUMMY	.1552696	.0247369	6.28	0.000	.106781	.2037583
KIDS	.1221017	.0256857	4.75	0.000	.0717534	.1724501
weeks	.0358199	.0009043	39.61	0.000	.0340473	.0375925
hours	.0071178	.0005539	12.85	0.000	.0060321	.0082035
ALLOPHONE	-.0241306	.0289973	-0.83	0.405	-.0809704	.0327091
FRENCH_ONLY	.5034352	.350962	1.43	0.151	-.1845115	1.191382
BOTH_OFFICIAL	.0138028	.0327399	0.42	0.673	-.050373	.0779786
NEITHER_OFF~L	-.145844	.124886	-1.17	0.243	-.3906423	.0989542

senior_management	.3201401	.0863003	3.71	0.000	.1509764	.4893038
business	.0909785	.0590707	1.54	0.124	-.0248102	.2067673
financial	.119384	.0716864	1.67	0.096	-.021134	.2599019
clerical	-.0540647	.064732	-0.84	0.404	-.1809507	.0728213
science	-.1790501	.0594008	-3.01	0.003	-.2954862	-.0626141
health	.1527896	.0605088	2.53	0.012	.0341817	.2713974
technical	.1974124	.0748727	2.64	0.008	.0506489	.3441759
social	-.0901196	.0724476	-1.24	0.214	-.2321296	.0518904
teaching	-.2076938	.0732009	-2.84	0.005	-.3511802	-.0642073
art_sports	-.0098401	.0708378	-0.14	0.890	-.1486944	.1290143
sales	-.3818009	.0873788	-4.37	0.000	-.5530786	-.2105231
supervisors	.0971906	.0690884	1.41	0.160	-.0382348	.232616
food	-.3988307	.0638232	-6.25	0.000	-.5239352	-.2737261
protective	-.5554343	.0720316	-7.71	0.000	-.6966289	-.4142398
childcare	-.0327288	.0746861	-0.44	0.661	-.1791265	.1136689
travel	-.6400439	.099856	-6.41	0.000	-.8357791	-.4443088
transportation	-.518079	.0615344	-8.42	0.000	-.638697	-.3974609
construction	-.1607772	.0813459	1.98	0.048	.001325	.3202294
trade	-.0822292	.0822325	-1.00	0.317	-.2434192	.0789608
operators	.0011312	.0602956	0.02	0.985	-.1170587	.119321
primary	-.0901068	.0646391	-1.39	0.163	-.2168106	.0365971
female	-.2054874	.0925095	-2.22	0.026	-.3868221	-.0241527
femalekids	-.2232863	.0279911	-7.98	0.000	-.2781537	-.168419
citizen	-.1752111	.0338857	-5.17	0.000	-.241633	-.1087893
immigrant	-.0783138	.0549004	-1.43	0.154	-.1859282	.0293006
YRIMMIG61	-.4598598	.144739	-3.18	0.001	-.7435734	-.1761462
YRIMMIG70	.5523343	.1566793	3.53	0.000	.2452156	.859453
YRIMMIG80	.4489324	.1522164	2.95	0.003	.1505618	.7473031
YRIMMIG90	.3992191	.1434661	2.78	0.005	.1180006	.6804376
YRIMMIG95	.2831234	.1447353	1.96	0.050	-.0005829	.5668297
YRIMMIG01	.1479717	.1473498	1.00	0.315	-.1408596	.436803
_cons	-.0456666	.1508044	-0.30	0.762	-.3412694	.2499363
	6.088744	.1134511	53.67	0.000	5.86636	6.311128

Quebec City

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f quebeccity==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

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Linear regression                                Number of obs =    7301
                                                F( 44, 7255) =      .
                                                Prob > F          =      .
                                                R-squared         =    0.4953
                                                Root MSE         =    .85761
```

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0955379	.0091968	10.39	0.000	.0775095	.1135663
EXPER2	-.0009596	.0001115	-8.61	0.000	-.0011781	-.000741
educexp	-.0025817	.0003874	-6.67	0.000	-.003341	-.0018224
YOSCHOOLING	.114709	.0085475	13.42	0.000	.0979533	.1314646
tradecert	-.0696279	.0303442	-2.29	0.022	-.1291113	-.0101444

MARRIED_DUMMY		.1256887	.0288889	4.35	0.000	.069058	.1823193
KIDS		.0216537	.0310558	0.70	0.486	-.0392248	.0825321
weeks		.028436	.0012244	23.23	0.000	.0260359	.0308361
hours		.0074799	.0008719	8.58	0.000	.0057707	.009189
ALLOPHONE		-.1804693	.108924	-1.66	0.098	-.3939921	.0330535
FRENCH_ONLY		.4160239	.6287923	0.66	0.508	-.816592	1.64864
BOTH_OFFICIAL		.4939384	.6285398	0.79	0.432	-.7381826	1.726059
NEITHER_OFFICIAL		.3718775	.698421	0.53	0.594	-.9972309	1.740986
senior_management		.3651298	.1112863	3.28	0.001	.1469763	.5832834
business		.217392	.0919745	2.36	0.018	.0370952	.3976888
financial		.1903305	.1000276	1.90	0.057	-.0057528	.3864138
clerical		.0296424	.0927315	0.32	0.749	-.1521382	.2114231
science		-.1009223	.0911874	-1.11	0.268	-.2796762	.0778316
health		.16233	.0907359	1.79	0.074	-.0155386	.3401987
technical		.3424663	.0959447	3.57	0.000	.1543867	.5305458
social		-.0378718	.0988409	-0.38	0.702	-.2316289	.1558852
teaching		.0372824	.0972808	0.38	0.702	-.1534163	.227981
art_sports		.1908307	.0963339	1.98	0.048	.0019882	.3796732
sales		-.2507176	.1123697	-2.23	0.026	-.4709949	-.0304402
supervisors		.0975042	.1017211	0.96	0.338	-.1018987	.2969071
food		-.3493978	.0953252	-3.67	0.000	-.5362628	-.1625327
protective		-.2200799	.0974822	-2.26	0.024	-.4111734	-.0289864
childcare		.0998478	.1044453	0.96	0.339	-.1048954	.304591
travel		-.6976626	.1554233	-4.49	0.000	-1.002338	-.3929876
transportation		-.4129322	.0912728	-4.52	0.000	-.5918534	-.2340109
construction		.2473	.1103075	2.24	0.025	.0310653	.4635348
trade		.1637378	.1172402	1.40	0.163	-.0660871	.3935628
operators		.0375165	.0998975	0.38	0.707	-.1583117	.2333448
primary		-.0870526	.0926172	-0.94	0.347	-.2686092	.0945041
female		-.2917311	.1846078	-1.58	0.114	-.653616	.0701538
femalekids		-.2340884	.0327028	-7.16	0.000	-.2981955	-.1699814
citizen		-.0351674	.0411962	-0.85	0.393	-.1159239	.0455891
immigrant		.1966834	.169349	1.16	0.246	-.1352899	.5286566
YRIMMIG61		-.1254648	.2909427	-0.43	0.666	-.6957972	.4448676
YRIMMIG70		.2637097	.4454592	0.59	0.554	-.60952	1.136939
YRIMMIG80		.1289139	.3130906	0.41	0.681	-.4848348	.7426626
YRIMMIG90		.0733859	.3190327	0.23	0.818	-.552011	.6987828
YRIMMIG95		.2839454	.2920599	0.97	0.331	-.2885771	.8564678
YRIMMIG01		.0756863	.305496	0.25	0.804	-.5231747	.6745473
_cons		-.2802021	.3023067	-0.93	0.354	-.8728111	.312407
		5.514239	.6451472	8.55	0.000	4.249563	6.778915

Winnipeg

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f winnipeg==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression

Number of obs = 7910
F(45, 7864) = 159.10
Prob > F = 0.0000
R-squared = 0.5382
Root MSE = .87737

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0867479	.0066547	13.04	0.000	.0737028	.0997929
EXPER2	-.000884	.0000827	-10.69	0.000	-.001046	-.0007219
educexp	-.0024256	.0003049	-7.96	0.000	-.0030233	-.001828
YOSCHOOLING	.1115541	.0071823	15.53	0.000	.0974748	.1256334
tradecert	.015605	.026609	0.59	0.558	-.0365558	.0677657
MARRIED_DUMMY	.2000685	.0294712	6.79	0.000	.1422971	.2578398
KIDS	.0697581	.0290701	2.40	0.016	.012773	.1267431
weeks	.0321297	.0011257	28.54	0.000	.0299231	.0343364
hours	.0088624	.0007121	12.45	0.000	.0074665	.0102584
ALLOPHONE	-.0379199	.0310562	-1.22	0.222	-.0987984	.0229585
FRENCH_ONLY	.1105103	.3708576	0.30	0.766	-.6164691	.8374897
BOTH_OFFICIAL	-.012771	.033737	-0.38	0.705	-.0789044	.0533625
NEITHER_OFFICIAL	-.5169951	.3142434	-1.65	0.100	-1.132996	.0990055
senior_management	.5453	.1062767	5.13	0.000	.3369695	.7536306
business	.0998253	.0731519	1.36	0.172	-.0435719	.2432225
financial	.1733209	.0795414	2.18	0.029	.0173985	.3292432
clerkical	-.0243134	.0821545	-0.30	0.767	-.1853581	.1367313
science	-.0962625	.0714897	-1.35	0.178	-.2364013	.0438762
health	.1543638	.0725694	2.13	0.033	.0121084	.2966191
technical	.1370519	.0878152	1.56	0.119	-.0350891	.309193
social	-.1378703	.0816258	-1.69	0.091	-.2978785	.022138
teaching	-.2701185	.089449	-3.02	0.003	-.4454622	-.0947747
art_sports	.0875435	.0798626	1.10	0.273	-.0690084	.2440954
sales	-.2162014	.1015525	-2.13	0.033	-.4152712	-.0171316
supervisors	.0777791	.0906795	0.86	0.391	-.0999768	.2555349
food	-.4217662	.0785108	-5.37	0.000	-.5756683	-.2678641
protective	-.4437465	.0919441	-4.83	0.000	-.6239813	-.2635117
childcare	.0099316	.0879806	0.11	0.910	-.1625337	.182397
travel	-.4873555	.1016378	-4.80	0.000	-.6865927	-.2881184
transportation	-.4165769	.076885	-5.42	0.000	-.5672919	-.265862
construction	.0971111	.1764624	0.55	0.582	-.2488021	.4430242
trade	-.0407608	.1022356	-0.40	0.690	-.2411697	.1596481
operators	-.1031863	.0808866	-1.28	0.202	-.2617456	.055373
primary	-.129388	.0731164	-1.77	0.077	-.2727156	.0139396
female	-.3697852	.1215188	-3.04	0.002	-.6079945	-.131576
femalekids	-.2514016	.0318092	-7.90	0.000	-.3137562	-.189047
citizen	-.0573295	.0405272	-1.41	0.157	-.1367736	.0221147
immigrant	-.0355206	.0721567	-0.49	0.623	-.176967	.1059257
YRIMMIG61	-.311407	.1669276	-1.87	0.062	-.6386294	.0158155
YRIMMIG70	.262767	.1871871	1.40	0.160	-.1041695	.6297035
YRIMMIG80	.3570239	.1698599	2.10	0.036	.0240534	.6899944
YRIMMIG90	.2143561	.1673659	1.28	0.200	-.1137254	.5424377
YRIMMIG95	.1057028	.1696558	0.62	0.533	-.2268676	.4382732
YRIMMIG95	-.0149822	.1759289	-0.09	0.932	-.3598496	.3298851
YRIMMIG01	-.0180115	.1780117	-0.10	0.919	-.3669616	.3309387
_cons	6.122203	.1338372	45.74	0.000	5.859847	6.38456

Hamilton

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerkical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> f hamilton==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

note: FRENCH_ONLY omitted because of collinearity

Linear regression

Number of obs = 7693
F(44, 7648) = 175.17
Prob > F = 0.0000
R-squared = 0.5501
Root MSE = .88679

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.1087008	.0070594	15.40	0.000	.0948625	.1225391
EXPER2	-.0009565	.0000866	-11.05	0.000	-.0011262	-.0007868
educexp	-.0036485	.0003065	-11.91	0.000	-.0042492	-.0030478
YOSCHOOLING	.1414197	.0074573	18.96	0.000	.1268013	.1560382
tradecert	-.0055806	.0283232	-0.20	0.844	-.0611017	.0499406
MARRIED_DUMMY	.1281117	.0308292	4.16	0.000	.067678	.1885454
KIDS	.1272262	.0296351	4.29	0.000	.0691333	.1853191
weeks	.0325168	.0011115	29.26	0.000	.0303381	.0346956
hours	.0081149	.0007162	11.33	0.000	.0067108	.0095189
ALLOPHONE	-.0234577	.0364678	-0.64	0.520	-.0949446	.0480292
FRENCH_ONLY	0	(omitted)				
BOTH_OFFICIAL	-.0389391	.0404488	-0.96	0.336	-.1182298	.0403517
NEITHER_OFF~L	-.2093084	.2620905	-0.80	0.425	-.7230776	.3044609
senior_mana~t	.4866902	.0941774	5.17	0.000	.3020767	.6713037
management	.1099085	.0607423	1.81	0.070	-.0091631	.2289801
business	.1705684	.0750282	2.27	0.023	.0234925	.3176443
financial	-.0976579	.0713537	-1.37	0.171	-.2375308	.042215
clerical	-.2524821	.064844	-3.89	0.000	-.3795941	-.12537
science	.1081419	.0630311	1.72	0.086	-.0154163	.2317002
health	.1149999	.0873277	1.32	0.188	-.0561862	.2861861
technical	-.1756079	.0813573	-2.16	0.031	-.3350904	-.0161254
social	-.2593028	.0820203	-3.16	0.002	-.420085	-.0985205
teaching	-.0577646	.0756059	-0.76	0.445	-.2059728	.0904437
art_sports	-.405242	.0965004	-4.20	0.000	-.5944093	-.2160747
sales	-.0122029	.0816823	-0.15	0.881	-.1723226	.1479168
supervisors	-.5555495	.0709266	-7.83	0.000	-.694585	-.4165139
food	-.5663554	.08936	-6.34	0.000	-.7415255	-.3911853
protective	-.0783964	.0926576	-0.85	0.398	-.2600307	.1032378
childcare	-.6686423	.1176042	-5.69	0.000	-.8991789	-.4381058
travel	-.568753	.0688702	-8.26	0.000	-.7037575	-.4337485
transportat~n	.174545	.1028614	1.70	0.090	-.0270915	.3761815
construction	-.1310993	.0873124	-1.50	0.133	-.3022555	.040057
trade	-.0366893	.0634263	-0.58	0.563	-.1610223	.0876438
operators	-.1497378	.0649952	-2.30	0.021	-.2771462	-.0223294
primary	-.3367217	.1079015	-3.12	0.002	-.5482382	-.1252052
female	-.2071664	.0335878	-6.17	0.000	-.2730078	-.141325
femalekids	-.248052	.0407506	-6.09	0.000	-.3279344	-.1681697
citizen	.0236356	.0636176	0.37	0.710	-.1010723	.1483436
immigrant	-.2299119	.2286785	-1.01	0.315	-.6781844	.2183606
YRIMMIG61	.2580138	.2324969	1.11	0.267	-.1977439	.7137716
YRIMMIG70	.2393473	.2277044	1.05	0.293	-.2070157	.6857103
YRIMMIG80	.1972051	.2279929	0.86	0.387	-.2497235	.6441337
YRIMMIG90	.0542911	.2290261	0.24	0.813	-.3946629	.5032451
YRIMMIG95	-.0344757	.2347586	-0.15	0.883	-.494667	.4257156
YRIMMIG01	-.1278724	.230439	-0.55	0.579	-.579596	.3238512
_cons	5.803572	.1368745	42.40	0.000	5.53526	6.071883

Endogeneity test and IV estimations (for BOTH OFFICIAL and FRENCH ONLY)

reg BOTH_OFFICIAL immigrant YRIMMIG* mtenglish mtfrench woftenenglish woftenfr

```
> ench woftenboth wregularenglish wregularfrench wregularboth hoftenenglish
hoft
> enfrench hoftenboth hregularenglish hregularfrench hregularboth
```

Source	SS	df	MS	Number of obs = 801055
Model	37793.8334	21	1799.70635	F(21,801033) =18411.36
Residual	78300.7964801033	.097749776		Prob > F = 0.0000
				R-squared = 0.3255
				Adj R-squared = 0.3255
Total	116094.63801054	.144927345		Root MSE = .31265

BOTH_OFFICIAL	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
immigrant	-.0272467	.0043511	-6.26	0.000	-.0357746 -.0187187
YRIMMIG61	-.0011735	.0047604	-0.25	0.805	-.0105036 .0081567
YRIMMIG70	.0114474	.0048416	2.36	0.018	.0019579 .0209368
YRIMMIG80	-.0048502	.00474	-1.02	0.306	-.0141404 .00444
YRIMMIG90	-.0117454	.0046924	-2.50	0.012	-.0209424 -.0025485
YRIMMIG95	-.0249343	.0047614	-5.24	0.000	-.0342664 -.0156022
YRIMMIG01	-.0287664	.0047195	-6.10	0.000	-.0380164 -.0195163
mtenglish	-.0494758	.0013943	-35.48	0.000	-.0522087 -.046743
mtfrench	.195938	.0026345	74.37	0.000	.1907744 .2011015
woftenenglish	.004554	.0008093	5.63	0.000	.0029679 .0061402
woftenfrench	.1178941	.0015549	75.82	0.000	.1148465 .1209417
woftenboth	.6147702	.0037697	163.08	0.000	.6073817 .6221587
wregulareng-h	.4331357	.0021597	200.56	0.000	.4289028 .4373686
wregularfre-h	.6367698	.0025575	248.98	0.000	.6317571 .6417824
wregularboth	.5890012	.0429656	13.71	0.000	.5047901 .6732123
hoftenenglish	.0631529	.0015294	41.29	0.000	.0601553 .0661506
hoftenfrench	-.0059206	.0028291	-2.09	0.036	-.0114656 -.0003756
hoftenboth	.5641422	.006375	88.49	0.000	.5516475 .5766369
hregulareng-h	.1681238	.0017027	98.74	0.000	.1647866 .171461
hregularfre-h	.4789791	.0028628	167.31	0.000	.4733682 .4845901
hregularboth	.6266079	.0125546	49.91	0.000	.6020013 .6512145
_cons	.0594923	.0010508	56.62	0.000	.0574328 .0615519

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. predict vhat, resid
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Montreal

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reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruption trade operators primary female femalekids citizen immigrant YRIMMIG*
v
> hat if montreal==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0
```

Source	SS	df	MS	Number of obs = 36142
Model	26088.6285	46	567.144097	F(46, 36095) = 695.66
Residual	29427.0229 36095	.815265906		Prob > F = 0.0000
				R-squared = 0.4699
				Adj R-squared = 0.4693
Total	55515.6513 36141	1.53608509		Root MSE = .90292

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
EXPERIENCE	.0702219	.0027111	25.90	0.000	.064908 .0755357

EXPER2	-.0007401	.0000332	-22.26	0.000	-.0008053	-.0006749
educexp	-.0017077	.0001171	-14.58	0.000	-.0019372	-.0014782
YOSCHOOLING	.0914858	.0030881	29.63	0.000	.0854331	.0975386
tradedcert	-.0404429	.0138573	-2.92	0.004	-.0676036	-.0132822
MARRIED_DUMMY	.14241	.0132496	10.75	0.000	.1164403	.1683797
KIDS	.083063	.0147576	5.63	0.000	.0541377	.1119884
weeks	.0314738	.0003913	80.44	0.000	.030707	.0322407
hours	.0076314	.0003281	23.26	0.000	.0069883	.0082745
ALLOPHONE	-.0711667	.0170229	-4.18	0.000	-.104532	-.0378014
FRENCH_ONLY	.0389816	.0236041	1.65	0.099	-.007283	.0852463
BOTH_OFFICIAL	.2035417	.0252788	8.05	0.000	.1539946	.2530888
NEITHER_OFFICIAL	.1233126	.0748992	1.65	0.100	-.0234921	.2701172
senior_management	.4254975	.044004	9.67	0.000	.3392484	.5117466
business	.2111595	.027393	7.71	0.000	.1574684	.2648507
financial	.2627933	.0366443	7.17	0.000	.1909693	.3346173
clerical	-.0524745	.0295847	-1.77	0.076	-.1104614	.0055124
science	-.1046936	.0256729	-4.08	0.000	-.1550133	-.0543739
health	.2377586	.0287733	8.26	0.000	.181362	.2941552
technical	.2067839	.0390005	5.30	0.000	.1303418	.283226
social	-.1167299	.0362923	-3.22	0.001	-.1878639	-.0455959
teaching	.0204728	.0334656	0.61	0.541	-.0451208	.0860664
art_sports	.1725293	.0327436	5.27	0.000	.1083508	.2367077
sales	-.1608602	.0348548	-4.62	0.000	-.2291767	-.0925437
supervisors	.0637	.0358879	1.77	0.076	-.0066414	.1340415
food	-.3429115	.0293324	-11.69	0.000	-.400404	-.2854191
protective	-.3740276	.035687	-10.48	0.000	-.4439752	-.3040799
childcare	.0863162	.0436391	1.98	0.048	.0007823	.1718501
travel	-.6622183	.0527278	-12.56	0.000	-.7655662	-.5588703
transportation	-.3909287	.0268106	-14.58	0.000	-.4434783	-.3383791
construction	.1988839	.0558388	3.56	0.000	.0894383	.3083296
trade	.0527618	.044068	1.20	0.231	-.0336128	.1391365
operators	.0509985	.0305068	1.67	0.095	-.0087957	.1107926
primary	-.085423	.0261419	-3.27	0.001	-.136662	-.0341841
female	-.2702145	.0656008	-4.12	0.000	-.398794	-.1416351
femalekids	-.1600136	.0148349	-10.79	0.000	-.1890903	-.1309368
citizen	-.0962989	.0194248	-4.96	0.000	-.134372	-.0582258
immigrant	.0164265	.0330893	0.50	0.620	-.0484295	.0812825
YRIMMIG61	-.2628003	.0735807	-3.57	0.000	-.4070206	-.1185799
YRIMMIG70	.2694002	.0819053	3.29	0.001	.1088635	.429937
YRIMMIG80	.2205448	.0764628	2.88	0.004	.0706755	.370414
YRIMMIG90	.1779421	.0749798	2.37	0.018	.0309795	.3249048
YRIMMIG95	.0867574	.0738095	1.18	0.240	-.0579113	.2314262
YRIMMIG01	.0304074	.074492	0.41	0.683	-.1155991	.1764138
vhat	-.1146906	.071024	-1.61	0.106	-.2538997	.0245185
_cons	-.1226078	.0182487	-6.72	0.000	-.1583757	-.0868399
	6.361115	.0618488	102.85	0.000	6.239889	6.48234

Quebec City

```

reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruction trade operators primary female femalekids citizen immigrant YRIMMIG*
v
> hat if quebeccity==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0

```

Source	SS	df	MS	Number of obs =	7301
Model	5243.71759	46	113.993861	F(46, 7254) =	155.17
				Prob > F	= 0.0000

Residual		5329.23259	7254	.734661234		R-squared	=	0.4960
-----+								
Total		10572.9502	7300	1.44834934		Adj R-squared	=	0.4928
						Root MSE	=	.85712

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0953898	.0063542	15.01	0.000	.0829337	.107846
EXPER2	-.0009589	.0000768	-12.48	0.000	-.0011095	-.0008083
educexp	-.002564	.0002728	-9.40	0.000	-.0030988	-.0020292
YOSCHOOLING	.1143037	.0070123	16.30	0.000	.1005576	.1280498
tradecert	-.0718291	.0281372	-2.55	0.011	-.1269861	-.016672
MARRIED_DUMMY	.1239101	.0284243	4.36	0.000	.0681903	.1796299
KIDS	.0207421	.0308303	0.67	0.501	-.0396942	.0811785
weeks	.0283567	.0008699	32.60	0.000	.0266515	.030062
hours	.0072933	.0007415	9.84	0.000	.0058398	.0087468
ALLOPHONE	-.1578705	.1094093	-1.44	0.149	-.3723446	.0566036
FRENCH_ONLY	.3706532	.3966586	0.93	0.350	-.4069132	1.14822
BOTH_OFFICIAL	.6021731	.3980362	1.51	0.130	-.1780938	1.38244
NEITHER_OFF~L	.3597209	.9747178	0.37	0.712	-1.55101	2.270451
senior_mana~t	.3440346	.0943856	3.64	0.000	.1590114	.5290578
management	.1988119	.0659238	3.02	0.003	.069582	.3280418
business	.1801835	.0816163	2.21	0.027	.0201917	.3401753
financial	.016594	.0659015	0.25	0.801	-.1125922	.1457802
clerical	-.1145699	.0604157	-1.90	0.058	-.2330022	.0038624
science	.1475467	.0636469	2.32	0.020	.0227802	.2723132
health	.3402818	.0780738	4.36	0.000	.1872344	.4933292
technical	-.042118	.0774246	-0.54	0.586	-.1938928	.1096567
social	.0305026	.0691665	0.44	0.659	-.1050839	.1660891
teaching	.1828552	.0725352	2.52	0.012	.0406652	.3250453
art_sports	-.2632317	.0788196	-3.34	0.001	-.4177412	-.1087223
sales	.0754607	.0826214	0.91	0.361	-.0865013	.2374227
supervisors	-.3616462	.0655606	-5.52	0.000	-.4901639	-.2331284
food	-.2377999	.073304	-3.24	0.001	-.3814971	-.0941027
protective	.0805231	.0794757	1.01	0.311	-.0752724	.2363186
childcare	-.6962987	.1173567	-5.93	0.000	-.9263521	-.4662454
travel	-.4244599	.0614632	-6.91	0.000	-.5449457	-.3039741
transportat~n	.2337306	.1333518	1.75	0.080	-.0276778	.495139
construction	.1596206	.092208	1.73	0.083	-.0211339	.3403752
trade	.0324354	.0681974	0.48	0.634	-.1012513	.1661222
operators	-.0977108	.0651036	-1.50	0.133	-.2253327	.0299112
primary	-.2977071	.1230117	-2.42	0.016	-.5388458	-.0565685
female	-.2338008	.0315456	-7.41	0.000	-.2956393	-.1719623
femalekids	-.0338183	.0410759	-0.82	0.410	-.114339	.0467023
citizen	.2027359	.1759172	1.15	0.249	-.142113	.5475848
immigrant	-.1198155	.2905065	-0.41	0.680	-.6892928	.4496619
YRIMMIG61	.2627919	.3520855	0.75	0.455	-.4273982	.952982
YRIMMIG70	.1283494	.3110812	0.41	0.680	-.4814603	.7381591
YRIMMIG80	.0736335	.3216078	0.23	0.819	-.5568115	.7040785
YRIMMIG90	.2783584	.2948424	0.94	0.345	-.2996185	.8563353
YRIMMIG95	.0564687	.3032895	0.19	0.852	-.538067	.6510044
YRIMMIG01	-.2820965	.2728932	-1.03	0.301	-.8170467	.2528537
vhat	-.1799005	.059181	-3.04	0.002	-.2959124	-.0638886
_cons	5.509217	.4328407	12.73	0.000	4.660723	6.35771

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. reg FRENCH_ONLY immigrant YRIMMIG* mtenglish mtfrench woftenenglish
woftenfren
> ch woftenboth wregularenglish wregularfrench wregularboth hoftenenglish
hoften
> french hoftenboth hregularenglish hregularfrench hregularboth
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Source		SS	df	MS	Number of obs =	801055
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Model	53639.466	21	2554.26028	F(21,801033) =52262.45
Residual	39149.4634801033		.048873721	Prob > F = 0.0000
				R-squared = 0.5781
				Adj R-squared = 0.5781
Total	92788.9293801054		.115833551	Root MSE = .22107

FRENCH_ONLY	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
immigrant	.0010256	.0030766	0.33	0.739	-.0050045	.0070557
YRIMMIG61	-.0059379	.0033661	-1.76	0.078	-.0125353	.0006594
YRIMMIG70	.0084601	.0034235	2.47	0.013	.0017501	.0151701
YRIMMIG80	.0148399	.0033516	4.43	0.000	.0082708	.021409
YRIMMIG90	.0195878	.003318	5.90	0.000	.0130847	.026091
YRIMMIG95	.017027	.0033668	5.06	0.000	.0104283	.0236258
YRIMMIG01	.010529	.0033371	3.16	0.002	.0039883	.0170697
mtenglish	-.0060714	.0009859	-6.16	0.000	-.0080038	-.004139
mtfrench	.0943594	.0018629	50.65	0.000	.0907082	.0980105
woftenenglish	-.0355344	.0005722	-62.10	0.000	-.0366559	-.0344128
woftenfrench	-.0007692	.0010995	-0.70	0.484	-.0029242	.0013857
woftenboth	-.2929597	.0026656	-109.91	0.000	-.2981841	-.2877353
wregulareng~h	-.3806425	.0015271	-249.26	0.000	-.3836356	-.3776494
wregularfre~h	-.1655541	.0018084	-91.55	0.000	-.1690985	-.1620096
wregularboth	-.1198888	.0303809	-3.95	0.000	-.1794343	-.0603433
hoftenenglish	-.0713005	.0010815	-65.93	0.000	-.0734201	-.0691809
hoftenfrench	.4877313	.0020005	243.81	0.000	.4838105	.4916522
hoftenboth	-.0491187	.0045077	-10.90	0.000	-.0579537	-.0402837
hregulareng~h	-.1858297	.001204	-154.35	0.000	-.1881894	-.1834699
hregularfre~h	.1164141	.0020243	57.51	0.000	.1124466	.1203816
hregularboth	.0321035	.0088773	3.62	0.000	.0147042	.0495028
_cons	.0973409	.000743	131.01	0.000	.0958846	.0987972

. predict vhatf, resid

Montreal

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruccion trade operators primary female femalekids citizen immigrant YRIMMIG*
v
> hatif if montreal==1 & MOB5P!=9 & KIDS!=. & EXPERIENCE>=0
```

Source	SS	df	MS	Number of obs = 36142
Model	26052.3733	46	566.355941	F(46, 36095) = 693.83
Residual	29463.2781	36095	.816270344	Prob > F = 0.0000
				R-squared = 0.4693
				Adj R-squared = 0.4686
Total	55515.6513	36141	1.53608509	Root MSE = .90348

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0705661	.0027125	26.02	0.000	.0652496	.0758826
EXPER2	-.0007439	.0000333	-22.36	0.000	-.0008091	-.0006787
educexp	-.0017295	.0001171	-14.77	0.000	-.001959	-.0015
YOSCHOOLING	.0920589	.0030891	29.80	0.000	.0860042	.0981135
tradecert	-.0394596	.0138655	-2.85	0.004	-.0666363	-.0122828

MARRIED_DUMMY		.1426055	.0132693	10.75	0.000	.1165973	.1686137
KIDS		.0832316	.0147683	5.64	0.000	.0542854	.1121779
weeks		.0315637	.0003913	80.67	0.000	.0307967	.0323306
hours		.0077293	.000328	23.56	0.000	.0070864	.0083722
ALLOPHONE		-.0816521	.0181429	-4.50	0.000	-.1172127	-.0460916
FRENCH_ONLY		.0487291	.0257081	1.90	0.058	-.0016595	.0991177
BOTH_OFFICIAL		.1288468	.0227978	5.65	0.000	.0841625	.1735312
NEITHER_OFF~L		.1267774	.0750702	1.69	0.091	-.0203624	.2739171
senior_mana~t		.443287	.0439898	10.08	0.000	.3570657	.5295082
management		.2270762	.0273607	8.30	0.000	.1734485	.2807039
business		.2762964	.0366357	7.54	0.000	.2044893	.3481035
financial		-.0374525	.0295475	-1.27	0.205	-.0953664	.0204615
clerical		-.0887775	.0256213	-3.46	0.001	-.138996	-.038559
science		.253954	.0287135	8.84	0.000	.1976747	.3102333
health		.2191564	.0389988	5.62	0.000	.1427175	.2955952
technical		-.1055803	.0362812	-2.91	0.004	-.1766925	-.0344681
social		.0267656	.0334742	0.80	0.424	-.0388448	.0923761
teaching		.1712846	.0327635	5.23	0.000	.1070671	.235502
art_sports		-.1497446	.0348482	-4.30	0.000	-.2180481	-.0814411
sales		.0816191	.0358858	2.27	0.023	.0112818	.1519564
supervisors		-.3256191	.0292766	-11.12	0.000	-.383002	-.2682361
food		-.3623572	.0356834	-10.15	0.000	-.4322977	-.2924166
protective		.0994912	.043623	2.28	0.023	.0139888	.1849935
childcare		-.6604896	.0527599	-12.52	0.000	-.7639005	-.5570787
travel		-.3786398	.0267777	-14.14	0.000	-.4311248	-.3261548
transportat~n		.2105379	.0558476	3.77	0.000	.101075	.3200008
construction		.058222	.0440903	1.32	0.187	-.0281962	.1446403
trade		.0606484	.0304918	1.99	0.047	.0008836	.1204132
operators		-.0758404	.026121	-2.90	0.004	-.1270384	-.0246424
primary		-.2633893	.0656336	-4.01	0.000	-.3920331	-.1347455
female		-.1592435	.0148436	-10.73	0.000	-.1883374	-.1301496
femalekids		-.0962315	.0194378	-4.95	0.000	-.1343302	-.0581329
citizen		.016741	.0331109	0.51	0.613	-.0481573	.0816394
immigrant		-.2693849	.0736221	-3.66	0.000	-.4136864	-.1250833
YRIMMIG61		.2698471	.081983	3.29	0.001	.1091581	.4305362
YRIMMIG70		.2273295	.0765128	2.97	0.003	.0773622	.3772968
YRIMMIG80		.1809396	.0750253	2.41	0.016	.0338878	.3279915
YRIMMIG90		.091522	.0738515	1.24	0.215	-.0532291	.2362731
YRIMMIG95		.0332229	.0745368	0.45	0.656	-.1128715	.1793173
YRIMMIG01		-.1133363	.0710714	-1.59	0.111	-.2526383	.0259656
vhatf		.0159642	.0195013	0.82	0.413	-.0222589	.0541873
_cons		6.371493	.0619583	102.84	0.000	6.250053	6.492934

Montreal

```

ivreg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks hou
> rs ALLOPHONE FRENCH_ONLY (BOTH_OFFICIAL=immigrant YRIMMIG* mtenglish mtfrench
> woftenenglish woftenfrench woftenboth wregularenglish wregularfrench
wregularb
> oth hoftenenglish hoftenfrench hoftenboth hregularenglish hregularfrench
hregu
> larboth) NEITHER_OFFICIAL senior_management management business financial
cler
> ical science health technical social teaching art_sports sales supervisors
foo
> d protective childcare travel transportation construction trade operators
prim
> ary female femalekids citizen immigrant YRIMMIG* if montreal==1 & MOB5P!=9 &
K
> IDS!=. & EXPERIENCE>=0

```

Instrumental variables (2SLS) regression

Source	SS	df	MS	Number of obs =	36142
Model	26016.2477	45	578.138838	F(45, 36096) =	708.63
Residual	29499.4036	36096	.817248549	Prob > F =	0.0000
				R-squared =	0.4686
				Adj R-squared =	0.4680
Total	55515.6513	36141	1.53608509	Root MSE =	.90402

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
BOTH_OFFICIAL	.2742367	.0422465	6.49	0.000	.1914324	.357041
EXPERIENCE	.0704287	.0027141	25.95	0.000	.065109	.0757484
EXPER2	-.0007412	.0000333	-22.26	0.000	-.0008064	-.0006759
educexp	-.0017137	.0001172	-14.62	0.000	-.0019435	-.0014839
YOSCHOOLING	.0912323	.0030968	29.46	0.000	.0851625	.097302
tradecert	-.0398415	.0138737	-2.87	0.004	-.0670343	-.0126486
MARRIED_DUMMY	.1424805	.0132659	10.74	0.000	.1164789	.1684821
KIDS	.0844048	.0147774	5.71	0.000	.0554407	.1133689
weeks	.031574	.0003915	80.65	0.000	.0308067	.0323413
hours	.0077094	.0003282	23.49	0.000	.0070661	.0083527
ALLOPHONE	-.0767487	.0170251	-4.51	0.000	-.1101185	-.0433789
FRENCH_ONLY	.193118	.0402551	4.80	0.000	.1142168	.2720192
NEITHER_OFF~L	.2332314	.0795322	2.93	0.003	.077346	.3891168
senior_mana~t	.4375367	.0439982	9.94	0.000	.3512989	.5237746
management	.2234191	.0273309	8.17	0.000	.1698497	.2769886
business	.2717372	.0366497	7.41	0.000	.1999028	.3435716
financial	-.0423804	.0295587	-1.43	0.152	-.1003163	.0155555
clerical	-.0919283	.0255974	-3.59	0.000	-.1421	-.0417565
science	.2511318	.0287076	8.75	0.000	.1948641	.3073996
health	.21783	.0390003	5.59	0.000	.1413882	.2942718
technical	-.1059828	.0362946	-2.92	0.004	-.1771214	-.0348442
social	.0235539	.0335026	0.70	0.482	-.0421122	.0892201
teaching	.1686534	.0327883	5.14	0.000	.1043873	.2329195
art_sports	-.154919	.034882	-4.44	0.000	-.2232886	-.0865493
sales	.0774987	.0358386	2.16	0.031	.007254	.1477434
supervisors	-.3301214	.0292699	-11.28	0.000	-.3874912	-.2727515
food	-.3650146	.0356912	-10.23	0.000	-.4349703	-.2950588
protective	.0943045	.0436661	2.16	0.031	.0087177	.1798913
childcare	-.6564495	.0527993	-12.43	0.000	-.7599378	-.5529612
travel	-.3801178	.0267773	-14.20	0.000	-.432602	-.3276336
transportat~n	.2087824	.0558798	3.74	0.000	.0992563	.3183085
construction	.0538488	.0441257	1.22	0.222	-.0326389	.1403366
trade	.0589658	.0305115	1.93	0.053	-.0008377	.1187694
operators	-.0741686	.0261327	-2.84	0.005	-.1253894	-.0229478
primary	-.2662254	.0656761	-4.05	0.000	-.3949526	-.1374982
female	-.1579619	.0148554	-10.63	0.000	-.1870789	-.128845
femalekids	-.0967464	.0194485	-4.97	0.000	-.1348661	-.0586267
citizen	.0109284	.0331567	0.33	0.742	-.0540598	.0759165
immigrant	-.2275938	.074335	-3.06	0.002	-.3732926	-.0818949
YRIMMIG61	.2415869	.0823221	2.93	0.003	.0802332	.4029407
YRIMMIG70	.2010371	.0768306	2.62	0.009	.0504469	.3516273
YRIMMIG80	.1544252	.0753467	2.05	0.040	.0067433	.302107
YRIMMIG90	.071681	.0740515	0.97	0.333	-.0734622	.2168241
YRIMMIG95	.0201808	.0746465	0.27	0.787	-.1261286	.1664902
YRIMMIG01	-.1184225	.0711184	-1.67	0.096	-.2578167	.0209717
_cons	6.244251	.0688058	90.75	0.000	6.109389	6.379112

Instrumented: BOTH_OFFICIAL
Instruments: EXPERIENCE EXPER2 educexp YOSCHOOLING tradecert MARRIED_DUMMY
KIDS weeks hours ALLOPHONE FRENCH_ONLY NEITHER_OFFICIAL
senior_management management business financial clerical
science health technical social teaching art_sports sales
supervisors food protective childcare travel transportation

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construction trade operators primary female femalekids citizen
immigrant YRIMMIG61 YRIMMIG70 YRIMMIG80 YRIMMIG90 YRIMMIG95
YRIMMIG01 mtenglish mtfrench woftenenglish woftenfrench
woftenboth wregularenglish wregularfrench wregularboth
hoftenenglish hoftenfrench hoftenboth hregularenglish
hregularfrench hregularboth

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Quebec city

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ivreg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks hou
> rs ALLOPHONE FRENCH_ONLY (BOTH_OFFICIAL=immigrant YRIMMIG* mtenglish mtfrench
> woftenenglish woftenfrench woftenboth wregularenglish wregularfrench
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> oth hoftenenglish hoftenfrench hoftenboth hregularenglish hregularfrench
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> larboth) NEITHER_OFFICIAL senior_management management business financial
cler
> ical science health technical social teaching art_sports sales supervisors
foo
> d protective childcare travel transportation construction trade operators
prim
> ary female femalekids citizen immigrant YRIMMIG* if quebeccity==1 & MOB5P!=9
&
> KIDS!=. & EXPERIENCE>=0

```

Instrumental variables (2SLS) regression

Source	SS	df	MS	Number of obs =	7301
Model	5236.89169	45	116.375371	F(45, 7255) =	158.19
Residual	5336.05849	7255	.735500825	Prob > F	= 0.0000
				R-squared	= 0.4953
				Adj R-squared	= 0.4922
Total	10572.9502	7300	1.44834934	Root MSE	= .85761

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
BOTH_OFFICIAL	.4047556	1.319106	0.31	0.759	-2.181075	2.990586
EXPERIENCE	.0955247	.0063604	15.02	0.000	.0830563	.107993
EXPER2	-.0009594	.0000769	-12.47	0.000	-.0011102	-.0008085
educexp	-.0025816	.0002729	-9.46	0.000	-.0031166	-.0020466
YOSCHOOLING	.1147171	.0070159	16.35	0.000	.1009639	.1284704
tradecert	-.0695758	.0281535	-2.47	0.013	-.1247648	-.0143868
MARRIED_DUMMY	.1256738	.0284352	4.42	0.000	.0699324	.1814151
KIDS	.0217194	.0308603	0.70	0.482	-.0387759	.0822146
weeks	.0284388	.0008709	32.65	0.000	.0267315	.030146
hours	.0074804	.0007394	10.12	0.000	.006031	.0089299
ALLOPHONE	-.1805819	.1092304	-1.65	0.098	-.3947052	.0335414
FRENCH_ONLY	.3269973	1.316986	0.25	0.804	-2.254678	2.908673
NEITHER_OFF~L	.2824708	1.594301	0.18	0.859	-2.842823	3.407764
senior_mana~t	.3650292	.0941946	3.88	0.000	.1803805	.549678
management	.2171274	.0657834	3.30	0.001	.0881729	.3460819
business	.1902162	.0816106	2.33	0.020	.0302357	.3501967
financial	.02942	.0658739	0.45	0.655	-.0997121	.1585521
clerical	-.1010079	.0602951	-1.68	0.094	-.219204	.0171881
science	.1622121	.0635189	2.55	0.011	.0376965	.2867276
health	.3423566	.0781304	4.38	0.000	.1891983	.495515
technical	-.0379563	.0774654	-0.49	0.624	-.189811	.1138984
social	.0371859	.0691834	0.54	0.591	-.0984338	.1728055
teaching	.1908572	.0725301	2.63	0.009	.0486772	.3330373
art_sports	-.2507692	.0787604	-3.18	0.001	-.4051625	-.0963759
sales	.0974204	.0823581	1.18	0.237	-.0640253	.2588662
supervisors	-.3496716	.0655878	-5.33	0.000	-.4782429	-.2211003

food	-.2201821	.0731278	-3.01	0.003	-.3635339	-.0768303
protective	.0997276	.0792844	1.26	0.208	-.055693	.2551482
childcare	-.6977416	.1174282	-5.94	0.000	-.927935	-.4675481
travel	-.4131757	.0614772	-6.72	0.000	-.533689	-.2926624
transportat-n	.2471212	.1333771	1.85	0.064	-.0143368	.5085791
construction	.1635945	.0922729	1.77	0.076	-.0172873	.3444762
trade	.0373527	.068255	0.55	0.584	-.0964469	.1711523
operators	-.0871864	.0650736	-1.34	0.180	-.2147497	.0403769
primary	-.2918526	.1230781	-2.37	0.018	-.5331215	-.0505836
female	-.2341748	.031587	-7.41	0.000	-.2960944	-.1722552
femalekids	-.0351788	.0410972	-0.86	0.392	-.1157414	.0453837
citizen	.2003252	.1833505	1.09	0.275	-.1590952	.5597455
immigrant	-.1336448	.3127331	-0.43	0.669	-.7466926	.479403
YRIMMIG61	.2725035	.3734889	0.73	0.466	-.4596434	1.00465
YRIMMIG70	.1377326	.335198	0.41	0.681	-.519353	.7948182
YRIMMIG80	.0816288	.3421558	0.24	0.811	-.5890962	.7523538
YRIMMIG90	.2926198	.3193762	0.92	0.360	-.3334506	.9186901
YRIMMIG95	.0848985	.330056	0.26	0.797	-.5621074	.7319044
YRIMMIG01	-.2688895	.3162611	-0.85	0.395	-.8888532	.3510742
_cons	5.599662	1.280476	4.37	0.000	3.089556	8.109767

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Instrumented: BOTH_OFFICIAL
Instruments: EXPERIENCE EXPER2 educexp YOSCHOOLING tradecert MARRIED_DUMMY
              KIDS weeks hours ALLOPHONE FRENCH_ONLY NEITHER_OFFICIAL
              senior_management management business financial clerical
              science health technical social teaching art_sports sales
              supervisors food protective childcare travel transportation
              construction trade operators primary female femalekids citizen
              immigrant YRIMMIG61 YRIMMIG70 YRIMMIG80 YRIMMIG90 YRIMMIG95
              YRIMMIG01 mtenglish mtfrench woftenenglish woftenfrench
              woftenboth wregularenglish wregularfrench wregularboth
              hoftenenglish hoftenfrench hoftenboth hregularenglish
              hregularfrench hregularboth
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Instrument Validity Test

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. ivreg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hou
> rs ALLOPHONE FRENCH_ONLY (BOTH_OFFICIAL=immigrant YRIMMIG* mtenglish mtfrench
> woftenenglish woftenfrench woftenboth wregularenglish wregularfrench
wregularb
> oth hoftenenglish hoftenfrench hoftenboth hregularenglish hregularfrench
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> larboth) NEITHER_OFFICIAL senior_management management business financial
cler
> ical science health technical social teaching art_sports sales supervisors
foo
> d protective childcare travel transportation construction trade operators
prim
> ary female femalekids citizen immigrant YRIMMIG* if montreal==1 & MOB5P!=9 &
K
> IDS!=. & EXPERIENCE>=0

```

Instrumental variables (2SLS) regression

Source	SS	df	MS	Number of obs	=	36142
Model	26016.2477	45	578.138838	F(45, 36096)	=	708.63
Residual	29499.4036	36096	.817248549	Prob > F	=	0.0000
				R-squared	=	0.4686
				Adj R-squared	=	0.4680
				Root MSE	=	.90402
Total	55515.6513	36141	1.53608509			

LNWAGE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
BOTH_OFFICIAL	.2742367	.0422465	6.49	0.000	.1914324	.357041
EXPERIENCE	.0704287	.0027141	25.95	0.000	.065109	.0757484
EXPER2	-.0007412	.0000333	-22.26	0.000	-.0008064	-.0006759
educexp	-.0017137	.0001172	-14.62	0.000	-.0019435	-.0014839
YOSCHOOLING	.0912323	.0030968	29.46	0.000	.0851625	.097302
tradecert	-.0398415	.0138737	-2.87	0.004	-.0670343	-.0126486
MARRIED_DUMMY	.1424805	.0132659	10.74	0.000	.1164789	.1684821
KIDS	.0844048	.0147774	5.71	0.000	.0554407	.1133689
weeks	.031574	.0003915	80.65	0.000	.0308067	.0323413
hours	.0077094	.0003282	23.49	0.000	.0070661	.0083527
ALLOPHONE	-.0767487	.0170251	-4.51	0.000	-.1101185	-.0433789
FRENCH_ONLY	.193118	.0402551	4.80	0.000	.1142168	.2720192
NEITHER_OFF-L	.2332314	.0795322	2.93	0.003	.077346	.3891168
senior_mana-t	.4375367	.0439982	9.94	0.000	.3512989	.5237746
management	.2234191	.0273309	8.17	0.000	.1698497	.2769886
business	.2717372	.0366497	7.41	0.000	.1999028	.3435716
financial	-.0423804	.0295587	-1.43	0.152	-.1003163	.0155555
clerical	-.0919283	.0255974	-3.59	0.000	-.1421	-.0417565
science	.2511318	.0287076	8.75	0.000	.1948641	.3073996
health	.21783	.0390003	5.59	0.000	.1413882	.2942718
technical	-.1059828	.0362946	-2.92	0.004	-.1771214	-.0348442
social	.0235539	.0335026	0.70	0.482	-.0421122	.0892201
teaching	.1686534	.0327883	5.14	0.000	.1043873	.2329195
art_sports	-.154919	.034882	-4.44	0.000	-.2232886	-.0865493
sales	.0774987	.0358386	2.16	0.031	.007254	.1477434
supervisors	-.3301214	.0292699	-11.28	0.000	-.3874912	-.2727515
food	-.3650146	.0356912	-10.23	0.000	-.4349703	-.2950588
protective	.0943045	.0436661	2.16	0.031	.0087177	.1798913
childcare	-.6564495	.0527993	-12.43	0.000	-.7599378	-.5529612
travel	-.3801178	.0267773	-14.20	0.000	-.432602	-.3276336
transportat-n	.2087824	.0558798	3.74	0.000	.0992563	.3183085
construction	.0538488	.0441257	1.22	0.222	-.0326389	.1403366
trade	.0589658	.0305115	1.93	0.053	-.0008377	.1187694
operators	-.0741686	.0261327	-2.84	0.005	-.1253894	-.0229478
primary	-.2662254	.0656761	-4.05	0.000	-.3949526	-.1374982
female	-.1579619	.0148554	-10.63	0.000	-.1870789	-.128845
femalekids	-.0967464	.0194485	-4.97	0.000	-.1348661	-.0586267
citizen	.0109284	.0331567	0.33	0.742	-.0540598	.0759165
immigrant	-.2275938	.074335	-3.06	0.002	-.3732926	-.0818949
YRIMMIG61	.2415869	.0823221	2.93	0.003	.0802332	.4029407
YRIMMIG70	.2010371	.0768306	2.62	0.009	.0504469	.3516273
YRIMMIG80	.1544252	.0753467	2.05	0.040	.0067433	.302107
YRIMMIG90	.071681	.0740515	0.97	0.333	-.0734622	.2168241
YRIMMIG95	.0201808	.0746465	0.27	0.787	-.1261286	.1664902
YRIMMIG01	-.1184225	.0711184	-1.67	0.096	-.2578167	.0209717
_cons	6.244251	.0688058	90.75	0.000	6.109389	6.379112

Instrumented: BOTH_OFFICIAL
Instruments: EXPERIENCE EXPER2 educexp YOSCHOOLING tradecert MARRIED_DUMMY
KIDS weeks hours ALLOPHONE FRENCH_ONLY NEITHER_OFFICIAL
senior_management management business financial clerical
science health technical social teaching art_sports sales
supervisors food protective childcare travel transportation
construction trade operators primary female femalekids citizen
immigrant YRIMMIG61 YRIMMIG70 YRIMMIG80 YRIMMIG90 YRIMMIG95
YRIMMIG01 mtenenglish mtfrench wofthenenglish wofthenfrench
wofthenboth wregularenglish wregularfrench wregularboth
hofthenenglish hofthenfrench hofthenboth hregularenglish
hregularfrench hregularboth

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. predict ehat, resid
(455156 missing values generated)

. reg ehat EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks hours
A
> LLOPHONE FRENCH_ONLY immigrant YRIMMIG* mtenglish mtfrench woftenenglish
wofte
> nfrench woftenboth wregularenglish wregularfrench wregularboth hoftenenglish
h
> oftenfrench hoftenboth hregularenglish hregularfrench hregularboth
NEITHER_OFF
> ICIAL senior_management management business financial clerical science health
> technical social teaching art_sports sales supervisors food protective
childca
> re travel transportation construction trade operators primary female
femalekid
> s citizen immigrant YRIMMIG* if montreal==1 & MOB5P!=9 & KIDS!=. &
EXPERIENCE>
> =0
note: YRIMMIG80 omitted because of collinearity
note: YRIMMIG95 omitted because of collinearity
note: immigrant omitted because of collinearity
note: YRIMMIG61 omitted because of collinearity
note: YRIMMIG70 omitted because of collinearity
note: YRIMMIG90 omitted because of collinearity
note: YRIMMIG01 omitted because of collinearity

```

Source	SS	df	MS	Number of obs =	36142
Model	105.425576	58	1.81768235	F(58, 36083) =	2.23
Residual	29393.978	36083	.814621235	Prob > F	= 0.0000
				R-squared	= 0.0036
				Adj R-squared	= 0.0020
Total	29499.4036	36141	.816230973	Root MSE	= .90256

ehat	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
EXPERIENCE	-.0001234	.0027136	-0.05	0.964	-.0054423 .0051954
EXPER2	-2.05e-06	.0000333	-0.06	0.951	-.0000673 .0000632
educexp	.0000227	.0001173	0.19	0.846	-.0002072 .0002526
YOSCHOOLING	-.0016822	.0030939	-0.54	0.587	-.0077464 .0043821
tradecert	.0001565	.0138652	0.01	0.991	-.0270197 .0273327
MARRIED_DUMMY	-.0071343	.0133001	-0.54	0.592	-.033203 .0189343
KIDS	-.0014622	.0147647	-0.10	0.921	-.0304015 .027477
weeks	.0001668	.0003978	0.42	0.675	-.0006129 .0009464
hours	-.0001393	.0003286	-0.42	0.672	-.0007833 .0005048
ALLOPHONE	-.0660305	.0670549	-0.98	0.325	-.1974601 .065399
FRENCH_ONLY	.0352213	.0130043	2.71	0.007	.0097324 .0607102
immigrant	.0173199	.0735712	0.24	0.814	-.1268818 .1615215
YRIMMIG61	-.0147793	.0819932	-0.18	0.857	-.1754883 .1459297
YRIMMIG70	-.0108933	.0764644	-0.14	0.887	-.1607657 .1389792
YRIMMIG80	0	(omitted)			
YRIMMIG90	.0119751	.073819	0.16	0.871	-.1327122 .1566625
YRIMMIG95	0	(omitted)			
YRIMMIG01	.0108656	.0710925	0.15	0.879	-.1284778 .1502089
mtenglish	-.1306509	.0633182	-2.06	0.039	-.2547564 -.0065454
mtfrench	-.0547657	.0652743	-0.84	0.401	-.1827052 .0731739
woftenenglish	-.0204136	.034376	-0.59	0.553	-.0877917 .0469644
woftenfrench	-.126237	.031428	-4.02	0.000	-.1878367 -.0646373
woftenboth	-.1135601	.035068	-3.24	0.001	-.1822945 -.0448258
wregulareng-h	.0959311	.0130919	7.33	0.000	.0702705 .1215916
wregularfre-h	.0593223	.0224271	2.65	0.008	.0153645 .1032801

wregularboth		.0942001	.2151994	0.44	0.662	-.3275971	.5159973
hoftenenglish		.0569474	.0256817	2.22	0.027	.0066105	.1072843
hoftenfrench		.0726964	.0267981	2.71	0.007	.0201714	.1252214
hoftenboth		.0197163	.0508206	0.39	0.698	-.0798935	.1193262
hregulareng~h		.0056947	.0191816	0.30	0.767	-.0319018	.0432913
hregularfre~h		-.0024971	.0237454	-0.11	0.916	-.0490388	.0440445
hregularboth		.0634646	.0640367	0.99	0.322	-.0620493	.1889785
NEITHER_OFF~L		-.0047506	.0749775	-0.06	0.949	-.1517087	.1422074
senior_mana~t		.0007789	.0446159	0.02	0.986	-.0866695	.0882273
management		.0043212	.0284353	0.15	0.879	-.0514128	.0600551
business		.0045459	.0374818	0.12	0.903	-.0689196	.0780114
financial		.007773	.0306423	0.25	0.800	-.0522869	.0678328
clerical		.0067166	.0268849	0.25	0.803	-.0459786	.0594118
science		-.000494	.0298627	-0.02	0.987	-.0590257	.0580377
health		.0141402	.0398398	0.35	0.723	-.063947	.0922274
technical		.0142225	.0371835	0.38	0.702	-.0586582	.0871032
social		.0235804	.0344174	0.69	0.493	-.0438786	.0910394
teaching		.0303502	.0338165	0.90	0.369	-.0359312	.0966316
art_sports		.0149268	.0357697	0.42	0.676	-.0551828	.0850364
sales		.0015325	.0366785	0.04	0.967	-.0703585	.0734234
supervisors		.0091848	.0304734	0.30	0.763	-.050544	.0689137
food		.0142033	.0364436	0.39	0.697	-.0572272	.0856339
protective		.0151716	.0443318	0.34	0.732	-.07172	.1020632
childcare		.0276804	.0534793	0.52	0.605	-.0771407	.1325015
travel		.0171924	.0279358	0.62	0.538	-.0375625	.0719473
transportat~n		.0135151	.0563476	0.24	0.810	-.0969279	.123958
construction		.0268377	.0447098	0.60	0.548	-.0607948	.1144703
trade		.0188197	.0314391	0.60	0.549	-.0428019	.0804413
operators		.0185559	.0271866	0.68	0.495	-.0347307	.0718424
primary		.028052	.0661308	0.42	0.671	-.1015664	.1576704
female		-.0008241	.0148372	-0.06	0.956	-.0299055	.0282573
femalekids		.0002571	.0194238	0.01	0.989	-.0378142	.0383284
citizen		.0015833	.0330911	0.05	0.962	-.0632761	.0664428
immigrant		0	(omitted)				
YRIMMIG61		0	(omitted)				
YRIMMIG70		0	(omitted)				
YRIMMIG80		.003148	.0749312	0.04	0.966	-.1437195	.1500155
YRIMMIG90		0	(omitted)				
YRIMMIG95		.0139171	.0745374	0.19	0.852	-.1321785	.1600126
YRIMMIG01		0	(omitted)				
_cons		.0702644	.0924958	0.76	0.447	-.1110301	.2515589

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. di 0.0036*36142
130.1112
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. di "chi-squared (14-1): " 24.996
chi-squared (14-1): 24.996
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Regression output for controlling different intercepts of the major cities

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE FRENCH_ONLY BOTH_OFFICIAL NEITHER_OFFICIAL senior_management
manage
> ment business financial clerical science health technical social teaching
art_
> sports sales supervisors food protective childcare travel transportation
const
> ruuction trade operators primary female femalekids citizen immigrant YRIMMIG*
i
> .majorcities if MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression

Number of obs = 334290
 F(54,334235) = 4985.84
 Prob > F = 0.0000
 R-squared = 0.5111
 Root MSE = .92412

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.096906	.0011052	87.68	0.000	.0947397	.0990722
EXPER2	-.0009983	.0000145	-68.84	0.000	-.0010267	-.0009699
educexp	-.0028561	.0000481	-59.35	0.000	-.0029504	-.0027618
YOSCHOOLING	.1154542	.0011939	96.70	0.000	.1131141	.1177943
tradecert	-.0089605	.0044031	-2.04	0.042	-.0175904	-.0003305
MARRIED_DUMMY	.1619071	.0049224	32.89	0.000	.1522593	.1715549
KIDS	.0632542	.0049551	12.77	0.000	.0535424	.072966
weeks	.0322197	.0001686	191.13	0.000	.0318893	.0325501
hours	.0070494	.000112	62.92	0.000	.0068298	.007269
ALLOPHONE	-.0627668	.0059259	-10.59	0.000	-.0743814	-.0511522
FRENCH_ONLY	-.0758738	.0062853	-12.07	0.000	-.0881927	-.0635548
BOTH_OFFICIAL	.0040188	.0048894	0.82	0.411	-.0055643	.0136018
NEITHER_OFF-L	-.1091227	.0257276	-4.24	0.000	-.159548	-.0586973
senior_mana-t	.3989652	.0157997	25.25	0.000	.3679983	.4299322
management	.1480038	.0106978	13.83	0.000	.1270363	.1689712
business	.2376708	.0130706	18.18	0.000	.2120528	.2632887
financial	-.0180096	.0114713	-1.57	0.116	-.0404931	.0044738
clerical	-.1035969	.0106156	-9.76	0.000	-.1244032	-.0827906
science	.2123636	.0109878	19.33	0.000	.1908279	.2338994
health	.1971181	.0137433	14.34	0.000	.1701817	.2240546
technical	-.079547	.0134551	-5.91	0.000	-.1059187	-.0531754
social	-.0887333	.0129924	-6.83	0.000	-.1141981	-.0632684
teaching	.1236524	.0121221	10.20	0.000	.0998935	.1474113
art_sports	-.2539472	.0153761	-16.52	0.000	-.284084	-.2238105
sales	.0675805	.0136566	4.95	0.000	.040814	.094347
supervisors	-.3761664	.0115313	-32.62	0.000	-.3987674	-.3535655
food	-.4095236	.0132898	-30.81	0.000	-.4355712	-.3834761
protective	.0413071	.0147919	2.79	0.005	.0123154	.0702988
childcare	-.6116144	.0173597	-35.23	0.000	-.6456389	-.5775898
travel	-.4267506	.0110673	-38.56	0.000	-.4484422	-.405059
transportat-n	.182346	.0181506	10.05	0.000	.1467713	.2179207
construction	-.0201924	.0148449	-1.36	0.174	-.049288	.0089032
trade	.0588847	.0114825	5.13	0.000	.0363793	.0813902
operators	-.01965	.0106301	-1.85	0.065	-.0404846	.0011846
primary	-.242641	.0140863	-17.23	0.000	-.2702498	-.2150322
female	-.219249	.0052143	-42.05	0.000	-.2294688	-.2090291
femalekids	-.122766	.0065024	-18.88	0.000	-.1355106	-.1100215
citizen	.0122708	.0108674	1.13	0.259	-.0090291	.0335706
immigrant	-.2236758	.0361806	-6.18	0.000	-.2945886	-.1527629
YRIMMIG61	.2935919	.0380244	7.72	0.000	.2190653	.3681186
YRIMMIG70	.2438836	.0368686	6.61	0.000	.1716222	.3161451
YRIMMIG80	.1924318	.0363194	5.30	0.000	.1212469	.2636167
YRIMMIG90	.0897442	.036389	2.47	0.014	.0184229	.1610656
YRIMMIG95	-.0142081	.0366692	-0.39	0.698	-.0860786	.0576624
YRIMMIG01	-.1369075	.0361495	-3.79	0.000	-.2077594	-.0660556
majorcities						
1	.1921577	.0050691	37.91	0.000	.1822225	.2020929
2	.0774756	.0062429	12.41	0.000	.0652397	.0897115
3	.1625302	.0068713	23.65	0.000	.1490626	.1759978
4	.1372452	.0087726	15.64	0.000	.1200512	.1544391
5	.1071213	.0085802	12.48	0.000	.0903044	.1239383

6		.0489127	.008744	5.59	0.000	.0317747	.0660507
7		.0423429	.0109748	3.86	0.000	.0208326	.0638531
8		.0031933	.0102068	0.31	0.754	-.0168116	.0231983
9		.1081524	.0104835	10.32	0.000	.087605	.1286998
_cons		6.039782	.0220833	273.50	0.000	5.996499	6.083064

Output table of regressions on all major cities after inclusion of bilingual

VARIABLES	(2) LNWAGE	(3) LNWAGE	(4) LNWAGE	(5) LNWAGE	(6) LNWAGE	(7) LNWAGE	(8) LNWAGE	(9) LNWAGE	(10) LNWAGE
EXPERIENCE	0.0949*** (0.00221)	0.0710*** (0.00322)	0.0973*** (0.00345)	0.108*** (0.00491)	0.0999*** (0.00464)	0.105*** (0.00471)	0.0997*** (0.00949)	0.0868*** (0.00546)	0.109*** (0.00562)
EXPER2	-0.000934*** (2.75e-05)	-0.000766*** (3.89e-05)	-0.000992*** (4.19e-05)	-0.00110*** (6.11e-05)	-0.00109*** (5.87e-05)	-0.00110*** (6.01e-05)	-0.00107*** (0.000113)	-0.000883*** (6.74e-05)	-0.000957*** (7.10e-05)
educexp	-0.00290*** (9.48e-05)	-0.00165*** (0.000139)	-0.00283*** (0.000154)	-0.00305*** (0.000216)	-0.00286*** (0.000212)	-0.00308*** (0.000215)	-0.00262*** (0.000408)	-0.00243*** (0.000255)	-0.00366*** (0.000253)
YOSCHOOLING	0.116*** (0.00252)	0.0919*** (0.00365)	0.110*** (0.00403)	0.124*** (0.00549)	0.108*** (0.00538)	0.112*** (0.00540)	0.106*** (0.0102)	0.112*** (0.00662)	0.142*** (0.00670)
tradecert	-0.0261** (0.0120)	-0.0347** (0.0164)	-0.0194 (0.0171)	-0.0601** (0.0261)	-0.0362 (0.0233)	0.0210 (0.0233)	-0.106** (0.0457)	0.0157 (0.0279)	-0.00509 (0.0293)
MARRIED_DUMMY	0.182*** (0.0115)	0.156*** (0.0156)	0.165*** (0.0183)	0.182*** (0.0249)	0.176*** (0.0245)	0.155*** (0.0244)	0.182*** (0.0415)	0.199*** (0.0287)	0.128*** (0.0305)
KIDS	0.0132 (0.0127)	0.0921*** (0.0170)	0.0537*** (0.0194)	0.0679*** (0.0259)	0.0617** (0.0255)	0.122*** (0.0264)	0.0152 (0.0434)	0.0701** (0.0315)	0.127*** (0.0325)
weeks	0.0315*** (0.000322)	0.0322*** (0.000468)	0.0338*** (0.000487)	0.0316*** (0.000716)	0.0351*** (0.000688)	0.0358*** (0.000667)	0.0301*** (0.00127)	0.0321*** (0.000824)	0.0325*** (0.000838)
hours	0.00759*** (0.000254)	0.00768*** (0.000382)	0.00766*** (0.000381)	0.00794*** (0.000568)	0.00731*** (0.000509)	0.00711*** (0.000505)	0.00624*** (0.00106)	0.00889*** (0.000625)	0.00811*** (0.000647)
ALLOPHONE	-0.0230 (0.0160)	-0.0233 (0.0238)	-0.0474* (0.0268)	-0.0484 (0.0444)	-0.119*** (0.0427)	0.00357 (0.0415)	-0.156 (0.149)	-0.00627 (0.0477)	0.0130 (0.0511)
BOTH_OFFICIAL	0.0329** (0.0142)	0.142*** (0.0228)	-0.0214 (0.0235)	0.0751*** (0.0175)	-0.00479 (0.0303)	0.0154 (0.0318)	0.670 (0.422)	-0.0116 (0.0316)	-0.0354 (0.0390)
NEITHER_OFFICIAL	-0.174*** (0.0354)	0.0753 (0.0770)	-0.243*** (0.0494)	-0.0613 (0.143)	-0.140 (0.0931)	-0.180 (0.124)	0.353 (0.944)	-0.555*** (0.154)	-0.252 (0.154)
bilingual	-0.0345** (0.0154)	-0.0525** (0.0207)	-0.100*** (0.0257)	-0.0316 (0.0367)	-0.0329 (0.0393)	-0.0344 (0.0377)	-0.0279 (0.0587)	-0.0402 (0.0433)	-0.0429 (0.0455)
senior_management	0.527*** (0.0345)	0.513*** (0.0494)	0.328*** (0.0563)	0.222*** (0.0772)	0.529*** (0.0704)	0.321*** (0.0848)	0.340** (0.138)	0.544*** (0.104)	0.487*** (0.105)
management	0.175*** (0.0216)	0.276*** (0.0336)	0.0343 (0.0350)	0.115** (0.0576)	0.231*** (0.0501)	0.0920* (0.0505)	0.183 (0.119)	0.0988 (0.0625)	0.110** (0.0548)
business	0.260*** (0.0279)	0.330*** (0.0426)	0.165*** (0.0474)	0.0711 (0.0707)	0.339*** (0.0606)	0.122* (0.0705)	0.143 (0.134)	0.172** (0.0801)	0.170** (0.0830)
financial	-0.0262 (0.0244)	-0.0116 (0.0366)	-0.112*** (0.0389)	-0.154** (0.0610)	0.110** (0.0546)	-0.0537 (0.0557)	-0.0908 (0.122)	-0.0254 (0.0694)	-0.0979 (0.0628)
clerical	-0.133*** (0.0206)	-0.0706** (0.0325)	-0.199*** (0.0345)	-0.244*** (0.0567)	-0.0624 (0.0489)	-0.178*** (0.0491)	-0.257** (0.117)	-0.0967* (0.0578)	-0.254*** (0.0535)
science	0.205*** (0.0229)	0.286*** (0.0348)	0.141*** (0.0381)	0.183*** (0.0574)	0.340*** (0.0507)	0.153*** (0.0541)	0.0511 (0.116)	0.154** (0.0670)	0.107* (0.0604)
health	0.0568* (0.0338)	0.209*** (0.0471)	0.0669 (0.0501)	-0.0584 (0.0747)	0.195*** (0.0716)	0.198*** (0.0671)	0.224* (0.134)	0.136* (0.0782)	0.115 (0.0792)
technical	-0.150*** (0.0346)	-0.114** (0.0474)	-0.0901* (0.0489)	-0.424*** (0.0785)	-0.0271 (0.0696)	-0.0889 (0.0657)	-0.141 (0.142)	-0.139* (0.0751)	-0.177** (0.0745)
social	-0.120*** (0.0277)	0.0708* (0.0411)	-0.295*** (0.0439)	-0.0694 (0.0637)	-0.0245 (0.0603)	-0.207*** (0.0599)	-0.00401 (0.122)	-0.270*** (0.0710)	-0.261*** (0.0703)
teaching	-0.0219 (0.0282)	0.164*** (0.0398)	-0.00553 (0.0445)	-0.104 (0.0655)	0.137** (0.0622)	-0.00885 (0.0621)	0.0377 (0.123)	0.0873 (0.0729)	-0.0581 (0.0684)

art_sports	-0.207*** (0.0295)	-0.111*** (0.0409)	-0.289*** (0.0461)	-0.302*** (0.0681)	-0.157** (0.0696)	-0.380*** (0.0718)	-0.390*** (0.126)	-0.216** (0.0848)	-0.406*** (0.0830)
sales	0.0289 (0.0297)	0.139*** (0.0413)	-0.0673 (0.0472)	0.0647 (0.0819)	0.182*** (0.0671)	0.0973 (0.0698)	-0.000955 (0.132)	0.0774 (0.0858)	-0.0129 (0.0740)
supervisors	-0.413*** (0.0236)	-0.286*** (0.0371)	-0.412*** (0.0371)	-0.493*** (0.0608)	-0.314*** (0.0535)	-0.397*** (0.0525)	-0.509*** (0.123)	-0.423*** (0.0641)	-0.556*** (0.0570)
food	-0.452*** (0.0303)	-0.341*** (0.0443)	-0.403*** (0.0423)	-0.476*** (0.0717)	-0.480*** (0.0593)	-0.554*** (0.0601)	-0.271** (0.137)	-0.444*** (0.0741)	-0.567*** (0.0764)
protective	-0.0733* (0.0390)	0.149*** (0.0531)	-0.0521 (0.0612)	-0.00439 (0.0763)	-0.0285 (0.0846)	-0.0322 (0.0764)	0.00505 (0.133)	0.00924 (0.0885)	-0.0799 (0.0903)
childcare	-0.614*** (0.0391)	-0.613*** (0.0707)	-0.570*** (0.0554)	-0.944*** (0.0935)	-0.653*** (0.0771)	-0.639*** (0.0785)	-0.916*** (0.207)	-0.489*** (0.0840)	-0.668*** (0.0915)
travel	-0.443*** (0.0220)	-0.331*** (0.0349)	-0.373*** (0.0345)	-0.570*** (0.0589)	-0.438*** (0.0495)	-0.518*** (0.0486)	-0.532*** (0.121)	-0.417*** (0.0590)	-0.569*** (0.0535)
transportation	0.181*** (0.0502)	0.258*** (0.0694)	0.0492 (0.0848)	-0.164 (0.121)	0.136 (0.0939)	0.162* (0.0916)	0.0846 (0.265)	0.0962 (0.122)	0.175 (0.133)
construction	0.00106 (0.0372)	-0.0132 (0.0589)	-0.257*** (0.0552)	-0.269*** (0.0848)	0.0225 (0.0716)	-0.0823 (0.0684)	0.00813 (0.207)	-0.0407 (0.0938)	-0.132 (0.0824)
trade	0.0360 (0.0259)	0.0635 (0.0402)	-0.0508 (0.0422)	-0.147** (0.0722)	0.0322 (0.0570)	0.00174 (0.0532)	-0.146 (0.141)	-0.104 (0.0662)	-0.0383 (0.0582)
operators	-0.109*** (0.0214)	-0.0636* (0.0345)	-0.0552 (0.0377)	-0.269*** (0.0634)	-0.158*** (0.0534)	-0.0891* (0.0531)	-0.300** (0.130)	-0.131** (0.0602)	-0.150*** (0.0529)
primary	-0.291*** (0.0487)	-0.155* (0.0886)	-0.158*** (0.0567)	-0.628*** (0.0989)	-0.225*** (0.0767)	-0.204*** (0.0691)	-0.166 (0.224)	-0.371*** (0.110)	-0.337*** (0.0934)
female	-0.167*** (0.0121)	-0.105*** (0.0172)	-0.109*** (0.0185)	-0.0953*** (0.0257)	-0.214*** (0.0249)	-0.223*** (0.0260)	-0.248*** (0.0443)	-0.250*** (0.0308)	-0.207*** (0.0315)
femalekids	-0.0574*** (0.0161)	-0.113*** (0.0228)	-0.155*** (0.0252)	-0.133*** (0.0339)	-0.142*** (0.0333)	-0.175*** (0.0340)	-0.000937 (0.0599)	-0.0578 (0.0405)	-0.248*** (0.0414)
citizen	0.0332** (0.0159)	0.0516 (0.0373)	-0.0110 (0.0270)	-0.0186 (0.0597)	-0.00903 (0.0462)	-0.0771 (0.0526)	0.415* (0.229)	-0.0344 (0.0689)	0.0237 (0.0594)
immigrant	-0.233*** (0.0515)	-0.202** (0.0824)	-0.153* (0.0829)	-0.340** (0.141)	-0.0657 (0.124)	-0.455*** (0.145)	-0.114 (0.360)	-0.302 (0.216)	-0.225 (0.185)
YRIMMIG61	0.288*** (0.0557)	0.218** (0.0904)	0.277*** (0.0914)	0.338** (0.152)	0.287** (0.137)	0.549*** (0.157)	0.395 (0.404)	0.258 (0.226)	0.255 (0.191)
YRIMMIG70	0.233*** (0.0529)	0.159* (0.0853)	0.201** (0.0866)	0.351** (0.146)	0.105 (0.131)	0.447*** (0.151)	0.126 (0.386)	0.351 (0.222)	0.237 (0.186)
YRIMMIG80	0.166*** (0.0518)	0.141* (0.0840)	0.164** (0.0833)	0.347** (0.143)	0.0767 (0.124)	0.398*** (0.145)	0.0823 (0.393)	0.212 (0.215)	0.195 (0.186)
YRIMMIG90	0.0816 (0.0514)	0.0450 (0.0829)	0.0563 (0.0829)	0.233* (0.141)	0.0439 (0.124)	0.284** (0.144)	0.416 (0.359)	0.101 (0.216)	0.0527 (0.186)
YRIMMIG95	-0.0403 (0.0514)	-0.00355 (0.0839)	-0.0437 (0.0826)	0.127 (0.142)	-0.0555 (0.124)	0.150 (0.146)	0.394 (0.373)	-0.0177 (0.219)	-0.0351 (0.187)
YRIMMIG01	-0.144*** (0.0502)	-0.0481 (0.0798)	-0.174** (0.0804)	0.0302 (0.135)	-0.134 (0.121)	-0.0437 (0.145)	-0.227 (0.338)	-0.0199 (0.216)	-0.128 (0.186)
Constant	6.248*** (0.0427)	6.212*** (0.0726)	6.241*** (0.0679)	5.983*** (0.108)	6.096*** (0.0950)	6.085*** (0.0982)	5.295*** (0.514)	6.120*** (0.121)	5.800*** (0.116)
Observations	54,992	25,661	21,403	11,643	11,756	11,329	3,005	7,906	7,693
R-squared	0.490	0.483	0.517	0.543	0.570	0.576	0.569	0.538	0.550

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p

Regression output for city dummies and interactions with bilinguals

```
. reg LNWAGE EXPER* educexp YOSCHOOLING tradecert MARRIED_DUMMY KIDS weeks
hours
> ALLOPHONE NEITHER_OFFICIAL senior_management management business financial
cl
> erical science health technical social teaching art_sports sales supervisors
f
> ood protective childcare travel transportation construction trade operators
pr
```

```
> imary female femalekids citizen immigrant YRIMMIG* majorcities##bilingual
majo
> rcities##BOTH_OFFICIAL if MOB5P!=9 & KIDS!=. & EXPERIENCE>=0, robust
```

Linear regression

```
Number of obs = 298531
F( 72,298458) = 3466.82
Prob > F      = 0.0000
R-squared     = 0.5216
Root MSE     = .91886
```

LNWAGE	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EXPERIENCE	.0984753	.0011587	84.99	0.000	.0962044	.1007463
EXPER2	-.0010131	.0000153	-66.42	0.000	-.001043	-.0009832
educexp	-.0029198	.0000508	-57.49	0.000	-.0030193	-.0028202
YOSCHOOLING	.1167622	.0012598	92.68	0.000	.114293	.1192313
tradecert	-.0122123	.0046547	-2.62	0.009	-.0213354	-.0030891
MARRIED_DUMMY	.1683203	.0051929	32.41	0.000	.1581424	.1784982
KIDS	.0654773	.0052041	12.58	0.000	.0552774	.0756772
weeks	.0325893	.0001788	182.22	0.000	.0322387	.0329398
hours	.0071083	.0001174	60.53	0.000	.0068781	.0073385
ALLOPHONE	-.0297826	.0090102	-3.31	0.001	-.0474424	-.0121228
NEITHER_OFF~L	-.159286	.0272957	-5.84	0.000	-.2127849	-.1057872
senior_managt	.4049213	.0165583	24.45	0.000	.3724675	.4373751
management	.1449893	.0115017	12.61	0.000	.1224463	.1675322
business	.2361459	.0139342	16.95	0.000	.2088353	.2634566
financial	-.029009	.012389	-2.34	0.019	-.0532911	-.004727
clerical	-.1160859	.011492	-10.10	0.000	-.1386098	-.0935619
science	.2092521	.0118154	17.71	0.000	.1860942	.23241
health	.1724035	.0148475	11.61	0.000	.1433029	.2015041
technical	-.0896935	.014584	-6.15	0.000	-.1182778	-.0611093
social	-.1072906	.0140032	-7.66	0.000	-.1347364	-.0798448
teaching	.0959356	.0130517	7.35	0.000	.0703547	.1215166
art_sports	-.2629538	.0162537	-16.18	0.000	-.2948105	-.2310971
sales	.0659214	.0143533	4.59	0.000	.0377893	.0940535
supervisors	-.3816145	.0124106	-30.75	0.000	-.405939	-.3572901
food	-.4261827	.0142968	-29.81	0.000	-.454204	-.3981614
protective	.0391179	.0156595	2.50	0.012	.0084257	.0698102
childcare	-.6136679	.0184221	-33.31	0.000	-.6497746	-.5775612
travel	-.4313547	.0119766	-36.02	0.000	-.4548285	-.4078809
transportat~n	.1695939	.0195932	8.66	0.000	.1311918	.2079961
construction	-.0492947	.016055	-3.07	0.002	-.080762	-.0178273
trade	.0521384	.0124632	4.18	0.000	.0277109	.0765659
operators	-.0220478	.0115815	-1.90	0.057	-.0447473	.0006516
primary	-.2555773	.0152453	-16.76	0.000	-.2854575	-.225697
female	-.2037986	.0054612	-37.32	0.000	-.2145023	-.1930949
femalekids	-.1298131	.0068374	-18.99	0.000	-.1432142	-.1164119
citizen	.0179085	.011038	1.62	0.105	-.0037256	.0395426
immigrant	-.1982175	.0368043	-5.39	0.000	-.2703528	-.1260822
YRIMMIG61	.2713729	.0385753	7.03	0.000	.1957664	.3469794
YRIMMIG70	.2238825	.0374509	5.98	0.000	.1504798	.2972853
YRIMMIG80	.178198	.0368983	4.83	0.000	.1058784	.2505176
YRIMMIG90	.0788228	.0369945	2.13	0.033	.0063146	.151331
YRIMMIG95	-.0209659	.0372858	-0.56	0.574	-.094045	.0521132
YRIMMIG01	-.1306356	.0367226	-3.56	0.000	-.2026108	-.0586604
majorcities						
1	.1942555	.0062724	30.97	0.000	.1819617	.2065494
2	-.0504539	.0250878	-2.01	0.044	-.0996254	-.0012825
3	.1854067	.0083153	22.30	0.000	.1691089	.2017044
4	.1002958	.0135073	7.43	0.000	.0738218	.1267697

5		.1120295	.0097617	11.48	0.000	.0928969	.1311622
6		.051454	.0100627	5.11	0.000	.0317313	.0711767
7		-.4797632	.59109	-0.81	0.417	-1.638283	.6787567
8		.0086724	.0120294	0.72	0.471	-.0149049	.0322496
9		.1039287	.0117488	8.85	0.000	.0809014	.126956
1.bilingual		.0095178	.0104855	0.91	0.364	-.0110335	.0300692
majorcities#							
bilingual							
1 1		-.0687375	.0117571	-5.85	0.000	-.091781	-.0456939
2 1		-.0773916	.0156115	-4.96	0.000	-.1079896	-.0467936
3 1		-.1025463	.0157467	-6.51	0.000	-.1334092	-.0716833
4 1		-.0404746	.0235383	-1.72	0.086	-.086609	.0056599
5 1		-.0709755	.0224117	-3.17	0.002	-.1149018	-.0270493
6 1		-.0512378	.0222363	-2.30	0.021	-.0948204	-.0076552
7 1		-.0318288	.053935	-0.59	0.555	-.13754	.0738823
8 1		-.0665119	.0264591	-2.51	0.012	-.118371	-.0146529
9 1		-.0156544	.027495	-0.57	0.569	-.0695439	.0382351
1.BOTH_OFFI~L		-.0133654	.006644	-2.01	0.044	-.0263874	-.0003434
majorcities#							
BOTH_OFFICIAL							
1 1		.0671276	.0150308	4.47	0.000	.0376676	.0965875
2 1		.1624746	.0258467	6.29	0.000	.1118157	.2131335
3 1		-.0176423	.0252916	-0.70	0.485	-.067213	.0319285
4 1		.0865482	.018013	4.80	0.000	.0512432	.1218532
5 1		.0059215	.0297035	0.20	0.842	-.0522964	.0641395
6 1		.0011964	.0327222	0.04	0.971	-.0629382	.065331
7 1		.5401302	.5913135	0.91	0.361	-.6188277	1.699088
8 1		.0097895	.0330773	0.30	0.767	-.0550411	.07462
9 1		-.0295447	.0403648	-0.73	0.464	-.1086585	.0495691
_cons		5.989414	.0232158	257.99	0.000	5.943912	6.034917

Appendix C: Heckit regression output

VARIABLES	(1) LNWAGE	(2) select	(3) athrho	(4) lnsigma
EXPERIENCE	0.107*** (0.000740)			
EXPER2	-0.000795*** (8.79e-06)			
educexp	-0.00283*** (3.43e-05)			
YOSCHOOLING	0.0975*** (0.000993)	0.0583*** (0.000554)		
tradecert	-0.000787 (0.00394)			
MARRIED_DUMMY	-0.00401 (0.00532)	0.260*** (0.00521)		
KIDS	-0.148*** (0.00562)	0.411*** (0.00589)		
weeks	0.0246*** (0.000119)			
hours	0.00543*** (8.48e-05)			
ALLOPHONE	0.0160***			

	(0.00556)	
FRENCH_ONLY	-0.0338***	-0.0873***
	(0.00647)	(0.00726)
BOTH_OFFICIAL	0.00286	
	(0.00522)	
NEITHER_OFFICIAL	0.0382*	-0.160***
	(0.0203)	(0.0175)
senior_management	0.378***	
	(0.0138)	
management	0.0948***	
	(0.00803)	
business	0.153***	
	(0.0118)	
financial	-0.113***	
	(0.00864)	
clerical	-0.195***	
	(0.00760)	
science	0.123***	
	(0.00894)	
health	0.107***	
	(0.0116)	
technical	-0.178***	
	(0.0108)	
social	-0.145***	
	(0.0100)	
teaching	0.0126	
	(0.0101)	
art_sports	-0.280***	
	(0.0113)	
sales	0.00493	
	(0.0116)	
supervisors	-0.442***	
	(0.00831)	
food	-0.471***	
	(0.00979)	
protective	-0.0586***	
	(0.0131)	
childcare	-0.615***	
	(0.0118)	
travel	-0.475***	
	(0.00750)	
transportation	0.101***	
	(0.0170)	
construction	-0.119***	
	(0.0118)	
trade	-0.0335***	
	(0.00878)	
operators	-0.100***	
	(0.00755)	
primary	-0.232***	
	(0.00945)	
female	-0.152***	-0.122***
	(0.00538)	(0.00486)
femalekids	-0.0268***	-0.109***
	(0.00736)	(0.00750)
citizen	-0.00991	
	(0.00848)	
immigrant	0.0239	0.00357
	(0.0251)	(0.00561)
YRIMMIG61	0.0367	
	(0.0265)	
YRIMMIG70	-0.0164	

	(0.0257)			
YRIMMIG80	-0.0510**			
	(0.0252)			
YRIMMIG90	-0.122***			
	(0.0251)			
YRIMMIG95	-0.206***			
	(0.0253)			
YRIMMIG01	-0.165***			
	(0.0243)			
1.Toronto	0.181***			
	(0.00450)			
2.Montreal	0.0628***			
	(0.00547)			
3.Vancouver	0.155***			
	(0.00616)			
4.Ottawa	0.133***			
	(0.00803)			
5.Calgary	0.0996***			
	(0.00799)			
6.Edmonton	0.0390***			
	(0.00804)			
7.Quebec City	0.0250**			
	(0.0104)			
8.Winnipeg	-0.0169*			
	(0.00947)			
9.Hamilton	0.0907***			
	(0.00964)			
AGEP		-0.0262***		
		(0.000139)		
mtenglish		0.0938***		
		(0.00428)		
mtfrench		0.0917***		
		(0.00683)		
ENGLISH_ONLY		0.0118**		
		(0.00590)		
movedprovince		0.354***		
		(0.00950)		
movedcddiv		-0.353***		
		(0.00889)		
unpaid		-0.0277***		
		(0.000642)		
vsblmnrtty		-0.0856***		
		(0.00546)		
Constant	7.054***	0.507***	-1.657***	0.148***
	(0.0176)	(0.0111)	(0.00523)	(0.00152)
Observations	506,901	506,901	506,901	506,901

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1