

LANGUAGE AND PUBLIC/PRIVATE SECTOR WAGE DIFFERENTIALS IN CANADA:
A SAMPLE SELECTION APPROACH

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ABSTRACT

As a nation which has official bilingualism entrenched in its constitution, Canada faces some very complex problems based upon language differences. These problems are not only social problems, but are also very much economic problems. Because economic power is concentrated in the hands of Anglophones, and because English is the predominant language of the Canadian workplace, there is speculation that there may be differentials in earnings between Anglophones and other linguistic groups. In addition to this, there is evidence that government sector workers enjoy a wage premium over private sector workers.

It is the purpose of this thesis to identify this and other sources of wage differentials between language groups in Canada as well as its sub-regions of English Canada, Quebec, and Montreal with emphasis on returns to language skills.

The method used to meet this objective is to employ a human capital model to estimate the contribution of language and other human capital characteristics to earned wages. In addition to this, econometric methods are used to control for the possibility of sample selection bias. Eight language groups are defined and the model is estimated for four geographic areas. The data are taken from the 1986 Canadian Census and include only employed, wage earning males.

Results reveal a large sectoral difference in monetary returns to language skills. That is, the public sector is found to reward bilingualism, while the private sector does not. Furthermore, in the public sector, learning French as a second language yields greater returns than does learning English as a second language. In the private sector there is a clear advantage to learning English as a second language.

In addition to this, strong regional differences are found. In particular, the effects on wages of possessing language skills other than English are much stronger - in the public sector that is, - in the Quebec and Montreal samples. Sample selection variables are found to be significant only for public sector workers and for the English Canada sample. The results suggest that self selection occurs and, on average, has a positive influence on wages.

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CHAPTER 1
INTRODUCTION

1.1 THE ISSUE

As a nation with official bilingualism entrenched in its constitution, Canada faces some very complex problems based upon language differences. These are not only social problems, but are very much economic problems too. Because economic power is concentrated in the hands of Anglophones¹, and because English is the predominant language of the Canadian workplace, there is speculation that there may be differentials in earnings between language groups.

This issue receives much academic as well as political attention in Canada. Several studies reveal that a Francophone/Anglophone wage differential in favour of Anglophones does in fact exist and that one source of this difference is variation in language skills [see Carliner (1981), Shapiro and Stelcner (1982), and Lax (1990)]. These papers also identify education, work experience, region of residence and date of immigration as additional sources of the wage differential².

¹ Anglophone managers outnumber Francophone managers in Canada by more than three to one in the sample used for this study. Also see Allaire and Miller 1980 pp.12-16.

² There is also the possibility that part of the differential can be attributed to discrimination, however, it is not the purpose of this thesis to deal with this separate issue. In effect, the analysis of this thesis assumes that wage differences are attributable only to differences in wage determining characteristics or endowments. See, for example, section 2.1 below.

There are, however, limits to which governments in Canada have an influence over the language policies of the Canadian workplace. The federal government, for example, is limited by the wording of the constitution to influence language policies within its jurisdiction, i.e. the federal public sector and Parliament of Canada. Of the provincial governments, only New Brunswick is an officially bilingual province under the Constitution Act, 1982. Again, however, the scope of influence is limited to the provincial public sector and the legislature. Even in Quebec, the power of Bill 101 is limited to public institutions, although to some extent this influence extends beyond these boundaries through advertising laws and restrictions on language of education. Nevertheless, in a bilingual nation the possibility of language-based wage differentials - especially in the federal, Quebec and New Brunswick public sectors - is an issue worthy of attention, and if necessary, remedial action.

Allaire and Miller (1980, p.32) suggest that this problem is not self-resolving and that government intervention is necessary if it is to be corrected. In Quebec, government intervention has taken the form of law in the Charter of the French Language (Bill 101), while on a federal level the government's response has been to increase its level of services in French, regardless of region. It is expected that these responses would serve to increase the demand for

Francophone workers by the public sector on a national level, and by both the private and public sectors in Quebec, thereby increasing wages of Francophones, Bilingual Anglophones, and/or French speaking Allophones³.

In English Canada there can be two possible reactions by the private sector to this type of policy. First, it is reasonable to conjecture that increasing the returns to those workers in the public sector who possess French language skills also increases the wage for this linguistic group in the private sector of English Canada as both sectors compete for these workers in an open market. Second, if the increased availability of government services in French, coupled with a decreased availability of services in English, prompts the private sector to hire more French speaking workers in order to adjust to the availability of government services, then wages for the Francophone face further upward pressure. Both reactions suggest that the government initiatives are instrumental in achieving the desired result, that is, reducing the wage gap attributable to different language skills.⁴

³ The term Allophone is used to describe the linguistic group consisting of those people whose home language is neither English nor French. Allo is the Greek word for other.

⁴ Note that there may be adverse employment effects as a result of the increase in wages paid to Francophones. This could affect Anglophones through lost employment opportunities due to a decrease in demand for their skills, and affect both Francophones and Anglophones due to increased cost for a comparable service on a fixed budget. This issue is not dealt with here as it is assumed that the government is only interested in moving toward equality of wages and that displaced workers will be redistributed throughout the labour force.

In Quebec, Bill 101 serves to increase the demand for Francophone workers by both sectors, thereby raising wages also. In sum, these programs are expected to reduce the wage differential between Anglophones and Francophones in both English Canada and Quebec, although in English Canada, this effect may be mainly discernable in the public sector.

These "affirmative action" type policies attempt to send a message to Canadians that Canada should operate as a bilingual nation. Whether or not this message has been, or can be, effectively transmitted from the government to the private sector is a question that is particularly worthy of investigation.

1.2 OBJECTIVES

This thesis studies the returns to language skills in Canada by examining the functional relationship between wages and a set of explanatory variables. The objective of this thesis is to determine whether or not a linguistic-based wage differential exists in Canada (and its sub regions) and if so, to identify the sources of this differential. It is of particular interest to ascertain whether or not this wage differential can be partially attributed to the sector of employment (i.e., public or private). This is done by building upon the previous research methods of Carliner

(1981), Shapiro and Stelcner (1982), and Lax (1990). Since none of these researchers have focused on the issue of public/private sector wage differentials as a partial explanation of the overall wage differential, this thesis extends their work by examining this issue in detail. In addition to this, sample selection techniques developed by Heckman (1979) are employed to allow for the possibility of a non-random sample being observed. The data used is 1986 Census data available on the Public Use Sample Tapes (PUST) distributed by Statistics Canada.

The questions to be formally answered, and corresponding refutable hypotheses, are as follows. Does a wage differential exist between language groups? (The null hypothesis being that no difference exists.) If so, what are the sources of the differential? In particular, is the differential prevalent in both the private and the public sectors? (The null hypothesis being that sector of employment is irrelevant.) Answering these questions through the statistical analysis of Canadian Census data will help to determine whether or not Canada is moving toward a truly bilingual nation with equal wages, ceteris paribus, regardless of which official language is spoken or in which sector one is employed.

1.3 PREVIEW

Chapter 2 of this thesis is a brief review of the relevant literature, and examines not only the results of previous studies, but also the various methods used to examine the problem. Chapter 3 builds the model and defines the specific variables to be included in the analysis. This chapter is also used to address some of the anticipated complications in the empirical estimation and to describe the implementation of the wage differential decomposition technique. Chapter 4 describes the application of the model and presents regression results, wage differentials, and associated discussion. Chapter 5 presents a summary and conclusions.

CHAPTER 2

LITERATURE REVIEW

The method of answering the questions posed above is based on a synthesis of the existing literature on four discernable topics: 1) wage differential decomposition, 2) the economic returns to language, 3) public/private sector wage differentials, and 4) sample selection methods. Below is a brief (partial) survey of this literature, followed by a short description of the underlying theory, and then a description of the data that is used.

2.1 WAGE DIFFERENTIAL ANALYSIS

Following Lax (1990) and Carliner (1981) a simple method for analyzing wage differentials based on fundamental properties of OLS estimators is utilized. The method is based on the fact that an equation estimated using OLS, evaluated at the sample means of the independent variables, is exactly equal to the mean of the dependant variable. That is, if the regression equation is $Y = X\beta + \varepsilon$, then it is true that $\bar{Y} = \bar{X}\hat{\beta}$, where $\hat{\beta}$ is the vector of OLS estimates of the true vector of parameters, β .

In the context of the present issue, assume the wage equation can be expressed as follows:

$$\ln W_i = \sum_{j=1}^k \beta_j X_{ij} + U_i \quad (1)$$

where the $\ln W_i$'s are the natural logarithms of some measurement of wages, the β_j 's are parameters to be estimated, and the X_j 's are sets of attributes. U_i is the error term which is normally distributed with mean zero. It follows that

$$\ln \bar{W} = \sum_{j=1}^k \beta_j \bar{X}_j \quad (2)$$

if the β_j 's are the OLS estimates.

The difference in observed mean wages between two groups, A and B, can then be written as follows⁵:

$$\ln \bar{W}^A - \ln \bar{W}^B = \sum_{j=1}^k \hat{\beta}_j (X_j^A - X_j^B) \quad (3)$$

where β_j is now the first derivative of Equation (2) with respect to endowment j . Equation (3) simply states that a change in endowment (variable) j from the level possessed by group A to that possessed by group B results in a percentage change in wages of β_j times the difference in endowment levels and that the total differential is the sum of the differentials attributable to each of the k variables.

⁵ This assumes that the regression coefficients are equal for the two groups A and B. In other words, the wage determination process is identical for both groups (i.e., no discrimination).

2.2 ANALYSES OF WAGE DIFFERENTIALS DUE TO LANGUAGE SKILLS

There have been several attempts to analyze the wage differences between linguistic groups in Canada. These include, but are not limited to, Lax (1990), Shapiro and Stelcner (1982), and Carliner (1981). Their findings are summarised in Table I. These researchers use dichotomous variables to control for linguistic groups and other qualitative factors, and quantitative variables to control for levels of other human capital attributes. In the cases of Carliner (1981) and Lax (1990) differences in wage levels between language groups are obtained by application of the OLS properties described in the previous section. All three researchers test for significance of wage differentials on the basis of significance tests on the coefficients.

One criticism of the method employed by these researchers is that by estimating only one equation for all language groups and both sectors the slope coefficients on the explanatory variables are constrained to being the same for both private and public sectors and for all language groups. If this is not a proper specification then biased estimates and invalid inferences result. Furthermore, a possibly important source of wage differentials is hidden within these biased coefficients in that the different wage determination processes of the various language groups and the two sectors is obscured.

Table I
Comparative Summary of Empirical Findings

AUTHOR	DATA SET	MODEL TYPE ⁶	LANGUAGE/SECTOR VARIABLES	SAMPLE	SUMMARY OF FINDINGS
Gunderson (1979)	1971 Canadian Census	Dual Equation: 1 public sector 1 private sector	<u>Language</u> : English Only (excluded group), French Only, Bilingual, Neither.	Canada	Bilingualism not rewarded in either sector. Francophones disadvantaged relative to Anglophones, more so in public sector than private sector. Wage differential of 9.3% in favour of the public sector.
Carliner (1981)	1971 Canadian Census	Single Equation	<u>Language</u> ⁷ : Engmono, Engbil, Fremono, Frebil, Otheng, Othfre, Othbil, Othnone. <u>Sector</u> : None.	Canada English Canada Quebec Montreal Toronto	All language groups except Engbil at a relative disadvantage to Engmono in all regions except Montreal where Engbil was also at a disadvantage. Significant returns to Fremono learning English (greatest in Quebec and Montreal), none for Engmono learning French.
Shapiro and Stelcner (1982)	1971 Canadian Census	1. Single Equation	<u>Language</u> : As in Carliner (1981). <u>Sector</u> : None	Quebec	All language groups disadvantaged due to language skills relative to Engmono group. Significant returns to Fremono learning English, none for Engmono learning French.
		2. Dual Equation 1 Public Sector 1 Private Sector	<u>Language</u> : As in Carliner (1981).	Quebec	For private sector results are similar to single equation model. Public sector Fremono at a disadvantage (5%), and bilingualism not rewarded. Other groups show no disadvantage to Engmono.
Shapiro and Stelcner (1989)	1981 Canadian Census	Dual Equation 1 Public Sector 1 Private Sector	<u>Language</u> : As in Gunderson (1979).	Canada	Bilingualism rewarded in both sectors, more so in public sector. Francophone disadvantaged relative to Anglophones, more so in private sector. Wage differential of 19.1% in favour of the public sector. Less than 1% of sectoral differential due to language skills.
Lax (1990)	1981 Canadian Census	Single Equation	<u>Language</u> : As in Carliner (1981).	English Canada Quebec	Bilingualism rewarded for both Fremono and Engmono. All non-bilingual groups disadvantaged relative to Engmono.

⁶ Note that none of the following models employ sample selection variables.

⁷ The definitions for the language variables are determined as follows: the variable name is comprised of two parts, the first part refers to home language and can be either Eng (English), Fre (French), or Oth (neither English nor French) the second part refers to additional language skills and can be Eng, Fre, Bil (both English and French), or none (neither English nor French). Thus the group Othbil refers to those individuals whose home language is one other than English or French, but who speak both English and French as additional languages.

One remedy to this potential problem is to include dichotomous variables multiplicatively so that separate intercept and slope coefficients from the reference group can be obtained. While the application of this method can rapidly lead to an enormous number of independent variables, some limited form of this differentiation, here, sector of employment, seems desirable. This method and its application in the present context is discussed in greater detail in sections 3.1.1 and 3.1.2.

The findings of these papers are basically consistent with one another and suggest the highest returns are to English language skills and that in the past there has been no return for Anglophones learning French. Conversely, there are substantial returns to non-Anglophones for learning English, although wages still do not reach a parity with those of Anglophones. Over time these differences are diminishing, although as of the 1981 Census these differences are still prevalent (see Lax 1990. page 80).

Shapiro and Stelcner (1982)⁸ estimate separate public and private sector models in addition to a single equation model. Their results from the public and private sector equations indicate that there are different wage determination processes

⁸ In reference to results of a working paper mentioned in the published article, but which was unavailable from the authors.

in the different sectors of employment and that in the private sector only there is a differential due to differing language skills for all groups. No differential attributable to language skills is found to exist in the public sector except for the Fremont and Allobil groups which are both disadvantaged relative to the Engmono group. These results serve as a basis of comparison for the results found in the present study.

2.3 ANALYSES OF WAGE DIFFERENTIALS DUE TO SECTOR OF EMPLOYMENT

Other researchers using similar techniques analyze the wage differential between public and private sector workers. Canadian researchers include Gunderson (1979), Shapiro and Stelcner (1982), Shapiro and Stelcner (1989) and Robinson and Tomes (1984). Gunderson (1979) using a two independent equation model and 1971 Census data finds that the wages of public sector employees are 9.3% greater than employees in the private sector. However this difference is limited to low level occupations and the results are reversed for high level occupations. The direction of the advantage found by Gunderson (1979) is corroborated by Shapiro and Stelcner (1989) although the latter study finds the differential to be much higher, while Robinson and Tomes (1984) explain that this difference is largely due to the high degree of unionization in the Canadian public sector as opposed to the private

sector, a factor which neither Gunderson (1979) nor Shapiro and Stelcner (1989) control for.

Additionally, Shapiro and Stelcner (1989), using 1981 Census data, include in their study on public/private sector wage differentials three dichotomous language group variables. They find that the coefficient on the Francophone variable is negative, but insignificant for both public and private sectors. This is in contrast to the findings of Shapiro and Stelcner (1982) who find, using 1971 Census data, this coefficient to be negative and insignificant in the public sector, but negative and significant for the private sector. The magnitude of these coefficients is also found to be much smaller in 1981 than in 1971 suggesting a movement by both sectors toward equal reward for both French and English language skills. Comparing these results suggests that between 1971 and 1981 the private sector has increased the returns to workers with a knowledge of the French language from a significantly lower level to a level consistent with that of Anglophones, something already apparent in the public sector by 1971.

For the bilingual variable Shapiro and Stelcner (1989) find that the coefficients are positive and significant for both sectors, further supporting the notion that language skills are rewarded equally in both sectors in 1981. The

coefficient on the Neither Language variable is large, negative and significant (observations for private sector only) indicating that those workers who speak neither French nor English would greatly benefit by learning either language. The general conclusion is that unilinguals and those who speak neither official language can expect positive returns to learning English and/or French, and that there is no significant earnings disparity between the unilingual Francophone and unilingual Anglophone groups.

The results of Shapiro and Stelcner (1989) are comparable in many ways to those of Shapiro and Stelcner (1982), in that an overall difference is found in the wage determination process for the two sectors. They indicate, however, that very little of the wage differential between sectors is attributable to language skills. This is somewhat in contrast to Shapiro and Stelcner (1982) who find appreciable differences in returns to language skills between sectors, especially for the bilingual groups. These findings act in part as a benchmark for comparison against the results which are obtained in the present study.

2.4 THE PROBLEM OF SAMPLE SELECTION BIAS

When analyzing the differences between distinct entities such as Public or Private sectors, an important theoretical consideration comes into play, that is, the issue of sample

selection bias. This issue has been addressed by Belman and Heywood (1989) for Public/Private sector wage differentials in the United States, by Grenier (1987) who studies emigration and returns to language in Quebec, by Reimers (1983) studying racial discrimination in the United States, and by Miller (1987) who examines gender based wage differences using Canadian data.

The problem is that wages are only observed for the individuals included in the sample, thus truncating the sample of the population by excluding a predetermined group of individuals from the sample with the result that the sample is non-random. The most basic form of this type of truncation occurs because only individuals who have chosen to participate in the labour force, can have positive wages. All other individuals are excluded, albeit necessarily, from the sample thus giving no consideration in the wage equations for these individuals. Simply put, selecting one's self into the sample is something which may be endogenous to the model and failure to account for this is tantamount to ignoring information valuable for the analysis of the wage formation process⁹.

⁹ In order to keep this project to a manageable size it is assumed that the labour force participation decision for males is exogenous to the model. It is thought that this is a reasonable assumption for males, however it may not be acceptable if the sample included females. If this assumption were not imposed a labour force participation model would have to be estimated, something which would be a sizeable undertaking itself.

Further truncation takes place in the present study, based on sector of employment and region of residence. Sector and regional choice are conceivably endogenous to the model, yet many researchers treat them as exogenous variables. The endogeneity of sector (or region) choice arises because

"An individual taken from one sector (region) and placed in the other is assumed to be paid according to the estimated equation of the second sector (region). If wage formation genuinely differs between sectors (regions), individuals will enter the sector (region) providing greater net benefit. Which sector (region) offers the greater benefit depends on particular characteristics, both observed and unobserved, of each individual. Consequently, each sector (region) consists of workers who would be disadvantaged by relocation to the other sector(region)."¹⁰

Thus the distribution of workers in a given sector or region is not random, but determined within the model by the labour market conditions. Failing to allow for these considerations could result in biased parameter and standard error estimates.

2.5 THE OFFERED WAGE

With the addition of sample selection variables, controlling for the truncation of an otherwise random sample, it becomes possible to define the offered wage. Reimers (1983) defines the offered wage as the observed wage less the bias due to selection. It represents what the worker, given

¹⁰ Belman and Heywood (1989) page 568.

his set of attributes, would be offered if he sought employment in the portion of the sample of which he is not a part.

The basic model given by Equation (1) can be expanded to incorporate the concept of the offered wage. Similarly, the decomposition technique can be applied to the new model. The equation describing the observed wage, controlling for sample selection is, for sub-sample S:

$$\ln W_i^S = \sum_{j=1}^k \beta_j^S X_{ij}^S + \sum_{m=1}^n \delta_m^S \lambda_{im}^S + U_i^S \quad (4)$$

where in addition to terms previously defined the λ_{im} 's are the sample selection variables associated with being in each of the n groups, the δ_m 's are parameters to be estimated. Following Reimers (1983), the offered wage is, for sample S:

$$\ln W_i^S - \sum_{m=1}^n \delta_m^S \lambda_{im}^S = \sum_{j=1}^k \beta_j^S X_{ij}^S + U_i^S \quad (5)$$

Using the properties of OLS described in section 2.1 we get the decomposition of the observed wage difference:

$$\overline{\ln W}_A^S - \overline{\ln W}_B^S = \sum_{j=1}^k \beta_j^S (\overline{X}_{Aj}^S - \overline{X}_{Bj}^S) + \sum_{m=1}^n \delta_m^S (\overline{\lambda}_{Am}^S - \overline{\lambda}_{Bm}^S) \quad (6)$$

Similarly, with respect to Equation (5) we get the decomposition of the offered wage differential:

$$\overline{\ln W}_A^S - \overline{\ln W}_B^S - \sum_{m=1}^n \delta_m^S (\overline{\lambda}_{Am}^S - \overline{\lambda}_{Bm}^S) = \sum_{j=1}^k \beta_j^S (\overline{X}_{Aj}^S - \overline{X}_{Bj}^S) \quad (7)$$

It is the term on the right hand side of equation (7) which identifies the k sources of the offered wage differential that this thesis is concerned with. These k terms are summarized and make up the body of the analysis in the following chapters.

CHAPTER 3

METHODOLOGY AND VARIABLES

3.1 METHODOLOGY

3.1.1 Background

Following the work of Carliner (1981) and Lax (1990) a human capital wage model is estimated. The basic structure of the model and many of the variables are the same as the models of Lax and Carliner, however the present model is significantly different in that it makes up for several shortcomings of these models. The first shortcoming is that neither author controls for sector of employment. Given the language policies of both federal and provincial governments, it is felt that this is an important consideration. The second shortcoming is the failure to control for the possibility of sample selection bias. This has been documented in several similar studies as an important factor which can significantly alter results.¹¹ Lax (1990) identifies several shortcomings in Carliner's model and alters his model accordingly. These improvements have been incorporated into the present model.

¹¹ For examples of the differences which include and exclude sample selection variables see Belman and Heywood (1989), Reimers (1983), and Miller (1987).

The inclusion of the sample selection variables allows the analysis to proceed beyond explaining observed wages as Lax (1990) and Carliner (1981) do, to explaining offered wages.

3.1.2 The Regression Equation

The equation of primary interest is of the following form:

$$Y_i = \sum_{j=0}^k (\alpha_j X_{ij} + \beta_j D_i X_{ij}) + \varepsilon_i. \quad (8)$$

where the α_j 's and the β_j 's represent parameters to be estimated; the X_j 's denote the independent variables (described and discussed below) and the second term inside the brackets represents the differential effect of being in the public sector ($D_i = 1$) as opposed to the private sector ($D_i = 0$).

However, to control for sample selection bias, theoretical as well as empirical considerations¹² suggest that sample selection statistics for the sector of employment and for each sub-sample be included in the regression. Thus the equation to be estimated takes the form:

$$Y_i = \sum_{j=0}^k (\alpha_j X_{ij} + \beta_j D_i X_{ij}) + \delta_1 \lambda_i^G D_i + \delta_2 \lambda_i^P (1 - D_i) + \delta_3 \lambda_i^R + \varepsilon_i \quad (9)$$

where λ_i^G , λ_i^P and λ_i^R correspond to the sample selection

¹² See Belman and Heywood (1989), and Grenier (1987).

statistics associated with the government sector, the private sector, and the regional sub-sample, respectively. The sample selection statistics are calculated according to the methodology described in Appendix I.

Researchers of this topic have, up to this point, specified the equation as a log-linear form and have found it to be the most appropriate, not only for goodness of fit, but also for ease of interpretation of the results.¹³

In all, eight regressions are performed: one for each of three sub-national, and one for the entire national sample. Each of these four regressions are run while including and again while excluding sample selection variables. The three sub-national samples are English Canada (defined as all provinces except Quebec), Quebec, and Montreal.

3.1.3 Heteroscedasticity

Lax (1990) notes that "previous studies on the nature of wage differences have indicated that variances are likely to vary with wage levels, specifically, that there is a larger difference in wages at higher levels" (Lax 1990, p.32). This is the problem of heteroscedasticity which, if left uncorrected, leads to inefficient parameter estimates and

¹³ Note that for an equation of the form $\ln(y) = f(x)$, $\partial f(x)/\partial x$ is approximately equal to the percentage change in y associated with a unit change in x . For a good justification of the use of this particular functional form see Vaillancourt (1980) p. 62.

biased estimated standard errors. Shapiro and Stelcner (1989) and Gunderson (1979) also indicate that wages in the government sector are not homoscedastic, however, neither attempt to correct this problem. In addition to the heteroscedasticity of the wage distribution, the truncation of a sample is also known to produce heteroscedastic errors. Heteroscedasticity is in fact a problem in the present study and an appropriate weighting scheme is determined below.

3.2 DATA AND VARIABLES

3.2.1 Data

The data employed come from the Public Use Sample Tapes (PUST) of the 1986 Canadian Census. These data are based on a sample of 500,000 individuals, representing approximately 2% of the population. In order to maintain consistency with previous work and to reduce the wage variation from supply side factors, the sub sample consisting of males between the ages of 18 and 64 inclusive, who worked more than 34 hours per week for more than 26 weeks per year and who were not self employed is used. This is the same sub-sample as is used by Carliner (1981) and Lax (1990) although in some instances variable definitions are changed or variables are eliminated altogether in the different Census years (for Carliner, 1971 and for Lax, 1981).

3.2.2 Variables

The variables employed for the purpose of estimating the wage determination equation are human capital variables such as education, experience, education and experience squared (to allow for non-linearities) and of course language and sector dichotomous variables. Other relevant variables include region, marital status, proximity to a Census Metropolitan Area (CMA), as well as interactive variables such as education times experience to measure the effect of the combination of these two attributes. In order to allow for differing wage determination processes for public and private sectors a multiplicative dichotomous variable is used.¹⁴

To account for the effects of sample selection bias, several¹⁵ variables which are generated using a probit model are included in the regressions. The variables employed to estimate these probit models are ones which are thought to effect the choice of the individual to locate in a particular region or be employed in a particular sector. Variables such as place of birth, ethnic origin, and language are chosen. For the details of this method and its application see Appendix I, results are given in Appendix II.

¹⁴ Based on the results of Robinson and Tomes (1984) it would be desirable to include union status as an independent variable. Unfortunately this information is not included in the 1986 Census.

¹⁵ In fact each equation will include three generated sample selection variables: two of these control for sector choice and one controls for inclusion in the regional sub-sample. Of course, for the Canada wide sample the regional selection variable, λ^R , is constant and therefore excluded.

3.2.3 Variable Definitions

The variables to be employed are defined in Table II below and are described in detail as follows.

The Dependent Variable

The dependent variable (Y) is the $\ln(\text{WAGES}/\text{HOUR})$. This variable is calculated for each individual in the sample as the natural logarithm of wages and salaries earned in 1985 divided by the number of hours worked in 1985. Since the data set does not provide the number of hours worked it is calculated as the product of the number of weeks worked in 1985¹⁶ and the number of hours worked in the reference week.

Using the hourly wage rather than annual income eliminates the variance of labour supply over individuals. This is also controlled for by limiting the sample to full time, full-year, male workers. As noted above the natural logarithm of the hourly wage is an appropriate transformation for measuring this variable.

The Independent Variables

The independent variables consist of both quantitative and qualitative variables. Quantitative variables include

¹⁶ As suggested by Statistics Canada, workers who reported 49-52 weeks worked were assigned a value of 52 weeks worked. This is due to the likely event that some people incorrectly reported that holidays were not counted as time worked. It is also likely that this problem affects, to an unknown degree, those who worked less than 49 weeks.

TABLE II
Variable Definitions

<u>Variable</u>	<u>Name</u>
Y is the logarithm of the hourly wage	Ln(WAGES/HOUR)
X ₀ (=1) is the intercept	Intercept
X ₁ is the highest level of formal schooling attained measured in years	EDUC
X ₂ is the square of the education variable, X ₁	EDSQ
X ₃ is the number of years of work experience (Age-X ₁ -6)	EXP
X ₄ is the square of the experience variable, X ₃	EXPSQ
X ₅ is the product of the education and experience variables, X ₁ and X ₃	EDEXP
X ₆ = 1 if individual lives in a Census Metropolitan Area = 0 otherwise	CMA
MAR = 1 if Married = 0 otherwise	MAR
D = 1 if the individual is employed in the Government ¹⁷ = 0 otherwise	GOV

Language Variables

(reference group is Anglophone)

	<u>Home Language</u>	<u>Second Language</u>	
X ₇ = 1 if = 0 otherwise	English	French	ENGBIL
X ₈ = 1 if = 0 otherwise	French	None	FREMONO
X ₉ = 1 if = 0 otherwise	French	English	FREBIL
X ₁₀ = 1 if = 0 otherwise	Other	English	OTHENG
X ₁₁ = 1 if = 0 otherwise	Other	French	OTHFRE
X ₁₂ = 1 if = 0 otherwise	Other	English and French	OTHBIL
X ₁₃ = 1 if = 0 otherwise	Other	None	OTHNONE

Immigration Variables

(reference group is Canadian Born)

<u>Immigration Period</u>	<u>Name</u>
X ₁₄ = 1 if 1984-1986 = 0 otherwise	IMM1
X ₁₅ = 1 if 1976-1983 = 0 otherwise	IMM2
X ₁₆ = 1 if 1961-1975 = 0 otherwise	IMM3
X ₁₇ = 1 if Pre 1961 = 0 otherwise	IMM4

Regional Variables

(reference group is Ontario)

<u>Region</u>	<u>Name</u>
X ₁₈ = 1 if B.C. = 0 otherwise	BC
X ₁₉ = 1 if Prairies = 0 otherwise	PRAI
X ₂₀ = 1 if Quebec = 0 otherwise	QUE
X ₂₁ = 1 if Maritimes = 0 otherwise	MARIT

¹⁷ "Government" includes all levels of government as well as educational institutions, health and social services.

TABLE II
Variable Definitions
(continued)

Occupational Variables

(the reference group is Managerial)

<u>Occupation</u>	<u>Name</u>	<u>Occupation</u>	<u>Name</u>
X ₂₂ = 1 if Natural Sciences = 0 otherwise	NATSCI	X ₂₈ = 1 if Agriculture = 0 otherwise	AGRIC
X ₂₃ = 1 if Social Sciences = 0 otherwise	SOCSCI	X ₂₉ = 1 if Primary = 0 otherwise	PRIM
X ₂₄ = 1 if Teaching = 0 otherwise	TEACH	X ₃₀ = 1 if Manufacturing = 0 otherwise	MANUF
X ₂₅ = 1 if Health = 0 otherwise	HEAL	X ₃₁ = 1 if Construction = 0 otherwise	CONSTR
X ₂₆ = 1 if Clerical = 0 otherwise	CLER	X ₃₂ = 1 if Transport = 0 otherwise	TRANSP
X ₂₇ = 1 if Service = 0 otherwise	SERV	X ₃₃ = 1 if Other = 0 otherwise	OTHER

CMA Variables (Canada Sample Only)

(the reference group is no CMA)

<u>CMA</u>		<u>CMA</u>	
CMA1 = 1 if Montreal = 0 otherwise	MONT	CMA6 = 1 if Regina/Saskatoon = 0 otherwise	REG/SASK
CMA2 = 1 if Toronto = 0 otherwise	TOR	CMA7 = 1 if Calgary = 0 otherwise	CALGARY
CMA3 = 1 if Ottawa/Hull = 0 otherwise	OTT/HULL	CMA8 = 1 if Edmonton = 0 otherwise	EDMONT
CMA4 = 1 if Hamilton/Kitchener = 0 otherwise	HAM/KITCH	CMA9 = 1 if Vancouver = 0 otherwise	VANC
CMA5 = 1 if Winnipeg = 0 otherwise	WINN		

education and experience, the products and squares of these variables, as well as sample selection variables. The qualitative variables include language, sector, period of immigration, occupation, region, census metropolitan area (CMA) and marital status. There is also a set of interactive variables which allow for different slope and intercept coefficients for government sector workers.

Language

For the purposes of this thesis the language variables are of key importance. There are eight language categories classifying each individual according to their home language¹⁸ and knowledge of either official language. Home language is classified as English, French or Other. Official language knowledge is either English, French, Bilingual (English and French) or None. Unfortunately no measure of language proficiency or indication of language spoken in the workplace is available.

Table II outlines the combinations which make up the eight groups. These language variables are identical to those defined by Carliner (1981) and Lax (1990).

¹⁸ Home Language is defined by Statistics Canada as the language most often spoken at home.

Education

Education is included as a continuous human capital variable (EDUC). It is expected that, ceteris paribus, higher wages are associated with more education. Statistics Canada reports "highest grade attained" for elementary and secondary school, and "years of university" and "years of non-university education". The education variable, therefore, is calculated as the sum of the reported values of these three questions.¹⁹

The education variable is also squared and included as an independent variable (EDSQ)²⁰. This is to control for diminishing returns to higher levels of education and the coefficient is expected to be negative reflecting the concave shape typical of earnings/education profiles.

Experience

Experience is included to measure the potential number of years of work experience for each individual. The variable is calculated as $EXPER = (AGE - EDUC - 6)$ and is limited to non-negative values. It is expected that greater work experience has a positive influence on wages, therefore the coefficient

¹⁹ For the variable "Highest Grade Attained" Statistics Canada reports a dichotomous variable for "less than grade five", and "grades five through eight". These variables were recoded to the midpoints of these ranges, 2.5 and 6.5 respectively.

²⁰ The inclusion of variables as well as their squares as independent variables is likely to create a problem of collinearity. Failure to include them may, however, cause a specification error and lead to biased parameter estimates. There are strong theoretical reasons as well as several empirical precedents that suggest that the education and experience variables should be squared and include as independent variables (see Lax, 1990). It is felt that unbiased parameter estimates are important for this analysis, therefore these variables are included.

on this variable is expected to be positive.

Experience squared (EXPSQ) is also included for the same reason as EDSQ is included, that is, diminishing returns. The coefficient is expected to be negative, again reflecting the concavity of typical age/earnings²¹ profiles.

Immigration

Immigration is included as a set of four dichotomous human capital variables (the fifth group, Canadian born, serves as the reference group and is therefore excluded). The four groups are defined in Table II. It is felt that period of immigration is an important human capital variable in the determination of wages in that a period of cultural and environmental adjustment is necessary. More recent immigrants will have had less time to adjust to a new culture relative to those who immigrated some time ago or to Canadian born individuals. Recent immigrants may not, therefore, be able to acquire employment at a wage equal that of less recent immigrants or Canadian born individuals. This effect is expected to diminish as time spent in Canada is increased.²² It is therefore expected that the coefficients will be large

²¹ Note that experience is highly correlated with age by construction, therefore we expect the shape of the experience/earnings profile to closely resemble the shape of the more common age/earnings profiles.

²² Meng (1987) studies this issue in detail using a similar human capital/wage model and presents seven hypotheses regarding wages of immigrants (p. 1110).

in absolute value and negative in sign for recent immigrants and will tend to zero as the number of years spent in Canada increases. Several studies (e.g Meng 1987) have shown that the coefficient actually becomes positive indicating that immigrants earn more in the long run than non-immigrants.

Occupation

Thirteen occupation variables (including the excluded group, Managerial) are included in the analysis to control for different wages in various occupations. The definitions are based on the 1981 Standard Occupation Classification of Statistics Canada and are given in Table II. Following Lax (1990) several occupation classifications are combined to form new groups: "Clerical" and "Sales" are joined to form the single group "Clerical", as are "Processing" and "Machining" which together form the group "Manufacturing". The "Artistic and Literary" group is included with the "Other Occupations" group.

Although it is commonly believed that Managers (the reference group) are the highest paid group, this is not taken as an established fact and, therefore, a priori predictions about the sign of the coefficients for this group of variables are not made.

Region and Census Metropolitan Area

Regional variables are included in the equation for the Canada wide sample to control for the historical fact that workers in certain regions of Canada are paid higher wages (Ontario and British Columbia) than other regions (the Maritime provinces). The four regional variables are defined in Table II, the reference group is Ontario.

Nine Census Metropolitan Areas (CMA's) are also defined to control for the possibility that residents of a particular CMA are paid differentially to compensate for a different cost of living than individuals who are not residents of that CMA. These nine definitions are included in the equation for the Canada sample only. In the other three equations a dichotomous "CMA" or "NO CMA" variable is used. In either case the reference group is "NO CMA".

Marital Status

Marital status is included simply as a control variable. It is expected that the sign of the coefficient will be positive reflecting the greater responsibility associated with being married as opposed to being single.

Interactive Variables

Two sets of interactive variables are included in the equation. The first is the variable EDEXP which is calculated

as the product of the education (EDUC) and experience (EXP) variables. This variable serves to control for the human capital value of the combination of education and experience as well as for non-linearities in the combination of these variables. Lax (1990, p.69) also points out that on the job training is not counted as education, nor is practical training which is part of an education program counted as work experience. The EDEXP variable is expected to control for these factors.

The second set of interactive variables is a much larger set and is designed to control for the differential impacts of all variables on government sector workers. Each variable in Table II is multiplied by 1 if the worker is employed by the government sector, and by 0 otherwise. This doubles the number of regressors, and is equivalent to estimating a separate regression equation for each sector, since it allows for different slope and intercept coefficients to be estimated for the two sectors. The benefit of the single equation method is that the significance of the difference between coefficients for the two sectors is readily discernable through the standard error of the estimated coefficients for these interactive variables. To assess the significance of the differential from the individual equation approach involves a more complex series of calculations.

Sample Selection Variables

In each regression sample selection statistics are included to control for self selection into a given sector and/or region (for the Canada sample the regional selection variable is a constant and therefore excluded). These variables are used in the determination of the offered wage as defined above. The computation of these variables is somewhat involved and the methodology is given in Appendix I.

3.2.4 Descriptive Statistics

Tables III-A through III-H on the following pages present the means of all variables entered into the regression equations by region and sector. Within each region and sector the means are given for each of the eight language groups defined in Table II.

The highest value for the mean of the dependent variable is 2.752 (\$15.67/hr) for the Othbil in the public sector of English Canada. The lowest value of the mean of the dependent variable is 0.890 (\$2.44/hr) for the Othfre group in the private sector of the Quebec sample. A similar pattern is found in all regions and sectors. That is, a bilingual group consistently has the highest mean wage and an Allophone group consistently has the lowest mean wage. Furthermore, within regional samples and for each language group the public sector wages are almost invariably higher than the wages of the private sector counterparts.

TABLE III-A
CANADA SAMPLE MEANS
PUBLIC SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	2.466	2.565	2.340	2.518	2.241	1.075	2.595	2.328
EDUC	14.087	15.707	12.682	14.829	13.109	9.531	14.773	6.3
EDSQ	210.64	256.45	178.72	233.11	196.75	119.3	244.32	67.33
EXP	20.02	17.362	21.182	18.694	25.063	26.219	22.766	37.5
EXPSQ	534.53	399.65	605.23	469.52	823.23	845.86	686.26	1637.3
EDEXP	266.19	266.34	235.37	261.5	283.96	209.48	297.38	183.45
IMM1	0.001	0.002	0	0.001	0.016	0.062	0.007	0
IMM2	0.012	0.01	0.001	0.003	0.153	0.187	0.144	0.15
IMM3	0.07	0.078	0.02	0.031	0.362	0.5	0.403	0.55
IMM4	0.078	0.092	0.006	0.013	0.275	0	0.317	0.15
BC	0.142	0.089	0	0.007	0.101	0	0.05	0.05
PRAI	0.253	0.141	0	0.014	0.254	0	0.036	0.25
QUE	0.01	0.143	0.991	0.821	0.037	1	0.612	0.15
MARIT	0.145	0.118	0.005	0.053	0.038	0	0.022	0
NATSCI	0.077	0.077	0.034	0.066	0.096	0.062	0.043	0
SOCSCI	0.046	0.056	0.036	0.048	0.049	0.062	0.043	0
TEACH	0.175	0.228	0.137	0.174	0.127	0.062	0.252	0
HEAL	0.05	0.053	0.109	0.063	0.09	0.063	0.187	0.05
CLER	0.058	0.059	0.065	0.072	0.061	0	0.036	0
SERV	0.264	0.205	0.273	0.23	0.233	0.375	0.151	0.6
AGRIC	0.013	0.007	0.008	0.003	0.03	0.062	0.007	0
PRIM	0.002	0.002	0.004	0.001	0.003	0	0	0
MANUF	0.031	0.013	0.04	0.017	0.045	0	0.029	0
CONSTR	0.036	0.011	0.06	0.026	0.052	0.187	0.029	0
TRANSP	0.02	0.012	0.023	0.012	0.01	0	0.029	0.05
OTHER	0.052	0.035	0.056	0.041	0.092	0.062	0.05	0.3
MONT	0.008	0.101	0.283	0.352	0.03	0.562	0.482	0.1
OTT/HULL	0.064	0.233	0.021	0.132	0.066	0.062	0.129	0
TOR	0.14	0.104	0	0.004	0.353	0	0.086	0.55
HAM/KIT	0.049	0.024	0	0.002	0.071	0	0.022	0
WINN	0.041	0.032	0	0.005	0.047	0	0.014	0.05
REG/SASK	0.03	0.016	0	0	0.021	0	0	0
CALGARY	0.034	0.018	0	0.001	0.024	0	0.014	0
EDMONT	0.056	0.03	0	0.004	0.063	0	0	0.1
VANC	0.06	0.042	0	0.002	0.064	0	0.029	0.05
MAR	0.794	0.76	0.777	0.777	0.817	0.875	0.791	0.95
λ^G	0.954	0.745	0.951	0.828	1.179	1.534	0.986	1.426
N	8997	1611	1426	2304	575	16	139	20

TABLE III-B
CANADA SAMPLE MEANS
PRIVATE SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	2.271	2.348	1.969	2.277	1.946	1.669	2.085	1.723
EDUC	12.340	13.397	10.598	12.633	11.179	8.473	12.398	6.826
EDSQ	161.240	190.871	122.821	170.988	143.829	88.459	173.333	61.796
EXP	18.833	17.687	19.786	18.812	23.606	27.936	20.361	32.86
EXPSQ	506.33	453.84	564.99	501.05	742.34	940.89	591.62	1251.68
EDEXP	217.10	219.59	182.06	215.95	231.00	208.20	221.70	199.70
IMM1	0.002	0.001	0.001	0.001	0.023	0.032	0.017	0.066
IMM2	0.023	0.019	0.005	0.006	0.218	0.392	0.189	0.349
IMM3	0.074	0.072	0.008	0.019	0.422	0.382	0.408	0.462
IMM4	0.071	0.081	0.005	0.013	0.226	0.177	0.225	0.099
BC	0.143	0.073	0	0.002	0.130	0	0.017	0.137
PRAI	0.227	0.130	0	0.015	0.165	0	0.038	0.084
QUE	0.014	0.298	0.984	0.842	0.043	0.962	0.707	0.117
MARIT	0.089	0.054	0.006	0.045	0.005	0	0.007	0
NATSCI	0.068	0.094	0.030	0.076	0.070	0.006	0.092	0
SOCSCI	0.005	0.013	0.001	0.008	0.003	0	0.006	0.000
TEACH	0.001	0.002	0	0.001	0	0	0.003	0
HEAL	0.003	0.003	0.001	0.003	0.006	0	0.003	0
CLER	0.186	0.209	0.144	0.214	0.106	0.097	0.190	0.043
SERV	0.039	0.046	0.050	0.045	0.100	0.124	0.124	0.252
AGRIC	0.017	0.008	0.019	0.008	0.023	0.011	0.007	0.026
PRIM	0.022	0.020	0.025	0.019	0.006	0.005	0.003	0.010
MANUF	0.241	0.166	0.369	0.211	0.356	0.457	0.281	0.304
CONSTR	0.095	0.056	0.107	0.072	0.140	0.129	0.061	0.237
TRANSP	0.073	0.054	0.089	0.071	0.032	0.059	0.032	0.018
OTHER	0.091	0.080	0.086	0.079	0.084	0.086	0.075	0.097
MONT	0.012	0.252	0.286	0.489	0.040	0.887	0.671	0.115
OTT/HULL	0.020	0.071	0.010	0.060	0.021	0.022	0.039	0.023
TOR	0.206	0.181	0	0.008	0.468	0.016	0.144	0.510
HAM/KIT	0.080	0.042	0	0.003	0.081	0.005	0.015	0.077
WINN	0.034	0.022	0	0.004	0.040	0	0.007	0.026
REG/SASK	0.022	0.009	0	0	0.006	0	0.001	0.003
CALGARY	0.043	0.033	0	0.001	0.037	0	0.014	0.018
EDMONT	0.043	0.025	0	0.002	0.036	0	0.011	0.026
VANC	0.070	0.041	0	0.001	0.094	0	0.015	0.120
MAR	0.740	0.722	0.747	0.758	0.793	0.892	0.696	0.880
λ^P	-0.216	-0.330	-0.189	-0.294	-0.174	-0.091	-0.187	-0.193
N	40060	4000	6983	6959	4716	186	720	392

TABLE III-C
ENGLISH CANADA SAMPLE MEANS
PUBLIC SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	2.471	2.595	2.196	2.395	2.237	n/a	2.752	2.345
EDUC	14.081	15.768	10.962	14.208	13.206	n/a	17.361	6.235
EDSQ	210.43	258.01	145.48	214.88	198.98	n/a	309.25	65.235
EXP	20.005	17.143	20.115	17.022	24.964	n/a	20.769	39.941
EXPSQ	533.83	390.66	685.87	419.04	817.73	n/a	544.02	1796.9
EDEXP	265.85	264.59	160.94	228.29	285.44	n/a	354.08	200.97
IMM1	0.001	0.003	0	0.002	0.016	n/a	0.019	0
IMM2	0.012	0.01	0	0.005	0.155	n/a	0.167	0.118
IMM3	0.069	0.076	0	0.039	0.363	n/a	0.389	0.588
IMM4	0.077	0.083	0	0.019	0.271	n/a	0.37	0.176
NATSCI	0.077	0.08	0	0.053	0.096	n/a	0.037	0
SOCSCI	0.046	0.059	0.154	0.027	0.051	n/a	0.093	0
TEACH	0.173	0.226	0.231	0.177	0.126	n/a	0.352	0
HEAL	0.049	0.046	0.077	0.039	0.09	n/a	0.111	0.059
CLER	0.058	0.057	0.077	0.087	0.063	n/a	0.037	0
SERV	0.265	0.211	0.231	0.308	0.227	n/a	0.074	0.588
AGRIC	0.013	0.007	0	0	0.031	n/a	0	0
PRIM	0.002	0.002	0	0.002	0.004	n/a	0	0
MANUF	0.032	0.011	0	0.024	0.045	n/a	0.037	0
CONSTR	0.036	0.011	0.077	0.031	0.051	n/a	0.037	0
TRANSP	0.021	0.012	0	0.019	0.011	n/a	0.019	0
OTHER	0.052	0.035	0	0.041	0.094	n/a	0	0.353
CMA	0.477	0.569	0.231	0.431	0.735	n/a	0.667	0.882
MAR	0.795	0.76	0.615	0.77	0.816	n/a	0.815	0.941
λ^G	0.954	0.725	0.664	0.764	1.173	n/a	0.732	1.376
λ^R	0.023	0.238	2.148	1.194	0.061	n/a	1.388	0.211
N	8911	1381	13	413	554	n/a	54	17

TABLE III-D
ENGLISH CANADA SAMPLE MEANS
PRIVATE SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	2.334	2.346	1.967	2.305	1.750	1.699	2.086	1.308
EDUC	12.337	13.481	8.102	11.397	11.213	7.000	13.832	6.853
EDSQ	161.15	193.45	75.19	141.13	144.65	68.86	207.56	61.91
EXP	18.773	17.565	27.783	19.705	23.480	29.000	19.017	32.68
EXPSQ	503.72	445.80	958.37	544.90	736.44	1046.57	515.58	1232.46
EDEXP	216.26	218.25	196.34	201.04	230.185	152.71	239.30	201.49
IMM1	0.002	0.001	0	0.002	0.023	0.143	0.028	0.058
IMM2	0.023	0.019	0.018	0.008	0.218	0.143	0.237	0.373
IMM3	0.072	0.069	0	0.011	0.424	0.571	0.384	0.451
IMM4	0.070	0.071	0.035	0.009	0.222	0.143	0.190	0.095
NATSCI	0.067	0.100	0	0.040	0.071	0	0.100	0
SOCSCI	0.005	0.014	0	0.003	0.003	0	0.019	0
TEACH	0.001	0.003	0	0.001	0	0	0.005	0
HEAL	0.003	0.004	0	0.004	0.006	0	0.005	0
CLER	0.186	0.193	0.088	0.144	0.106	0	0.152	0.046
SERV	0.038	0.048	0.035	0.045	0.095	0.143	0.128	0.240
AGRIC	0.017	0.009	0.018	0.015	0.024	0	0	0.029
PRIM	0.022	0.027	0.186	0.067	0.006	0	0.005	0.012
MANUF	0.240	0.164	0.310	0.266	0.356	0.286	0.227	0.283
CONSTR	0.096	0.069	0.151	0.142	0.142	0.571	0.095	0.257
TRANSP	0.073	0.060	0.071	0.070	0.033	0	0.019	0.020
OTHER	0.091	0.080	0.115	0.084	0.085	0	0.081	0.104
CMA	0.525	0.595	0.088	0.279	0.816	1.000	0.825	0.905
MAR	0.740	0.721	0.832	0.741	0.792	1.000	0.711	0.887
λ^P	-0.216	-0.357	-0.191	-0.292	-0.174	-0.071	-0.275	-0.194
λ^R	0.026	0.272	1.528	0.846	0.077	0	1.363	0.256
N	39498	2807	113	1100	4511	7	211	346

TABLE III-E
 QUEBEC SAMPLE MEANS
 PUBLIC SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	1.980	2.386	2.342	2.544	2.343	1.075	2.496	2.233
EDUC	14.692	15.346	12.698	14.964	10.548	9.531	13.129	6.667
EDSQ	231.56	247.08	179.03	237.1	137.94	119.3	203.08	79.167
EXP	21.622	18.672	21.192	19.059	27.69	26.219	24.04	23.67
EXPSQ	606.63	453.67	604.49	480.55	968.42	845.86	776.63	732.83
EDEXP	301.54	276.8	236.05	268.76	245.04	209.48	261.37	84.17
IMM1	0.012	0	0	0.001	0	0.062	0	0
IMM2	0.035	0.009	0.001	0.003	0.095	0.187	0.129	0.333
IMM3	0.244	0.091	0.021	0.036	0.333	0.5	0.412	0.333
IMM4	0.151	0.148	0.006	0.012	0.381	0	0.282	0
NATSCI	0.035	0.061	0.034	0.068	0.095	0.062	0.047	0
SOCSCI	0.07	0.043	0.035	0.053	0	0.062	0.012	0
TEACH	0.314	0.239	0.136	0.174	0.143	0.062	0.188	0
HEAL	0.116	0.096	0.109	0.069	0.095	0.063	0.235	0
CLER	0.081	0.07	0.065	0.069	0	0	0.035	0
SERV	0.174	0.17	0.274	0.213	0.381	0.375	0.2	0.667
AGRIC	0	0.004	0.008	0.003	0	0.062	0.012	0
PRIM	0	0	0.004	0.001	0	0	0	0
MANUF	0.023	0.026	0.04	0.015	0.048	0	0.024	0
CONSTR	0.023	0.009	0.059	0.024	0.095	0.187	0.024	0
TRANSP	0	0.013	0.023	0.01	0	0	0.035	0.333
OTHER	0.058	0.03	0.057	0.041	0.048	0.062	0.082	0
CMA	0.919	0.774	0.304	0.517	0.857	0.625	0.847	0.667
MAR	0.721	0.761	0.778	0.778	0.857	0.875	0.776	1
λ^G	0.913	0.86	0.954	0.841	1.33	1.534	1.147	1.708
λ^R	2.734	1.216	0.052	0.189	2.035	0	0.318	1.524
N	86	230	1413	1891	21	16	85	3

TABLE III-F
 QUEBEC SAMPLE MEANS
 PRIVATE SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	2.270	2.349	2.108	2.129	1.954	0.890	2.083	1.778
EDUC	12.514	13.198	10.639	12.865	10.451	8.531	11.802	6.619
EDSQ	167.671	184.804	123.605	176.597	125.730	89.226	159.143	60.951
EXP	22.996	17.978	19.658	18.644	26.368	27.893	20.918	34.229
EXPSQ	690.52	472.73	558.52	492.83	872.25	936.76	623.12	1396.54
EDEXP	275.263	222.731	181.819	218.747	249.130	210.373	214.410	186.197
IMM1	0.005	0.001	0.001	0.001	0.029	0.028	0.012	0.130
IMM2	0.083	0.022	0.005	0.006	0.210	0.402	0.169	0.174
IMM3	0.158	0.081	0.008	0.019	0.376	0.374	0.418	0.543
IMM4	0.125	0.101	0.004	0.014	0.313	0.179	0.240	0.130
NATSCI	0.107	0.081	0.030	0.083	0.049	0.006	0.088	0
SOCSCI	0.007	0.012	0.001	0.009	0	0	0	0
TEACH	0.002	0	0	0.001	0	0	0.002	0
HEAL	0.005	0.002	0.001	0.002	0.005	0	0.002	0
CLER	0.201	0.250	0.045	0.227	0.107	0.101	0.206	0.022
SERV	0.062	0.042	0.051	0.045	0.220	0.123	0.122	0.348
AGRIC	0.005	0.008	0.019	0.006	0.005	0.011	0.010	0
PRIM	0.002	0.004	0.022	0.010	0	0.006	0.002	0
MANUF	0.221	0.170	0.370	0.200	0.361	0.464	0.303	0.457
CONSTR	0.027	0.027	0.106	0.059	0.078	0.112	0.047	0.087
TRANSP	0.055	0.042	0.089	0.071	0.029	0.061	0.037	0
OTHER	0.101	0.080	0.086	0.079	0.049	0.089	0.073	0.043
CMA	0.890	0.873	0.299	0.623	0.951	0.927	0.957	1.000
MAR	0.738	0.725	0.745	0.761	0.805	0.888	0.690	0.826
λ^P	-0.198	-0.266	-0.189	-0.295	-0.180	-0.092	-0.150	-0.181
λ^R	2.091	0.926	0.045	0.143	2.042	0	0.248	1.514
N	562	1193	6870	5859	205	179	509	46

TABLE III-G
MONTREAL SAMPLE MEANS
PUBLIC SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	1.837	2.501	2.361	2.565	2.288	1.314	2.375	2.382
EDUC	14.986	15.793	12.277	14.668	10.941	8	12.239	8.75
EDSQ	241.45	260.22	170.96	230.11	147.88	92.722	181.4	115.625
EXP	14.746	18.96	22.50	20.19	29.53	32.11	25.21	21.75
EXPSQ	607.16	463.75	680.38	533.09	1097.1	1144.1	858.38	721.13
EDEXP	310.26	288.21	239.06	275.45	264.47	220.22	245.6	91.88
IMM1	0.014	0	0	0.001	0	0	0	0
IMM2	0.042	0.012	0	0.002	0.118	0.222	0.134	0.5
IMM3	0.282	0.111	0.045	0.037	0.353	0.778	0.403	0.5
IMM4	0.155	0.167	0.02	0.019	0.471	0	0.328	0
NATSCI	0.042	0.062	0.025	0.052	0.059	0.111	0.045	0
SOCSCI	0.056	0.056	0.035	0.053	0	0	0.015	0
TEACH	0.352	0.272	0.119	0.173	0.176	0	0.134	0
HEAL	0.127	0.117	0.124	0.073	0.118	0.111	0.239	0
CLER	0.07	0.056	0.069	0.074	0	0	0.045	0
SERV	0.155	0.123	0.27	0.232	0.471	0.444	0.209	1
AGRIC	0	0	0.01	0.006	0	0.111	0.015	0
PRIM	0	0	0.002	0	0	0	0	0
MANUF	0.014	0.019	0.062	0.015	0.059	0	0.03	0
CONSTR	0.014	0.006	0.079	0.036	0	0.222	0.03	0
TRANSP	0	0.012	0.04	0.016	0	0	0.045	0
OTHER	0.056	0.031	0.052	0.038	0	0	0.104	0
MAR	0.69	0.765	0.71	0.757	0.824	0.889	0.776	1
λ^G	0.868	0.804	1.074	0.874	1.121	1.736	1.296	1.277
λ^R	2.423	1.256	1.38	0.921	2.305	0.821	0.561	1.73
N	71	162	403	810	17	9	67	2

TABLE III-H
MONTREAL SAMPLE MEANS
PRIVATE SECTOR

VARIABLE	ENGMONO	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
Y	2.381	2.413	2.064	2.352	1.785	1.783	2.101	1.281
EDUC	12.797	13.417	10.623	12.967	10.516	8.397	11.786	6.711
EDSQ	174.429	190.406	123.609	179.580	127.500	86.213	158.637	62.167
EXP	22.376	17.667	19.645	18.606	27.032	28.245	20.832	33.889
EXPSQ	686.396	460.90	568.77	496.97	904.71	954.43	622.31	1373.12
EDEXP	279.32	223.09	180.30	218.92	257.02	209.27	211.92	187.59
IMM1	0.006	0.001	0.002	0.001	0.032	0.030	0.010	0.133
IMM2	0.086	0.022	0.010	0.010	0.207	0.388	0.168	0.178
IMM3	0.176	0.091	0.023	0.030	0.383	0.388	0.422	0.533
IMM4	0.133	0.110	0.009	0.018	0.340	0.188	0.238	0.133
NATSCI	0.116	0.086	0.030	0.086	0.054	0.006	0.089	0
SOCSCI	0.009	0.011	0.001	0.010	0	0	0	0
TEACH	0.002	0	0	0.001	0	0	0.002	0
HEAL	0.004	0.002	0.001	0.002	0.005	0	0.002	0
CLER	0.206	0.267	0.165	0.236	0.106	0.109	0.215	0.022
SERV	0.056	0.042	0.059	0.052	0.218	0.115	0.114	0.356
AGRIC	0	0.004	0.009	0.003	0.005	0.006	0.008	0
PRIM	0	0.001	0.003	0.001	0	0	0	0
MANUF	0.208	0.143	0.352	0.186	0.378	0.497	0.311	0.467
CONSTR	0.020	0.026	0.109	0.052	0.059	0.103	0.041	0.067
TRANSP	0.047	0.040	0.096	0.075	0.021	0.067	0.039	0
OTHER	0.106	0.075	0.104	0.083	0.048	0.073	0.077	0.044
MAR	0.729	0.724	0.709	0.744	0.824	0.897	0.687	0.822
λ^P	-0.201	-0.269	-0.168	-0.287	-0.177	-0.081	-0.144	-0.185
λ^R	2.452	1.024	1.212	0.793	2.125	0.719	0.412	1.571
N	466	1012	1997	3401	188	165	483	45

Education levels mimic this pattern and seem, therefore, to be an important factor in explaining wage differentials. The group with the highest mean education level, 17.36 years, is the group that has the highest mean wage (Othbil, public sector, English Canada sample). The group with the lowest average level of education, 6.62 years, is the Othnone group of the Quebec private sector. As with wages, the public sector employees of a given region and language group have, in almost all cases, higher mean education levels than their private sector counterparts. This may explain, at least in part, the common belief that public sector workers are overpaid in relation to the private sector. In fact, the public sector may be simply rewarding workers for possessing a higher level of a valuable attribute. It is this type of wage differential, often incorrectly perceived as being unfair, which this thesis attempts to explain.

Experience levels have a fairly close relationship to education levels in that a worker with a high number of years of experience will tend to have a low level of education. This occurs primarily in the monolingual Allophone language groups (Otheng, Othfre, Othnone). These are also the groups that tend to have the lowest wages. Given these observations it is expected that both the education and experience variables will generate positive coefficients, and that the absolute value of the education coefficient will be larger

than that of the experience coefficient.

Means of the immigration variable show that the Allophone language groups have in all regions and both sectors a majority of immigrants, many of whom are recent immigrants (variables IMM1 and IMM2), while the groups with English or French as the home language have a majority of Canadian born individuals. It is assumed that being Canadian born is an advantage, in terms of wages, to being an immigrant due to factors such as cultural adjustment. It is also expected that the wage differentials attributable to immigration will be largest for the Allophone language groups. This is partially due to the expectation that the variables representing recent immigration (IMM1 and IMM2) will have large, negative coefficients, and partially due to the large difference in means of these variables for Allophone groups compared to the Engmono base group.

The most striking contrast in the means of the occupation variables is not between language groups, but between sectors. For example there is a very small number of individuals in the teaching and health industries in the private sector compared to the public sector. Conversely, there are very few individuals in the manufacturing or construction industries in the public sector, yet in the private sector these industries employ more people than any other. In this way some of the

occupational classifications are closely related to the sector of employment and may, therefore, add little to the explanatory power of the model over and above that which the dichotomous sectoral variable (D) does. Many of the other occupational classifications do not appear to be as closely related to the sector of employment and these are expected to enhance the explanatory power of the model.

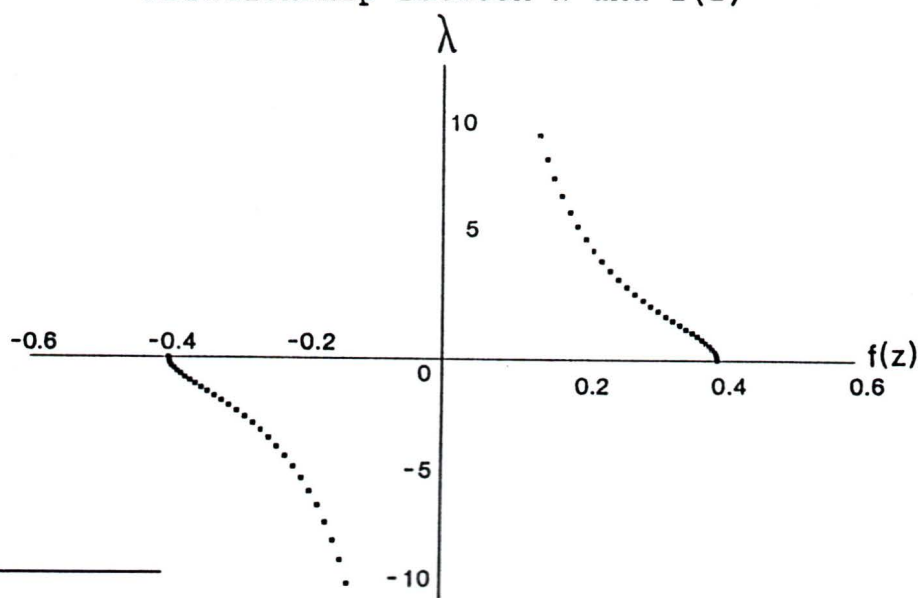
The CMA variables show that the majority of Anglophone and Allophone Canadians live within a CMA. The proportion of Allophones living within a CMA is greater than the proportion of Anglophones living within a CMA. The majority of Francophones have chosen to live outside of a CMA. This pattern is expected to be reflected in the wage differentials. That is, assuming that because of a higher cost of living within a CMA the coefficient on this variable is positive, then we expect a negative differential for the Allophone language groups (due to the negative difference in means i.e., $\bar{CMA}_{Anglo} - \bar{CMA}_{Allo}$ is negative) and a positive differential for the Francophone groups. No sectoral difference is apparent in the means of the CMA variables, therefore the sectoral differential is expected to be small for this variable.

The majority of individuals in the sample are married, regardless of language group, although a higher percentage of

the Allophone groups are married than the Engmono group. There is no obvious pattern to the regional and sectoral difference (which is generally very small) between the proportion of married individuals in the Engmono group and those in the Engbil or Francophone groups. The wage differentials are expected to be small for these latter two groups and larger in absolute value and negative (assuming a positive coefficient) for the Allophone groups as these groups have the highest proportion of married individuals in comparison to other language groups.

Lastly we turn to the sample selection variables. As Figure 1 shows a high absolute value of λ is associated with a low probability of being included in the given sample.

Figure 1
Relationship Between λ and $f(z)$ ²³



²³ $f(z)$ is the ordinate of the standard normal density function.

This is generally reflected in the means of the selection variables. A priori we would expect the Anglophone groups to have a high probability of being selected into the English Canada sample, and the Francophone groups to have a low probability. We would expect the converse to be true for the Quebec sample. Indeed this is what is found. λ^R for the Engmono group in English Canada is 0.023 in the public sector, and 0.026 in the private sector. The Fremono group on the other hand has mean values for λ^R of 2.148 and 1.528 for the public and private sectors respectively. In the Quebec sample λ^R for the Engmono group has a mean value of 2.374 in the public sector and 2.091 in the private sector. The corresponding values for the Fremono group are 0.052 and 0.045 indicating high probabilities of being included in the Quebec sample.

For the sectoral selection variables there is no a priori reason to believe that any group is more likely to be in a particular sector. The means of the sample selection variables suggest, however, that the Allophone groups are more likely to be employed in the private sector than in the public sector.

3.3 DECOMPOSITION OF THE WAGE DIFFERENTIAL

3.3.1 Application

In order to analyze the offered wage differential it is first necessary to define the offered wage. Following Reimers (1983), (see also section 2.5), the offered wage is defined as the observed wage less the average selectivity bias. Rearranging Equation (9), the offered wage is therefore,

$$\begin{aligned} Y_i - \delta_1 \lambda_i^G D_i - \delta_2 \lambda_i^P (1-D_i) - \delta_3 \lambda_i^R \\ = \sum_{j=0}^k (\alpha_j X_{ij} + \beta_j D_i X_{ij}) + \epsilon_i \end{aligned} \quad (10)$$

The application to equation (10) of the OLS properties described in section 2.1 is a relatively straightforward process. If we let Anglophones represent the reference group, and if we let Δ_{ehm} denote the portion of the offered wage differential that can be explained by different endowment levels between language group e (Anglophones) and language group h, in sample m, then

$$\begin{aligned} \Delta_{ehm} = \bar{Y}_{em} - \bar{Y}_{hm} - \delta_1 (\bar{\lambda}_{em}^G - \bar{\lambda}_{hm}^G) D_m - \delta_2 (\bar{\lambda}_{em}^P - \bar{\lambda}_{hm}^P) (1-D_m) - \delta_3 (\bar{\lambda}_{em}^R - \bar{\lambda}_{hm}^R) \\ = \sum_{j=1}^k (\hat{\alpha}_{jm} + \beta_{jm} D_m) (\bar{X}_{ejm} - \bar{X}_{hjm}) \end{aligned} \quad (11)$$

where Δ_{ehm} is simply the sum of the first partial derivatives of $\ln(\text{WAGES}/\text{HOUR})$ with respect to the variable in question, multiplied by the differences in variable means. $\hat{\alpha}_{jm}$ is the

coefficient of the j^{th} variable in sample m , β_{jm} is the coefficient of the j^{th} variable in sample m multiplied by the dichotomous variable corresponding to sector of employment. In the case of variables which enter non linearly (e.g., EDSQ), or interactively (i.e., EDEXP) the first derivative is slightly more complex. \bar{X}_{ejm} and \bar{X}_{hjm} represent the mean values of variable j in sample m for language groups e (Anglophone) and h (comparison group), respectively.

The difference in wage levels due to differences in language skills is simply the negative of the estimated coefficient on the language variable $[(\hat{\alpha}_{jm} + \beta_{jm}D_m)]$, since $(\bar{X}_{ejm} - \bar{X}_{hjm})$ is always equal to -1 for the language variables.

3.3.2 Interpretation

The interpretation of Δ_{ehm} is as follows. Letting h represent, say, the Francophone language group and assuming for the moment that D_m takes on the value 0 (representing a private sector worker), then Δ_{ehm} represents the increase in wage offered (in percent) to private sector, Francophone workers if the average level of the attribute X_{hjm} is equated with the average level possessed by Anglophone private sector workers, \bar{X}_{ejm} . A positive value for $\hat{\alpha}_{jm}$, combined with a positive value for $(\bar{X}_{ejm} - \bar{X}_{hjm})$ indicates that if the group h worker possessed a higher level of attribute X_j , then that worker would receive a higher wage offer. This clearly

identifies a source of the wage offer differential between Anglophone workers and group h workers.

When D_m takes the value 1, the interpretation is similar, except that we are now considering the differential if the worker is employed in the public sector. The total differential in this case is the sum of the coefficients $\hat{\alpha}_{jm}$ and β_{jm} , multiplied by the appropriate difference in means. An additional piece of information is given by the coefficient β_{jm} which represents the differential return to a particular attribute, X_j , as a result of being employed in the public sector as opposed to the private sector. If $\hat{\alpha}_{jm}$, β_{jm} and $(\bar{X}_{ejm} - \bar{X}_{hjm})$ take on a positive values, then the implication is that a government worker of group h (e.g. Francophone) would receive an increase in the wage offered if that worker's mean level of attribute X_j were increased. Furthermore, that increase would be greater because the worker is employed in the government sector as opposed to the private sector. This identifies both attribute levels and sector of employment as sources of wage differentials.

This type of analysis can be applied to each explanatory variable and to each sub-national sample. The final result is a complete decomposition of the total wage offer differential into identifiable sources by region, sector and language

group. This information is a valuable policy tool in that it identifies clearly the sources of wage differences and thus allows policy makers to take the most effective and efficient remedial measures possible towards the elimination of wage differentials due to differing language skills, as well as other factors.

CHAPTER 4

APPLICATION OF THE MODEL TO 1986 CENSUS DATA

4.1 ESTIMATION

4.1.1 Probit Equations

In order to generate the sample selection variables to be employed in the wage equation two steps are required. The first is to estimate probit equations of the form given in Equation (A-1) in Appendix I. Due to the limitations of the computer resources available it is impossible to use the entire sample for estimation purposes. Instead, a random sample of 3500 is drawn from the population and the equations are estimated on this sample. To test for robustness of the resulting equations a second sample is drawn and the estimation procedure is repeated. This additional step yields results which differ very little from the first equation and so the first estimations are used. These results are presented in Appendix II. A description of the theoretical justification of the variables included in these equations is given in the same appendix.

The predictions of these probit equations are then used to determine the inverse of Mill's Ratio (given by Equation (A-2) in Appendix I). The resulting figures serve as independent variables to control for sample selection bias in the wage equation.

4.1.2 Wage Equation

Equation (9) is employed to estimate wage equations for the Canadian population as a whole as well as the sub-samples of Quebec, English Canada and Montreal. The equation is estimated both with and without sample selection variables in order to determine the extent of the bias, if any, associated with the exclusion of this factor.

Preliminary regressions and results of the Breusch-Pagan test reveal the presence of heteroscedasticity, therefore Equation (9) is re-estimated using weighted least squares. Appropriate weights are estimated based upon the results of this test and are presented in Table IV for the models which include sample selection variables. An important feature of these equations is the inclusion of the interactive variables $X1*D$ to $X5*D$. The purpose of these variables is to control for the possibility that the variance of errors is different in the two sectors - an issue of some concern when using this single equation technique²⁴.

4.2 Regression Results

The results of the four regressions performed which include the sample selection variables are given in Tables V-A

²⁴ Note that by employing GLS to estimate the final equation the relationship $\bar{Y} = \bar{X}\hat{\beta}$ no longer holds as the model no longer has a constant term. This, as well as the inclusion of interactive and non-linear variables precludes the calculated wage differentials from summing to the observed wage differential. The basic technique, however, is still valid.

TABLE IV
MODELS OF HETEROSCEDASTIC ERROR TERMS²⁵

VARIABLE	CANADA	ENGLISH CAN.	QUEBEC	MONTREAL
EDUC (X1)	-0.550	-0.603	-0.435	-.0334
EDSQ (X2)	0.015	0.018	0.010	0.008
EXP (X3)	-0.098	-0.085	-0.125	-0.089
EXPSQ (X4)	0.001	0.001	0.001	0.001
EDEXP (X5)	0.005	0.005	0.006	0.004
EDUC*D (X1*D)	-0.419	-0.437	-0.063	-0.397
EDSQ*D (X2*D)	0.013	0.013	0.005	0.015
EXP*D (X3*D)	-0.093	-0.091	-0.064	-0.073
EXPSQ*D (X4*D)	0.001	0.001	0.002	0.001
EDEXP*D (X5*D)	0.001	0.001	-0.003	0.001
D	3.675	3.953	0.588	2.859
Constant	2.291	2.468	1.896	0.767
F-Stat.	205.48	157.49	39.59	15.15

through V-D. The corresponding results for the equations excluding sample selection variables are given in Appendix III. The coefficients on the left hand side of the Tables V-A through V-D represent the impact of each variable on the wages of private sector employees, while the coefficients on the right hand side represent the additional effect on the wages of public sector employees. Therefore, the total effect on public sector employees consists of the sum of the two coefficients. Since the model used is of a log-linear form the coefficients can be interpreted as the percentage change in wages, given a unit change in the explanatory variable. As indicated in the table t-ratios are given at the immediate

²⁵ In each case the dependent variable is $\ln(\text{RESID}^2)$ where RESID is the residual value of the regression of Equation 9 without any correction for heteroscedasticity.

TABLE V-A
REGRESSION RESULTS
CANADA SAMPLE

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Quantitative Variables					
X1 (Education)	0.169	8.51	X34 (D*X1)	-0.069	-1.62*
X2 (Educ. ²)	-0.003	-4.84	X35 (D*X2)	0.002	1.82**
X3 (Experience)	0.073	15.52	X36 (D*X3)	-0.012	-1.24*
X4 (Exp. ²)	-0.0009	-16.42	X37 (D*X4)	-0.00002	-0.19*
X5 (Educ.*Exp.)	-0.002	-7.41	X38 (D*X5)	0.001	2.83
Qualitative Variables					
<u>Language</u>					
X7 (Engbil)	-0.018	-0.65*	X40 (D*X7)	0.036	0.80*
X8 (Fremono)	-0.147	-3.88	X41 (D*X8)	0.173	2.47
X9 (Frebil)	-0.018	-0.55*	X42 (D*X9)	0.076	1.27*
X10 (OtherEng)	-0.219	-7.92	X43 (D*X10)	0.081	1.32*
X11 (OtherFre)	-0.459	-3.54	X44 (D*X11)	-1.859	-5.03
X12 (OtherBil)	-0.151	-2.46	X45 (D*X12)	0.304	2.48
X13 (OtherNone)	-0.165	-1.68**	X46 (D*X13)	0.083	0.21*
<u>Immigration</u>					
X14 (1984-86)	-1.848	-18.42	X47 (D*X14)	-0.414	-1.76**
X15 (1976-83)	-0.178	-5.05	X48 (D*X15)	-0.062	-0.70*
X16 (1961-75)	-0.064	-2.53	X49 (D*X16)	-0.025	-0.52*
X17 (Pre 1961)	0.041	1.50*	X50 (D*X17)	-0.064	-1.34*
<u>Region</u>					
X18 (B.C.)	0.082	2.72	X51 (D*X18)	-0.011	-0.20*
X19 (Prairies)	-0.197	-6.90	X52 (D*X19)	0.152	2.94
X20 (Quebec)	-0.069	-1.88*	X53 (D*X20)	0.031	0.49*
X21 (Maritimes)	-0.104	-3.39	X54 (D*X21)	0.089	1.68**
<u>Occupation</u>					
X22 (Nat. Sci.)	0.080	2.80	X55 (D*X22)	-0.178	-3.29
X23 (Soc. Sci.)	-0.338	-2.60	X56 (D*X23)	0.388	2.30
X24 (Teaching)	-0.080	-0.30*	X57 (D*X24)	0.181	0.60*
X25 (Health)	-0.145	-0.93*	X58 (D*X25)	-0.091	-0.47*
X26 (Clerical)	-0.250	-9.94	X59 (D*X26)	-0.128	-2.07
X27 (Service)	-0.643	-7.85	X60 (D*X27)	0.654	5.08
X28 (Agric.)	-1.342	-24.83	X61 (D*X28)	0.873	7.34
X29 (Primary)	-0.045	-0.72*	X62 (D*X29)	-0.245	-0.91*
X30 (Manuf.)	-0.142	-4.31	X63 (D*X30)	-0.243	-2.22
X31 (Constr.)	-0.181	-5.95	X64 (D*X31)	-0.147	-1.87**
X32 (Transp.)	-0.238	-7.50	X65 (D*X32)	-0.204	-2.21
X33 (Other)	-0.171	-6.30	X66 (D*X33)	-0.115	-1.93**

TABLE V-A
CONTINUED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
<u>Census Metro Area</u>					
CMA1 (Montreal)	0.163	5.96	DCMA1 (D*CMA1)	-0.127	-2.60
CMA2 (Ott./Hull)	0.072	1.90**	DCMA2 (D*CMA2)	0.083	1.52*
CMA3 (Toronto)	0.135	6.30	DCMA3 (D*CMA3)	-0.068	-1.54*
CMA4 (Ham./Kit.)	0.099	3.47	DCMA4 (D*CMA4)	-0.090	-1.48*
CMA5 (Winnipeg)	0.220	5.01	DCMA5 (D*CMA5)	-0.081	-1.04*
CMA6 (Reg./Sas.)	0.088	1.62**	DCMA6 (D*CMA6)	0.142	1.57*
CMA7 (Calgary)	0.334	8.22	DCMA7 (D*CMA7)	-0.254	-3.11
CMA8 (Edmonton)	0.339	8.28	DCMA8 (D*CMA8)	-0.165	-2.32
CMA9 (Vancouver)	0.035	0.96*	DCMA9 (D*CMA9)	-0.064	-0.93*
Married	0.174	11.56	DMAR (D*Mar)	0.018	0.62*
<u>Sample Selection Variables</u>					
λ^P	-0.069	-0.55*	λ^G	0.194	1.64**
Constant (Priv.)	0.162	0.99*	Constant (Pub.)	0.219	0.44*
R ² Adjusted	0.07752				
F Statistic	77.4				
# Observations	79104				

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE V-B
REGRESSION RESULTS
ENGLISH CANADA SAMPLE

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Quantitative Variables					
X1 (Education)	0.170	7.42	X34 (D*X1)	-0.051	-1.05*
X2 (Educ. ²)	-0.003	-4.10	X35 (D*X2)	0.001	0.99*
X3 (Experience)	0.070	13.49	X36 (D*X3)	-0.014	-1.26*
X4 (Exp. ²)	-0.0008	-14.35	X37 (D*X4)	0.00003	0.28*
X5 (Educ.*Exp.)	-0.002	-5.96	X38 (D*X5)	0.001	2.17
Qualitative Variables					
X6 (CMA or Not)	0.124	7.80	X39 (D*X6)	-0.037	-1.22*
<u>Language</u>					
X7 (Engbil)	-0.018	-0.59*	X40 (D*X7)	0.046	1.01*
X8 (Fremono)	-0.164	-0.97*	X41 (D*X8)	0.007	0.02*
X9 (Frebil)	-0.147	-2.73	X42 (D*X9)	-0.006	-0.08*
X10 (OtherEng)	-0.213	-7.64	X43 (D*X10)	0.070	1.14*
X11 (OtherFre)	-1.529	-2.22	X44 (D*X11)	-	.26
X12 (OtherBil)	-0.329	-3.04	X45 (D*X12)	0.365	2.01
X13 (OtherNone)	-0.120	-1.15*	X46 (D*X13)	-0.027	-0.07*
<u>Immigration</u>					
X14 (1984-86)	-1.773	-17.01	X47 (D*X14)	-0.348	-1.42*
X15 (1976-83)	-0.178	-4.87	X48 (D*X15)	-0.100	-1.12*
X16 (1961-75)	-0.050	-1.94**	X49 (D*X16)	-0.059	-1.20*
X17 (Pre 1961)	0.047	1.69**	X50 (D*X17)	-0.082	-1.69**
<u>Occupation</u>					
X22 (Nat. Sci.)	0.057	1.84**	X55 (D*X22)	-0.139	-2.45
X23 (Soc. Sci.)	-0.163	-1.24*	X56 (D*X23)	0.205	1.24*
X24 (Teaching)	0.246	0.93*	X57 (D*X24)	-0.187	-0.65*
X25 (Health)	0.042	0.27*	X58 (D*X25)	-0.193	-1.02*
X26 (Clerical)	-0.268	-10.18	X59 (D*X26)	-0.041	-0.63*
X27 (Service)	-0.497	-6.16	X60 (D*X27)	0.486	3.99
X28 (Agric.)	-1.341	-23.24	X61 (D*X28)	0.928	7.41
X29 (Primary)	-0.031	-0.50*	X62 (D*X29)	-0.464	-1.67**
X30 (Manuf.)	-0.159	-4.77	X63 (D*X30)	-0.224	-2.14
X31 (Constr.)	-0.239	-7.55	X64 (D*X31)	-0.066	-0.81*
X32 (Transp.)	-0.247	-7.22	X65 (D*X32)	-0.206	-2.12
X33 (Other)	-0.178	-6.06	X66 (D*X33)	-0.128	-1.98

26 No observations available in this category.

TABLE V-B
CONTINUED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Mar	0.169	10.13	DMAR (D*Mar)	0.051	1.52*
<u>Sample Selection Variables</u>					
λ^P	0.149	1.25*	λ^G	0.154	1.47*
λ^R	0.090	2.70			
Constant (Priv.)	0.080	0.50*	Constant (Pub.)	0.202	0.38*
R ² Adjusted	0.07852				
F Statistic	82.06				
# Observations	59936				

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE V-C
REGRESSION RESULTS
QUEBEC SAMPLE

<u>PRIVATE SECTOR</u>			<u>PUBLIC SECTOR</u>		
<u>VARIABLE</u>	<u>COEFFICIENT</u>	<u>T-RATIO</u>	<u>VARIABLE</u>	<u>COEFFICIENT</u>	<u>T-RATIO</u>
<u>Quantitative Variables</u>					
X1 (Education)	0.152	3.84	X34 (D*X1)	0.022	0.27*
X2 (Educ. ²)	-0.002	-1.73**	X35 (D*X2)	0.0002	0.06*
X3 (Experience)	0.084	7.69	X36 (D*X3)	0.005	0.27*
X4 (Exp. ²)	-0.001	-8.11	X37 (D*X4)	-0.0002	-0.86*
X5 (Educ.*Exp.)	-0.002	-3.76	X38 (D*X5)	0.001	0.98**
<u>Qualitative Variables</u>					
X6 (CMA or not)	0.161	5.06	X39 (D*X6)	-0.140	-2.37
<u>Language</u>					
X7 (Engbil)	0.007	0.08*	X40 (D*X7)	0.185	1.03*
X8 (Fremono)	-0.117	-1.36*	X41 (D*X8)	0.473	2.82
X9 (Frebil)	0.008	0.09*	X42 (D*X9)	0.404	2.43
X10 (OtherEng)	-0.308	-2.23	X43 (D*X10)	0.413	1.14**
X11 (OtherFre)	-0.280	-1.75**	X44 (D*X11)	-1.252	-3.06
X12 (OtherBil)	-0.021	-0.19*	X45 (D*X12)	0.361	1.61*
X13 (OtherNone)	-0.360	-1.27*	X46 (D*X13)	0.653	0.55*
<u>Immigration</u>					
X14 (1984-86)	-2.485	-8.48	X47 (D*X14)	-0.730	-0.99*
X15 (1976-83)	-0.273	-2.62	X48 (D*X15)	0.266	0.84*
X16 (1961-75)	-0.183	-2.34	X49 (D*X16)	0.102	0.73*
X17 (Pre 1961)	-0.027	-0.30*	X50 (D*X17)	0.015	0.09*
<u>Occupation</u>					
X22 (Nat. Sci.)	0.102	1.57*	X55 (D*X22)	-0.300	-2.29
X23 (Soc. Sci.)	-0.297	-1.03*	X56 (D*X23)	0.627	1.68**
X24 (Teaching)	0.242	0.36*	X57 (D*X24)	0.316	0.43*
X25 (Health)	-0.040	-0.10*	X58 (D*X25)	0.020	0.04*
X26 (Clerical)	-0.269	-4.79	X59 (D*X26)	-0.360	-2.58
X27 (Service)	-0.661	-3.76	X60 (D*X27)	1.011	3.56
X28 (Agric.)	-1.400	-10.55	X61 (D*X28)	0.656	1.94
X29 (Primary)	-0.332	-2.25	X62 (D*X29)	1.161	1.81**
X30 (Manuf.)	-0.201	-2.72	X63 (D*X30)	-0.422	-1.61*
X31 (Constr.)	-0.085	-1.21*	X64 (D*X31)	-0.426	-2.38
X32 (Transp.)	-0.272	-3.91	X65 (D*X32)	-0.135	-0.60*
X33 (Other)	-0.184	-3.00	X66 (D*X33)	-0.134	-0.99*

TABLE V-C
CONTINUED

VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Married	0.184	5.55	DMAR(D*MAR)	-0.064	-1.02*
<u>Sample Selection Variables</u>					
λ^P	-0.058	-0.21*	λ^G	0.686	2.52
λ^R	0.012	0.62*			
Constant (Priv.)	0.062	0.18*	Constant(Pub.)	-1.629	-1.50*
R ² Adjusted	0.06834				
F Statistic	23.62				
# Observations	19119				

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE V-D
REGRESSION RESULTS
MONTREAL SAMPLE

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
<u>Quantitative Variables</u>					
X1 (Education)	0.124	2.714	X34 (D*X1)	0.019	0.10*
X2 (Educ. ²)	-0.002	-1.02*	X35 (D*X2)	0.0006	0.17*
X3 (Experience)	0.074	9.85	X36 (D*X3)	-0.007	-0.21*
X4 (Exp. ²)	-0.001	-6.47	X37 (D*X4)	-0.0002	-0.29*
X5 (Educ.*Exp.)	-0.002	-2.47	X38 (D*X5)	0.001	1.02*
<u>Qualitative Variables</u>					
<u>Language</u>					
X7 (Engbil)	-0.008	-0.09*	X40 (D*X7)	0.417	2.07
X8 (Fremono)	-0.156	-1.85**	X41 (D*X8)	0.652	3.38
X9 (Frebil)	-0.058	-0.68*	X42 (D*X9)	0.636	3.36
X10 (OtherEng)	-0.262	-2.01	X43 (D*X10)	0.480	1.21*
X11 (OtherFre)	-0.202	-1.33*	X44 (D*X11)	-1.649	-2.88
X12 (OtherBil)	-0.031	-0.29*	X45 (D*X12)	0.411	1.67**
X13 (OtherNone)	-0.352	-1.31*	X46 (D*X13)	0.858	0.68*
<u>Immigration</u>					
X14 (1984-86)	-2.597	-9.81	X47 (D*X14)	2.194	2.12
X15 (1976-83)	-0.283	-2.78	X48 (D*X15)	0.348	0.96*
X16 (1961-75)	-0.203	-2.62	X49 (D*X16)	0.103	0.59*
X17 (Pre 1961)	-0.057	-0.64*	X50 (D*X17)	-0.044	-0.22*
<u>Occupation</u>					
X22 (Nat. Sci.)	0.042	0.57*	X55 (D*X22)	-0.349	-1.76**
X23 (Soc. Sci.)	-0.376	-1.16*	X56 (D*X23)	0.819	1.63**
X24 (Teaching)	0.265	0.35*	X57 (D*X24)	0.541	0.59*
X25 (Health)	-0.180	-0.40*	X58 (D*X25)	0.300	0.49*
X26 (Clerical)	-0.264	-4.09	X59 (D*X26)	-0.278	-1.31*
X27 (Service)	-0.688	-3.53	X60 (D*X27)	1.047	2.58
X28 (Agric.)	-0.942	-3.66	X61 (D*X28)	0.946	1.84**
X29 (Primary)	-0.716	-1.37*	X62 (D*X29)	2.007	1.34*
X30 (Manuf.)	-0.196	-2.37	X63 (D*X30)	-0.504	-1.24*
X31 (Constr.)	-0.078	-0.87*	X64 (D*X31)	-0.225	-1.24*
X32 (Transp.)	-0.278	-3.26	X65 (D*X32)	-0.314	-1.01*
X33 (Other)	-0.294	-4.06	X66 (D*X33)	-0.031	-0.15*

TABLE V-D
CONTINUED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Married	0.220	5.48	DMAR(D* <u>MAR</u>)	-0.120	-1.40*
<u>Sample Selection Variables</u>					
λ^P	-0.189	0.59*	λ^G	0.744	1.75**
λ^R	0.003	0.11*			
Constant (Priv.)	0.501	1.25*	Constant(Pub.)	-1.476	-0.86*
R^2 Adjusted	0.079				
F Statistic	13.89				
# Observations	9298				

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

right of the coefficients²⁷. Although the R^2 's are low, the F-statistics indicate overall significance and the results generally fulfil expectations.

Results for the education and experience variables (including their squares and products) are generally as expected and are identical in sign pattern to those found by Lax (1990) and Carliner (1981).²⁸ In all four samples the education and experience variables generate a positive sign, while their squares and product generate negatively signed coefficients indicating that there are positive, yet diminishing returns to education and experience as well as the combination of the two. All coefficients for these variables are statistically significant in the private sector of English Canada and Canada, while in Quebec and Montreal the returns to additional education increase at a constant rate whereas in the Canada and English Canada samples the returns increase at a decreasing rate. In the public sector the differential effects are not significant (except for the EDEXP variable which is significant and positive in Canada and English Canada regional samples) indicating that no sectoral difference is present in the returns to these factors. The noted exceptions

²⁷ The standard errors calculated using GLS are biased in an upwards direction (see Greene 1990, p.740). Although computer software has been developed to calculate the correct standard errors, its acquisition was beyond the scope of resources available for this thesis. Inferences regarding statistical significance should be made with due caution.

²⁸ Note that different models are employed in each case, therefore any comparisons made are not entirely valid.

suggest that the public sector employees are rewarded more for marginal additions to the combination of education and experience than are private sector employees in Canada and English Canada, but not in Quebec or Montreal.

It is interesting to note that the coefficients on the education and experience variables are appreciably larger, ranging from 0.100 to 0.174 for education and from 0.056 to 0.089 for experience, than those found by Lax (1990 p.74, 1981 data)²⁹, ranging from 0.090 to 0.122 for education and from 0.044 to 0.064 for experience, and Carliner (1981 p.392) ranging from 0.053 to 0.059 for education and from 0.043 to 0.047 for experience. This, in conjunction with the lower constant also found in this model compared to these other models, suggests that since 1971 (Carliner's study) employers have significantly increased the returns to these human capital attributes while decreasing the constant wage³⁰. This may, in part, reflect technological advances which require more highly skilled and specialized workers. These figure also suggest a reversal in the trend of lower returns to education over the 1970's suggested by the work of Dooley (1986) and Vaillancourt and Henriques (1986).

²⁹ Referring to his extended model.

³⁰ The reader should bear in mind that different models are being compared here and, therefore, conclusions based on these comparisons should be interpreted with due caution.

The coefficients on the language group variables in all sub-samples show that in the private sector the wage differentials for being in a language group other than the Engmono group are consistently negative (or insignificant). The results for the public sector, however, tend to show less of a disadvantage to non-Engmono's, and in many cases a reversal in sign of the private sector coefficients occurs indicating a wage advantage to bilinguals and non-Engmono public sector workers. This wage advantage is most prevalent in the Quebec and Montreal samples, while in the English Canada sample the only group in the public sector which has a wage advantage in relation to the Engmono group is the Othbil group. These results are an indication of the different ways in which language skills are rewarded in the two sectors and the degree to which different governments pursue language policy initiatives. That is, in all regions the private sector rewards language skills other than English less than it rewards English language skills, while in the public sector a large difference is found in the way in which French language skills are rewarded in Quebec and Montreal as opposed to English Canada. This latter finding indicates that the language policies of the various levels of government in Quebec are working effectively, while there is little, if any, evidence to show that Federal language policies are having an effect in either sector of English Canada.

Results for the immigration variables are as expected, and again are very similar to those of Lax (1990) and Carliner (1981). The results show a pattern of negative, large absolute value coefficients for recent immigrants, progressing to values near zero for those who immigrated prior to 1961. This pattern suggests that recent immigrants are at a disadvantage relative to Canadian born workers or immigrants who have been residents of Canada for a long period of time.

The disadvantage to recent immigrants is most acute in the Quebec and Montreal private sectors, while in the public sector of Quebec and Montreal the coefficients suggest that immigrants have little, if any, disadvantage relative to Canadian born individuals (note that with the exception of the IMM1 variable in the Quebec sample the total effects, i.e. the sum of the public and private sector coefficients, are not significantly different from zero³¹). Conversely, in the English Canada and Canada public sectors, recent immigrants are at a relative disadvantage to their private sector counterparts (again, the coefficients are not statistically different from zero). These differences reduce to zero in all

³¹ This is not obvious from the information given in Tables V-A through V-D. However, in order to determine the significance of the total effects for the public sector, rather than just the significance of the differential effects, we can compute t-ratios for the sum of the public and private sector coefficients (i.e., the total effect for the public sector) by computing the variance of this sum. The variance of the sum of two parameters, say A and B, is expressed as follows:

$$\text{Var}(A+B) = \text{Var}(A) + \text{Var}(B) + 2\text{Cov}(A,B).$$

It is noted that several coefficients are not statistically different from zero. They are assumed to be unbiased, however, and are therefore used in the subsequent computation of wage differentials. Furthermore, there is the possibility of Type II error. These points should be kept in mind when interpreting the regression results or calculated wage differentials.

sectors and regional samples as the length of time since immigration increases.

Results for the Occupation variables indicate that in the private sector a change in occupation to a managerial position from any other occupation, with the exception of Natural Science, results in an increase, or at least no decrease, in wages. This is the same result found by Lax (1990). Carliner (1981) does not include occupational variables in his model.

The largest difference is for Agricultural workers whose wages would increase by 94% or more if they became managers. This result, while seemingly extreme, is not entirely unexpected as Agricultural work in the private sector is highly seasonal and generally low paying.³²

In the public sector the additional effects of the occupational variables are mixed. In some cases the differences are compounded (i.e. Manufacturing), while in other cases the differences are diminished (i.e. Service and Agriculture). No clear pattern is prevalent.

Living in a Census Metropolitan Area has a positive effect on wages in both sectors, although the effect is

³² The mean of $\ln(\text{WAGES}/\text{HOUR})$ for agricultural workers is 0.798 compared to an all occupation average of 2.260.

generally dampened for public sector workers (the two exceptions to this, appearing in the Canada sample only, are the CMA's of Ottawa/Hull and Regina/Saskatoon). This premium is a reflection of the higher cost of living associated with living in a large city.

Married individuals can also expect to earn higher wages than singles in both sectors. There is no significant difference for married public sector workers over private sector workers. These higher wages are thought to be associated with the increased responsibility of being married as well as the increased likelihood of having dependants.

The regression results clearly indicate that some difference in the wage determination process between the government and private sectors exists. This is confirmed by the results of F-tests performed using results from the estimation of the wage equation when all the interactive variables are excluded from the equation³³. The failure to include these variables, in some form, introduces the possibility of mis-specification error.

³³ The appropriate F statistic is given as Equation (8.7.3) in Gujarati (1988). The calculated F statistics and their corresponding critical values are as follows: for the Canada sample $F_{calc} = 9.39$, $F_{.01,43,79016} = 1.59$, for the English Canada sample $F_{calc} = 7.37$, $F_{.01,30,59872} = 1.70$, for the Quebec sample $F_{calc} = 2.72$, $F_{.01,30,19056} = 1.70$, and for the Montreal sample $F_{calc} = 2.13$, $F_{.01,30,9235} = 1.70$.

4.2.1 Sample Selection Statistics

Sample selection variables for sector are significant (at the 10% level) in the public sector in all regions except for English Canada (significant at the 15% level), and always insignificant in the private sector. This is a similar result, in that a difference in wage determination processes is apparent, to that found by Belman and Heywood (1989) whose study focuses on government wage differentials in the United States. They state:

"Such results indicate that while the covariance between omitted factors in the sectoral choice and in the government wage equation is small, the covariance between the omitted choice factors and the omitted factors in the private wage equation is substantial. That omitted choice factors correlate with omitted factors in one wage equation but not the other is consistent with the marked differences in the wage determination process in the two sectors." (Belman and Heywood (1989) p. 432).

Note also that all coefficients for λ^G are positive, as are the mean values for λ^G . This indicates that the process of sector choice positively influences the wages for those who are employed in the government sector. That is, the observed wage is higher than the offered wage. A move to the private sector from the public sector would likely be associated with a decrease in wages. As none of the coefficients on λ^P are statistically different from zero a change from the private sector to the public sector is not likely to affect wages on average.

Regional sample selection variables are significant only in the English Canada sample perhaps indicating that workers in English Canada receive a higher wage, on average, because they have chosen to work in English Canada. If the average worker from English Canada moved to Quebec, he would likely face a lower wage offer since both the coefficient and means for λ^R are positive. In Quebec and Montreal workers who move to English Canada would likely receive the same wage offer as they would in Quebec as the coefficient for λ^R is not significantly different from zero. A likely cause of this is the high proportion of bilinguals in Quebec relative to English Canada. In a bilingual nation with geographical boundaries coinciding with linguistic boundaries, bilingualism is conducive to mobility with a minimum of friction.

At this point it is prudent to briefly consider the results when selection variables are excluded. These results are presented in Appendix III. The important points to note are as follows. First, the estimated coefficients in the wage equations seem to differ little, although close inspection shows that the coefficients are generally of smaller magnitude in the equations where the selection variables are excluded. This finding is consistent with what Gronau (1974) suggests.

Second, the computed t-ratios are generally higher in the equations which exclude sample selection variables. There are

several possible reasons why this would occur and it is impossible to isolate the particular cause. One reason is that the variance computed using OLS (or GLS) on an equation which includes sample selection variables is overstated (see Greene 1990, page 740), therefore, the t-ratios will be understated in these models. Another possible reason is that the exclusion of relevant variables will allow the remaining variables to incorrectly "explain" some of the variance in the dependent variable, thereby leading to a lower standard error.

4.3 WAGE DIFFERENTIALS

The following section applies the methodology described in Chapter 2 and presents an analysis of the resulting wage differentials. The wage differentials calculated from the model where sample selection variables appear are presented in Tables VI-A through VI-D. The results for the models where sample selection variables are excluded are left to an appendix (Appendix III).

Since the primary objective of this thesis is to analyze the monetary returns of language skills in the workplace, that is where the focus will lie. Other factors such as period of immigration, marital status, region of residence, etc. are considered only as control variables, although an entire study could well be conducted on the contribution of any of these factors. Furthermore, the contribution to the overall wage

TABLE VI-A
SUMMARY WAGE DIFFERENTIALS³⁴
CANADA SAMPLE

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.099	0.126	-0.052	0.225	1.391	-0.129	0.138
SELECTION	0.041	0.001	0.024	-0.044	-0.113	-0.006	-0.092
OFFERED WAGE DIFFERENTIAL	-0.140	0.125	-0.076	0.269	1.504	-0.123	0.230
LANGUAGE	-0.018	-0.026	-0.058	0.138	2.318	-0.153	0.082
EDUCATION	-0.084	0.073	-0.038	0.051	0.236	-0.035	0.403
EXPERIENCE	0.027	-0.012	0.014	-0.051	-0.063	-0.028	-0.178
IMMIGRATION	0.003	-0.011	-0.007	0.098	0.216	0.080	0.075
REGION	0.003	0.034	0.028	0.002	0.034	0.018	0.010
OCCUPATION	-0.030	0.029	-0.013	0.043	0.043	0.011	0.041
CMA	-0.017	0.030	0.009	-0.015	0.014	-0.002	-0.020
MARRIED	0.007	0.003	0.003	-0.004	-0.016	0.001	-0.030
TOTAL	-0.110	0.119	-0.063	0.262	2.782	-0.109	0.382

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.077	0.302	-0.006	0.325	0.602	0.186	0.548
SELECTION	-0.008	0.002	-0.005	0.003	0.009	0.002	0.002
OFFERED WAGE DIFFERENTIAL	-0.069	0.300	-0.001	0.322	0.593	0.184	0.546
LANGUAGE	0.018	0.147	0.018	0.219	0.459	0.151	0.165
EDUCATION	-0.058	0.096	-0.016	0.064	0.212	-0.003	0.303
EXPERIENCE	0.015	-0.012	0.000	-0.062	-0.117	-0.020	-0.181
IMMIGRATION	-0.003	-0.007	-0.006	0.089	0.136	0.071	0.200
REGION	0.003	0.025	0.022	-0.018	0.023	0.013	-0.030
OCCUPATION	-0.024	0.025	-0.011	0.041	0.060	0.027	0.139
CMA	-0.022	0.033	-0.007	-0.037	-0.069	-0.064	-0.042
MARRIED	0.003	-0.001	-0.003	-0.009	-0.026	0.008	-0.024
TOTAL	-0.069	0.305	-0.004	0.287	0.678	0.183	0.530

³⁴ Note that the figures in the "OFFERED WAGE DIFFERENTIAL" row do not equal the figures in the "TOTAL" row in this and subsequent wage differential tables as might be expected based on Equation (10). This is due to the inclusion of the squared variables, EDSQ and EXPSQ and the fact that the mean of the square is not equal to the square of the mean. The correction for heteroscedasticity also precludes the two rows from being equal.

TABLE VI-B
SUMMARY WAGE DIFFERENTIALS
ENGLISH CANADA SAMPLE

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.124	0.275	0.076	0.234	N/A	-0.281	0.126
SELECTION	0.016	-0.147	-0.076	-0.037	N/A	-0.089	-0.082
OFFERED WAGE DIFFERENTIAL	-0.140	0.422	0.152	0.271	N/A	-0.192	0.208
LANGUAGE	-0.028	0.157	0.153	0.143	N/A	-0.036	0.147
EDUCATION	-0.071	0.132	-0.005	0.037	N/A	-0.138	0.331
EXPERIENCE	0.032	-0.001	0.033	-0.056	N/A	-0.009	-0.224
IMMIGRATION	0.005	-0.016	-0.005	0.110	N/A	0.126	0.087
OCCUPATION	-0.032	-0.036	-0.008	0.038	N/A	-0.036	0.046
CMA	-0.008	0.021	0.004	-0.022	N/A	-0.017	-0.035
MARRIED	0.008	0.040	0.006	-0.005	N/A	-0.004	-0.032
TOTAL	-0.095	0.297	0.178	0.245	N/A	-0.113	0.320

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.012	0.367	0.029	0.584	0.635	0.248	1.026
SELECTION	-0.001	-0.139	-0.063	-0.011	-0.019	-0.112	-0.024
OFFERED WAGE DIFFERENTIAL	-0.011	0.506	0.092	0.595	0.654	0.360	1.050
LANGUAGE	0.018	0.164	0.147	0.213	1.529	0.329	0.120
EDUCATION	-0.066	0.246	0.055	0.065	0.310	-0.087	0.318
EXPERIENCE	0.018	-0.132	-0.014	-0.069	-0.150	-0.004	-0.204
IMMIGRATION	-0.003	-0.007	-0.003	0.082	0.292	0.094	0.179
OCCUPATION	-0.028	0.010	0.006	0.034	0.069	-0.005	0.117
CMA	-0.009	0.054	0.030	-0.036	-0.059	-0.037	-0.047
MARRIED	0.003	-0.016	0.000	-0.009	-0.044	0.005	-0.025
TOTAL	-0.067	0.319	0.220	0.280	1.947	0.295	0.458

TABLE VI-C
SUMMARY WAGE DIFFERENTIALS
QUEBEC SAMPLE

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.486	-0.362	-0.564	-0.363	0.905	-0.516	-0.253
SELECTION	0.055	0.004	0.080	-0.278	-0.393	-0.132	-0.531
OFFERED WAGE DIFFERENTIAL	-0.541	-0.366	-0.644	-0.085	1.298	-0.384	0.278
LANGUAGE	-0.193	-0.357	-0.412	-0.105	1.531	-0.341	-0.294
EDUCATION	-0.066	0.201	-0.027	0.417	0.519	0.157	0.807
EXPERIENCE	0.082	0.012	0.071	-0.168	-0.128	-0.067	-0.057
IMMIGRATION	-0.051	-0.059	-0.054	-0.028	0.181	-0.023	-0.031
OCCUPATION	0.044	0.106	0.064	0.056	0.143	0.088	0.057
CMA	0.003	0.013	0.008	0.001	0.006	0.002	0.005
MARRIED	-0.005	-0.007	-0.007	-0.016	-0.018	-0.007	-0.033
TOTAL	-0.186	-0.091	-0.357	0.156	2.234	-0.190	0.454

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.079	0.162	0.141	0.316	1.380	0.187	0.492
SELECTION	0.010	0.025	0.018	0.002	0.031	0.025	0.008
OFFERED WAGE DIFFERENTIAL	-0.089	0.137	0.123	0.314	1.349	0.162	0.484
LANGUAGE	-0.007	0.117	-0.008	0.308	0.280	0.021	0.360
EDUCATION	-0.045	0.124	-0.023	0.136	0.263	0.047	0.389
EXPERIENCE	0.108	0.072	0.093	-0.072	-0.105	0.045	-0.241
IMMIGRATION	-0.041	-0.062	-0.060	0.139	0.185	0.090	0.406
OCCUPATION	-0.008	0.027	0.002	0.099	0.087	0.056	0.169
CMA	0.003	0.095	0.043	-0.010	-0.006	-0.011	-0.018
MARRIED	0.002	-0.001	-0.004	-0.012	-0.028	0.009	-0.016
TOTAL	0.011	0.370	0.043	0.587	0.677	0.257	1.049

TABLE VI-D
SUMMARY WAGE DIFFERENTIALS
MONTREAL SAMPLE

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.664	-0.524	-0.728	-0.451	0.523	-0.518	-0.525
SELECTION	0.051	-0.150	0.000	-0.188	-0.641	-0.313	-0.302
OFFERED WAGE DIFFERENTIAL	-0.715	-0.374	-0.728	-0.263	1.164	-0.205	-0.223
LANGUAGE	-0.409	-0.496	-0.578	-0.218	1.851	-0.380	-0.507
EDUCATION	-0.084	0.281	0.033	0.420	0.725	0.285	0.647
EXPERIENCE	0.119	0.046	0.094	-0.098	-0.151	-0.010	0.061
IMMIGRATION	-0.020	-0.040	-0.041	0.028	0.017	0.018	-0.029
OCCUPATION	0.076	0.223	0.141	0.031	0.224	0.207	-0.063
MARRIED	-0.008	-0.002	-0.007	-0.013	-0.020	-0.009	-0.031
TOTAL	-0.325	0.012	-0.358	0.149	2.646	0.111	0.078

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.032	0.317	0.029	0.596	0.598	0.280	1.100
SELECTION	-0.009	0.010	-0.011	0.005	0.028	0.017	0.006
OFFERED WAGE DIFFERENTIAL	-0.023	0.307	0.040	0.591	0.570	0.263	1.094
LANGUAGE	0.008	0.156	0.058	0.262	0.202	0.031	0.351
EDUCATION	-0.022	0.079	-0.006	0.082	0.159	0.037	0.220
EXPERIENCE	0.049	0.028	0.039	-0.049	-0.061	0.016	-0.120
IMMIGRATION	-0.049	-0.069	-0.071	0.155	0.194	0.091	0.429
OCCUPATION	-0.010	0.051	0.010	0.102	0.080	0.059	0.182
MARRIED	0.001	0.004	-0.003	-0.021	-0.037	0.009	-0.020
TOTAL	-0.023	0.249	0.028	0.532	0.537	0.242	1.041

differential of these variables is generally small. The analysis for these factors will be limited to the observations in the following section. Education and experience are more significant determinants of wage differentials thus it is appropriate to remark on these variables in slightly more detail in the body of the analysis.

4.3.1 Wage Differential Calculation - An Example

As the aforementioned control variables are all dichotomous, the directional effect of any one variable is most readily seen by looking at the sign of the regression coefficient. Section 4.2, (Regression Results), describes these general effects.

The sign and magnitude of the differential depends not only on the sign and magnitude of the estimated coefficient, but also on the difference in the proportion of individuals in the language group being analyzed and the base group (Engmono) who possess the quality of interest. For example, in the Quebec public sector the differential associated with being married for the Engbil group is -0.005 suggesting that if this group had the same proportion of individuals married as the Engmono group, then the average wage for this group would decrease by 0.5%. This figure is computed from Equation (11) on page 44 as follows. The regression coefficient is 0.120 indicating unambiguously that wages are higher on average for

married people than for non married individuals. The differential is calculated by multiplying this figure by the difference in proportions of married individuals between the Engbil and the Engmono group, that is by -0.04^{35} . The negative sign of the differential is due to the fact that a larger proportion of Engbils are married than Engmonos. The small magnitude of the differential is due to the fact that the difference in proportions is very small. This example illustrates the fact that the differentials for these dichotomous variables must be examined in terms of their components (regression coefficient and differences in means) before an accurate interpretation can be made. It is best to examine each on a case by case basis.

The following sections analyze the wage differentials between language groups. Engmono is the base group and for each of the other seven language groups an analysis of the portion of the differentials due to education, experience and language skills is presented with the focus being on the latter. Since differentials are calculated for each region and sector it is also possible to make inter-regional and inter-sectoral comparisons.

³⁵ Due to rounding in the text the product is not precisely equal to the differential reported.

4.3.2 Language Based Wage Differentials

English Bilingual

In all sample regions the Engbil group is paid higher, on average, than the Engmono group. This is true for both observed and offered wages. They also, in all cases, have more education and less experience. These facts are reflected in the wage differentials found for these variables. That is, we find that English bilinguals would suffer a decrease in wages if their education levels were equated with the Engmono's, and would obtain a higher wage if they possessed the higher experience levels of the Engmono group. This is expected and indicates that higher levels of education and/or experience earn positive returns.

In Canada as a whole and in English Canada the greater returns to a higher level of education outweigh the lower returns due to lower experience levels. The opposite is true in Quebec and Montreal. In all regions, the education differential is larger and in all regions, except Quebec, the experience differential is larger in magnitude in the public sector than in the private sector.

The additional language skill the Engbil group has compared to the Engmono group is rewarded by the public sector in all regions. The returns range from 1.8% in the Canada wide sample and 2.8% in English Canada sample to 19.3% in

Quebec and 40.9% in Montreal. These latter results illustrate well the emphasis on French language skills in the public sectors of Quebec and Montreal, while the results for the English Canada and the Canada wide sample are inconclusive (differentials are positive, but the coefficients are not statistically different from zero) as to whether or not knowledge of French in addition to English is an asset that is rewarded.

The results found for the private sector are in sharp contrast to those found in the public sector. Indeed in all samples, except Quebec, the differential returns to language for the English group are actually negative³⁶, indicating that if an English monolingual worker expends the time and energy to learn French, then he can actually expect to earn a lower wage in the private sector. Even in Quebec there is no significantly positive return to learning French in addition to English for a private sector worker. This may be a reflection of the predominance of the English language in the North American work environment, of which Quebec is only a small part.

These results beg the question: "Have the language laws and policies had an impact on wage equality?" The studies of Gunderson (1979) and Shapiro and Stelcner (1989) serve as

³⁶ Note, however, that the estimated coefficients are not significantly different from zero.

benchmarks for comparison as these Canadian studies estimate wage equations for both sectors and include language variables. Gunderson (1979) using 1971 Census data finds that bilingual³⁷ private sector workers are paid 2.56% more than public sector workers, ceteris paribus. Shapiro and Stelcner (1989) find, using 1981 Census data, only a 0.5% differential (in favour of public sector workers) between the bilingual groups of the two sectors. Gunderson (1979) finds that bilinguals are at a disadvantage (albeit small) to Engmonos in the public sector and at an advantage in the private sector, while Shapiro and Stelcner (1989) find bilinguals to be at a slight advantage in both sectors.

The results for the Canada wide sample indicate that considerable change with the respect to the returns to bilingualism have taken place since the time of these studies as a result of language laws and policies. Furthermore, the direction of these changes is found to be consistent with the increased emphasis on these language policy initiatives. Specifically, the difference in returns to bilingualism between sectors has progressed from a relative disadvantage to the public sector in 1971 [Gunderson (1979, p.235)] to a small advantage in 1981 [Shapiro and Stelcner (1989, p. 79)] to a 3.6% - 30.4% public sector advantage in 1986 (Table VI-A).

³⁷ Neither Gunderson (1979), nor Shapiro and Stelcner (1989) differentiate between Engbil and Frebil as is done in this thesis.

There are also interesting changes within sectors. That is, in the private sector Gunderson (1979) finds that in 1971 bilinguals are at a 1% advantage (statistically insignificant) to Engmonos, while Shapiro and Stelcner (1989) find for 1981 that bilinguals are at a 3% advantage. The results of the present study indicate that in the private sector, bilinguals are at a 1.8% disadvantage (although statistically insignificant) to Engmonos. In other words the returns to bilingualism found in the private sector in 1981 have disappeared and been replaced with returns similar to those found in 1971, that is they are not significantly different from zero.

In the public sector the returns to bilingualism also display some changes over the 1971 and 1981 findings. Gunderson (1979) finds public sector bilinguals to be at a 1.4% disadvantage relative to Engmonos, while Shapiro and Stelcner (1989) find that this group holds a 3.5% wage advantage. Results in the present study indicate that in the public sector the advantage over Engmonos is 1.8% in favour of Engbils³⁸.

³⁸ Due to the structure of the equation it is not clear whether or not the difference between the test group and the base group (Engmono) is significantly different from zero for the public sector. It is only clear whether or not the coefficient is significantly different from that of the same language group in the private sector. In order to determine statistical significance from the base group, confidence intervals for the sum of the public and private sector coefficients are calculated. These results, although computed, are not presented. They are, however, referred to in the text when a statement about statistical significance of a public sector coefficient is made. Also see fn. 30.

One of the most interesting results of the present study is the strong regional difference displayed in returns to language skills. It is also interesting to note that this difference is limited to the public sector. For example, in the public sector of Montreal the language differential for English is 40.8% while in English Canada it is only 2.8%. In the private sector, the wage differential attributable to language skills differs by only 1% between the Montreal and English Canada samples for the English group. These results are suggestive of the strong influence of language laws in Quebec as opposed to English Canada, while the sectoral difference within Quebec suggests that the influence of these laws has not precipitated to the private sector. There are no studies available which use the Quebec and Montreal subsamples for this type of analysis. This is unfortunate since the results for these regions display large sectoral differences in returns to language skills, and are appreciably different from the results for the Canada and English Canada samples.

French Monolingual

French monolinguals are paid a lower wage on average than the English monolinguals in all regions and both sectors, with the exception of the Quebec and Montreal public sectors. The signs of the overall wage differentials reflect this fact. This is not, however, entirely unexpected, as the working

language of English Canada, and therefore the majority of Canada, is English giving way to a greater demand for Anglophone workers than Francophone workers.

The lower wages of Fremonos in Canada and English Canada are largely attributable to the lower education levels of Fremonos compared to Engmonos in all regions and sectors. The differentials for education vary from 7.3% in the public sector of the Canada sample to 28.1% in the Quebec public sector. In the Quebec and Montreal public sectors wage differentials in favour of Fremonos vis a vis Engmonos would be even greater if they possessed the higher average education levels of the Engmonos.

Experience has a relatively small impact everywhere, except for the English Canada private sector. The small magnitudes are due to the fact that everywhere except in the private sector of English Canada, the mean experience levels of the two groups are nearly identical. In the English Canada private sector, Fremonos have, on average, nearly seven years more experience than the Engmonos, and are rewarded for it as indicated by the negative differential of 13.2%.

In the public sector, in all regions except English Canada, the knowledge of only French generates higher returns than knowledge of only English. These results seem to be

indicative of the language policies of the various governments. The effect is largest in Montreal where a 49.6% advantage is found for the Fremonos over the Engmonos. This reflects the policy of the provincial government of Quebec of actively promoting the use of French only in the workplace. The implication is the same for the Quebec sample where the differential is 35.7%. The effects are less strong in the Canada sample, at 2.6%, although the coefficient is not significantly different from zero (see fn. 37 for an explanation of how this is determined). The results for this sample reflect a mix of both the Federal and Provincial government language policies (or lack thereof), and is, therefore, not a good indicator of the strength of Federal language policies.

The differential for English Canada is large and in favour of Engmonos, although statistically insignificant. This insignificance shows that the governments in English Canada (including the Federal government), where the vast majority of work takes place in English, do not offer a wage significantly different for those who speak only French, as might be expected. Although this result again reflects a mixture of Federal and Provincial language policies it is possible to make some observations (perhaps conjectural) concerning the effectiveness of the Federal policy to promote the use of both official languages. If we assume that the

various provincial governments in English Canada, in the absence of provincial policies promoting the use of French, act like the private sector with respect to returns to language skills (that is, they reward non-English language skills less than English language skills), then the Federal language policies can be seen as the balancing force which results in no significant overall difference in Engmono and Fremono wages in the English Canada public sector. The only way to determine this in a definitive way is to differentiate between the various levels of government.

The sign pattern for the private sector differentials is similar to that found for the private sector Engbil group. That is, in all regions Fremonos are relatively disadvantaged in comparison to Engmonos due to differences in language skills. The differential in Quebec is smallest (the coefficient is statistically insignificant), at 11.7%, while in English Canada the difference, at 16.4%, is larger but is also computed using a statistically insignificant coefficient. In Montreal the difference is 15.6%, while in Canada as a whole a private sector Engmono worker has, ceteris paribus, a 14.7% (statistically significant coefficient) wage advantage over the private sector Fremono worker.

The indicated disadvantage experienced by Fremonos in the Quebec private sector might at first seem counter-intuitive:

one would expect that in a French speaking province Francophones would be at an advantage over Anglophones. A possible explanation of this result might be that it reflects labour market conditions facing the private sector. That is, while English is the preferred language of work in this sector, there is a relatively small supply of Anglophone (referring to home language) workers in Quebec compared to English Canada, while the supply of Francophone workers is relatively large. This creates a shortage of Anglophone workers and a surplus of Francophone workers. The differentials found are consistent with this labour supply scenario. In English Canada, and Canada as a whole, the results have a similar interpretation.

Gunderson (1979) finds that Francophones are at a disadvantage to Anglophones in both sectors, although less so in the private sector. The disadvantage is approximately 10.5% for the public sector and 10% for the private sector. Shapiro and Stelcner (1989) also find Francophones to be at a disadvantage to Anglophones although the magnitude of the disadvantage is much smaller than Gunderson finds. Their results indicate that the sectoral difference reverses from 1971 (Gunderson's study) to 1981 as the private sector is found to be at a 1.2% disadvantage while the disadvantage is 0.9% for the public sector workers.

Results of the present study for the Canada wide sample indicate that Fremonos in the private sector are at a marked disadvantage while in the public sector Fremonos are at a slight advantage over Engmonos as a result of language skills. The results suggest that Federal and Quebec language policies have had some effect in the public sector, although none whatsoever in the private sector for Fremonos. This shows that the private sector has felt no need to adjust its wage function as a result of government language policies. This could be due either to the availability of federal government services in the language of choice, or in Quebec a surplus of Francophone workers.

French Bilingual

The Frebil group has a higher mean wage than the Engmono group in all regions and both sectors, except for the English Canada region. In this region the Anglophone groups earn the highest incomes in both sectors. Once again these results are, in part, a reflection of the relative education and experience levels between groups.

The differentials found for language in the private sector resemble those found for the Fremono group private sector differentials in that no wage advantage is found over

the Engmono group as might be expected.³⁹ This indicates that the private sector does not reward language skills other than English at the same rate as it rewards English language skills. In fact, it seems that the private sector penalizes those whose mother tongue is French, even if they have English language abilities. In the public sector the knowledge of French in addition to English is valued very highly in Quebec and Montreal (a 41.2% and 57.8% advantage, respectively, over Engmono) and moderately (a 5.8% advantage) in the Canada wide sample.

One puzzling result, apparently in contrast to that found by previous researchers, is that the wage differential for French language skills in the public sector of English Canada is positive (implying lower wages than an Engmono worker). The findings indicate that a bilingual Francophone in the public sector of English Canada can actually expect to earn 15.3% (coefficient is statistically significant) less than a worker with equal qualities who speaks only English. One would at first expect that a bilingual worker would earn at least as much as an Anglophone with similar qualities in the public sector as a result of the language policies.

³⁹ The differential for the Quebec Frebil group is negative, however the coefficient is not statistically different from zero.

Due to the fact that markedly different models are used, the discrepancy between this result and those of other authors is generally not comparable. Most authors studying returns to language skills in Canada have not up to this point, included the sample selection techniques used here in their models. Indeed several studies⁴⁰ have shown that failure to include these variables leads to biased parameter estimates. A direct comparison between the results found here and those of these other authors (whose results are potentially erroneous) is, therefore, impossible.

Miller (1987), who studies gender wage differences using the sample selection technique and includes language variables in his analysis finds a similar result in that his coefficient for Frebil is negative (but insignificant) when he includes sample selection variables, implying a positive wage differential (that is an increase in wages would result if the individual became Engmono).⁴¹ When he excludes sample selection variables the coefficient is positive (and still insignificant), as Lax (1990) and Carliner (1981) find. When sample selection variables are excluded (see Appendix III) the Frebil coefficient in English Canada becomes insignificant, although still negative. The magnitude is approximately one-half the magnitude of the coefficient when sample selection

⁴⁰ For example see Miller (1987), Belman and Heywood (1989), Robinson and Tomes (1984).

⁴¹ Note that Miller is using a Canada wide sample in his analysis.

variables are included. This suggests the very real possibility of biased parameter estimates in models where sample selection is ignored.

The second way to analyze this apparently odd result is to consider the data from which it is formed. The data used is not precise enough to give a true sense of the proficiency of languages spoken or even which language is used in the workplace. It may well be that many Frebils in English Canada never use the French language in the workplace, or that their command of the English language is weak, yet required for the workplace (note that 30.8% of this group is employed in the service sector). In either case one would not expect a worker to be rewarded on the basis of additional language skills beyond English.

The next four sections deal with the computed differentials for those individuals whose home language is one other than English or French. These are referred to as the Allo groups. It is important to bear in mind that for some of the samples very few observations are available. This is especially pertinent to the public sector samples. For example in the English Canada, public sector, there are no observations available in the Othfre group. In other groups with minimal numbers of observations it is important to interpret the results with appropriate caution.

Other English

The wage differential (both offered and observed) is positive in all regions and sectors, except for the Montreal and Quebec public sectors. As for the language groups previously analyzed education, experience and language are dominant factors, however, for this group as well as the other three Allophone language groups, period of immigration plays an important role in explaining the wage differential. This is largely due to the fact that the Allophone groups have a much larger proportion of individuals who are recent immigrants than do the groups whose home language is either English or French.

Differentials due to education are all positive reflecting the fact that in all regions and sectors the mean level of education is lower for the Otheng group than it is for the Engmono group. Magnitudes are moderate in all regions and sectors, except for the Quebec and Montreal public sectors (reporting differentials of 41.7% and 42.0% respectively). These large differentials are due to the large difference in mean education levels between these groups and their Engmono counterparts - over four years on average compared to a difference of approximately one year for other regions and sectors.

Differentials for experience are negative in all regions and sectors reflecting the higher mean levels of experience found for the Otheng group compared to the Engmono group. There does not appear to be a sectoral or regional difference in differentials due to experience.

Differentials due to language are positive in all regions and sectors except, once again, the Quebec and Montreal public sectors. Notwithstanding the noted exceptions, these differentials suggest that the degree of proficiency (assuming that home language reflects relative proficiency) in English is rewarded by higher wages (that is, Engmonos are more proficient in English than are Othengs and are therefore rewarded more for their language skills). The two exceptions suggest that an Otheng worker from Montreal or Quebec would be at a disadvantage if he became an Anglophone. This is not entirely unexpected since the members of the Otheng group are bilingual and a large proportion are employed in service occupations. If these people are employed in, say, the tourist industry it is easy to see why these workers would be at a disadvantage to an Engmono worker who in all other ways possess similar qualities. Note also that the numbers of observations in these two groups are relatively small.

Other French

The Othfre group faces a wage disadvantage (offered and observed) relative to Engmonos in all regions and sectors. In many cases the calculated differentials are unrealistically large, i.e., the Canada sample, public sector differential due to language skills alone is 2.318. This may be in part due to the very small numbers of observations available for this group, especially in the public sector, or due to the very large differences in mean wages⁴². Indeed in the public sector of English Canada no observations are available for this language group. Caution should, therefore, be exercised when analyzing the calculated differentials.

As in groups analyzed above, education and experience play a large role in explaining the wage differential. As in the Otheng group immigration also plays an important role. It is the language variables, however, that contribute the most to the wage differentials. The lowest value calculated for the wage differential due to language skills is 20.2% in the private sector of Montreal. The largest is 2.318 (231.8%) in the public sector of the Canada sample.⁴³ While this latter result may be unreasonably high, it and the other language differentials for this language group illustrate the dramatic

⁴² If the difference in means is large the concept of the derivative as a measure of the rate of change is no longer meaningful as it applies, strictly speaking, only to minute changes.

⁴³ There are only sixteen individuals in this category, all of them residents of Quebec.

effects language can have on wages.

Other Bilingual

The Othbil group is an interesting group in that its members are not bilingual, but trilingual. One might suppose that knowledge of three languages would command a high wage. This is true, however, only in the public sector as can be seen by comparing the observed and offered wage differentials for the public and private sectors in the various regions. In the public sector the advantage the Othbil group enjoys over the Engmono group due to language skills varies from 3.6% (English Canada) to 38% (Quebec). In contrast, the results for the private sector show a disadvantage ranging from 2.1% (Quebec) to 32.9% (English Canada). Considering these results in conjunction with the results for other bilingual language groups the conclusion can be made with a fair degree of confidence that the private sector does not reward employees for language skills other than English. The conclusion can also be made that the public sector does provide positive returns to additional language skills.

The Othbil group has a higher mean level of education than the Engmono group in both sectors of the English Canada and Canada samples, and lower mean levels of education in the Montreal and Quebec samples. The signs of the wage differentials reflect these means. The interpretation is

similar for the experience variables. Immigration variables again play an important role, although the magnitudes of the differentials due to immigration are not as large as for the Otheng or Othfre groups. The calculated differentials are positive in all regions and sectors, except for the public sector of Quebec.

Other None

The results for the Othnone group are highly variable and in some cases, due to low numbers of observations as well as other factors, considered to be unreliable. In some instances the differential attributable to the language variable is negative, indicating an advantage over an Engmono worker, ceteris paribus. This is difficult to justify and is considered to be erroneous. One source of error that could cause this type of result is a data error caused by reporting errors. It is not difficult to imagine an individual who speaks neither English nor French filling out a census questionnaire incorrectly.

Bearing the above in mind the results are largely as expected and the calculated differentials do a reasonably good job of predicting the actual differentials. Differentials due to education are positive in all regions and sectors reflecting the relatively low mean education level of workers in this group compared to those of the Engmono group.

Conversely the differentials due to experience are all negative (except for the Montreal public sector) reflecting the greater degree of experience. As with the other Allophone groups immigration accounts for a sizeable portion of the wage disadvantage.

Language differentials, at least where they achieve the anticipated sign, are generally larger than the language differential for most other groups indicating that knowledge of neither English nor French is the source of a distinct wage disadvantage and that this group stands to gain more than any other group for acquiring an additional language skill.

4.4 PREMIUMS TO LANGUAGE SKILLS

Table VII presents wage premiums that would be realized for acquiring additional language skills. The figures in the table reveal some important evidence regarding differences in premiums to languages skills between sectors and in the different regions.

The most striking difference is in the contrasting way in which the two sectors reward language skills. The calculated wage differentials show that in all regions, except English Canada, the Fremont group enjoys a premium over the Engmono group in the public sector. Conversely, in all regions the

TABLE VII
LANGUAGE PREMIUMS⁴⁴
(% change in wages)

Language Group	Premium to Learning:	<u>Canada</u>		<u>English Canada</u>		<u>Quebec</u>		<u>Montreal</u>	
		Public Sector	Private Sector	Public Sector	Private Sector	Public Sector	Private Sector	Public Sector	Private Sector
ENGMONO	FRENCH	1.8	1.8	2.8	-1.8	19.3	0.7	40.9	-0.8
FREMONO	ENGLISH	3.2	12.9	0.4	1.7	5.5	12.5	8.2	9.8
OTHENG	FRENCH	29.1	6.8	17.9	-11.6	23.6	28.7	16.2	23.1
OTHFRE	ENGLISH	247.1	30.8	N/A	120.0	187.2	25.9	223.1	17.1
OTHNONE	FRENCH	-223.6	-29.4	N/A	-140.9	182.5	8.0	235.8	14.9
OTHNONE	ENGLISH	-5.6	-5.4	0.4	-9.3	-18.9	5.2	-28.9	8.9
OTHNONE	ENGLISH and FRENCH	23.5	1.4	18.3	-20.9	-4.7	33.9	-12.7	32.0
Premium to ENGMONO over FREMONO		-2.6	14.7	15.7	16.4	-35.7	11.7	-49.6	15.6
Premium to ENGBIL over FREBIL		-4.0	0.0	18.1	12.9	-21.9	-0.1	-16.9	5.0

⁴⁴ The source of the figures in the table is Tables VI-A through VI-D.

Engmono group enjoys a premium over the Fremono groups in the private sector (see row labelled "Premium to ENGMONO over FREMONO" in Table VII). Similarly, the rewards for the Engmono group learning French are consistently higher, while the rewards for the Fremono group learning English are consistently lower in the public sector than in the private sector. This evidence points to the conclusion that the private sector rewards English language skills over French language skills, while the public sector rewards French language skills over English language skills.

Both sectors generally reward bilingualism although, as Table VII shows, in the private sector there are substantially greater rewards to the Fremono groups learning English than there is for the Engmono groups learning French. In the public sector there are strong regional differences in the returns to language skills. For example, in the English Canada sample the public sector Fremono group is at a 15.7% disadvantage compared to the Engmono group, while in Quebec the Fremono group of the public sector enjoys a 35.7% premium over their Engmono group counterparts. Similar results are found for the returns to bilingual language skills. That is, in the English Canada sample the return to the Engmono group learning French is only 2.8%, while in Quebec it is 19.3% and even higher in Montreal at 40.9%. The results for Quebec reflect the provincial government policy of promoting the use of the

French language in the workplace, while the fact that there is a reward to bilingualism in English Canada is perhaps a reflection of Federal language policy initiatives.

Perhaps the most striking indication of the way in which the different regions and sectors reward language skills is seen in the last row of Table VII. The entries in this row compare two groups with similar language skills, that is Engbil and Frebil. It is clear however, that with the exception of the Canada and Quebec private sectors, that these two groups are rewarded differentially across regions and sectors. The results presented in this row can be thought of as a reflection of the demand-for-language-skills scenarios discussed earlier.

First comparing across regions we can see that English Canada rewards the Engbil considerably more than the Frebil group in both sectors. This is in contrast to the Quebec sample where the advantage lies with the Frebil group in both sectors. The Canada sample reflects the fact that it is comprised of the Quebec and English Canada samples as the differences between the two groups are somewhat moderated. The figures for the Montreal sample suggest that the public sector favours Frebil, as in the Quebec sample, whereas the private sector favours Engbil, much like the English Canada sample.

Comparing results across sectors reiterates previous results. That is, the private sector tends to reward more proficient English language skills (assuming Engbils are more proficient in English than are Frebils), while the public sector rewards more proficient French language skills. The exception to this is the English Canada sample where both sectors favour Engbils over Frebils. This result suggests that Federal language policy initiatives have not impacted the public sector of this region.

CHAPTER 5

SUMMARY AND CONCLUSIONS

5.1 OVERVIEW

This thesis attempts to explain wage differentials in Canada in terms of a variety of human capital, demographic and labour market variables. The primary focus is on explaining the returns attributable to language skills, while a secondary focus is to analyze how these returns differ between the government and private sectors. A tertiary focus is to introduce sample selection methods into the analysis to control for any bias which might be introduced into the estimates if this factor is ignored.

The motivation for the idea of this thesis is the work of Carliner (1981) and Lax (1990), while the motivation of the extension of their ideas to include sectoral and sample selection variables is based upon a survey of the recent literature on wage differentials. The structure of the model of Lax (1990) is otherwise followed closely to facilitate comparison.

A human capital wage model is estimated including sample selection variables generated by probit equations. This allows the formation of a measure of offered wages. The offered wage is then decomposed using fundamental properties of OLS estimators. The calculated wage differentials are then

analyzed by language group with emphasis on sectoral differences.

The results generally fulfil expectations, although the measures of goodness of fit (adjusted R^2 's) are low indicating that some important variables may have been inadvertently excluded from the model. Nevertheless, some important and valid conclusions are reached.

5.2 SUMMARY OF FINDINGS

The primary finding of this thesis is that a stark difference exists in the way language skills are rewarded in the public and private sectors. We find that in all regions the ability to speak two or more languages is rewarded in the public sector. However, in the private sector bilingual groups receive little or no additional wage as a result of their additional language skills over those who speak only English. In many cases the bilingual groups are at a disadvantage to monolingual Anglophones. This is reflective of two things: one is the language policies of the various governments, the other is the value of language skills in the private sector. The results suggest that the language policies put in place at various levels of the public sector are working effectively, but that there has been no resulting influence passed on to the private sector.

A second important finding of this thesis is that language skills are rewarded differentially in Quebec as compared to the rest of Canada. In the public sector of Quebec all language groups (except Othfre) enjoy a wage advantage over the Engmono group as a result of language skills. In the English Canada public sector this is only true for the Engbil and Othbil groups. The indication here is that the government in Quebec is strongly promoting the use of French in the workplace (as suggested by the differential for the Fremono group). This is consistent with the language laws in place in Quebec. The effects have not been passed to the private sector of Quebec, but they have, to a certain extent, been passed to the public sector of Canada as a whole. That is, the ability to speak French - with the exception of Frebil in English Canada - is rewarded more than is the ability to speak English in the Canadian public sector.

A third important finding is that in the public sector of all regions, the returns to an individual from the Engmono group to learning French are higher than those for a member of the Fremono group learning English. This is seemingly in contrast to the results found by Lax (1990) and Carliner (1981), however it is largely due to the structure of the model, as the results for the private sector show that the advantage is reversed. This result highlights two important points. First, it highlights that the returns to learning

French are greater than the returns to learning English in the public sector, a finding consistent with language policy initiatives. Second, it highlights the importance of including sector variables in the equation. It is also found that the inclusion of sample selection variables does not alter the results to a large degree. However, in some cases the estimated sample selection coefficients are statistically significant and lead to results worthy of further investigation.

Does the Canadian workplace operate in a truly bilingual fashion, offering equal wages, ceteris paribus, regardless of which official language is spoken? Clearly, the answer is "No".

Are returns to language skills dependant on sector of employment? The answer is "Yes". In fact, the findings of this thesis indicate that sector of employment is the primary source of language-based wage differentials. This reflects the application of language policy initiatives by the Federal and Quebec public sectors, and the lack of transfer of these initiatives to the public sector of English Canada and the private sector in all regions.

Do these differences vary across the sub-regions of Canada? Yes. In the public sector the differences between

the English Canada and Quebec samples are stark. This reflects the strong commitment on the part of the Quebec provincial government to upholding the primacy of the French language in the Province of Quebec and the lack of language policy initiatives on the part of the governments of English Canada. This important information is not revealed in the Canada sample as it is an amalgamation of these contrasting results. In the private sector results are more uniform across regions.

Has Canada made progress since 1971 in its struggle for wage equality between language groups? Gunderson (1979) finds that in 1971 the returns to bilingualism are higher in the private sector than in the public sector, and that bilingualism is not rewarded in the public sector. Shapiro and Stelcner (1989) find the opposite result, that is, the returns to bilingualism are higher in the public sector than in the private sector, and that bilingualism is rewarded in both sectors. The results of the present study indicate that a large public sector advantage in returns to language skills other than English exists. Additionally, the results indicate that returns to language skills other than English are negative or zero in the private sector regardless of region, but positive in the public sector in all regions except English Canada. In other words, while progress has been made, the entire burden of bilingualism is shouldered by the Federal

public sector, while the public sector of Quebec maintains a strong and effective policy to promote the use of the French language.

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APPENDIX ISample Selection Statistics

The sample selection technique described in the text requires the use of the so called Probit model to generate sample selection statistics to be included in the wage equation as independent variables. This appendix describes this selection variable generating process and its application in the present context, while Appendix II describes the estimated probit model in more detail.

The procedure for estimating the sample selection statistics used in Equation 9 is as follows. Using data from the entire national sample estimate for each sub sample and for the sector choice, estimate the probit model:

$$z_{ij}^* = \gamma_j' \mathbf{w}_{ij} + u_{ij} \quad (\text{A-1})$$

Where z is a dichotomous variable (= 1 if observation i belongs to the sample of interest j , and = 0 otherwise) and where \mathbf{w}_{ij} is a set of explanatory variables. Then for each observation i in the sample of interest j compute:

$$\hat{\lambda}_{ij} = \frac{\phi(\hat{\gamma}_j' \mathbf{w}_{ij})}{\Phi(\hat{\gamma}_j' \mathbf{w}_{ij})} \quad j = 1, 2. \quad (\text{A-2})$$

where ϕ is the probability density function of the normal distribution and where Φ is the cumulative normal density function.

For the sector selection process it is also necessary to compute:

$$\hat{\lambda}_{i1}^* = \frac{-\phi(\hat{\gamma}_1' \mathbf{W}_{i1})}{1 - \Phi(\hat{\gamma}_1' \mathbf{W}_{i1})} \quad (\text{A-3})$$

which can be thought of as the complement of λ_{i1} . This completes the specification of Equation 9.

APPENDIX II
PROBIT RESULTS

For this particular application four probit models are estimated: one for each of three regional samples, and one for the choice between employment in the public and private sector. For the regional sub-sample equations, the explanatory variables chosen are language group, age, education, occupation, marital status, place of birth and ethnic origin. The explanatory variables for the public/private sector choice are age, occupation, language group, region of residence, education, and place of birth. Due to the problem of perfect collinearity it is necessary to exclude at least one variable from the wage equation that is included in the probit equation. The excluded variable in the wage equation is place of birth for the sector probit, while for the regional probits both place of birth and ethnic origin are excluded.

TABLE A-II-1
ESTIMATED PROBIT EQUATIONS

VARIABLE	GOVERNMENT	ENGLISH CANADA	QUEBEC	MONTREAL
D (Govt)		0.27904 (1.80)	-0.27904 (1.80)	-0.20538 (-2.17)
AGE	0.020593 (7.42)	-0.00619 (-1.37)	0.00619 (1.37)	
X1 (EDUC)	0.082645 (7.84)			
X7 (ENGBIL)	0.215820 (1.80)	-0.98306 (-5.95)	0.98306 (5.95)	1.38000 (8.99)
X8 (FREMONO)	0.191080 (1.08)	-3.34990 (-12.26)	3.34990 (12.26)	1.33220 (6.70)
X9 (FREBIL)	0.246720 (1.66)	-2.62150 (-12.02)	2.62150 (12.02)	1.97300 (10.50)
X10 (OTHENG)		0.18288 (0.86)	-0.18288 (-0.86)	-0.12627 (-0.64)
X11 (OTHFRE)		-7.41620 (-0.067)	7.41620 (0.067)	1.17790 (3.60)
X12 (OTHBIL)		-2.60450 (-9.63)	2.60450 (9.63)	2.27530 (9.70)
X13(OTHNONE)		-0.48373 (-1.05)	0.48373 (1.05)	0.57826 (1.32)
OTHLANG ⁴⁵	0.00029 (0.002)			
X18 (B.C.)	0.20596 (1.65)			
X19 (PRAIR)	0.10997 (0.92)			
X20 (QUE)	-0.19286 (-1.32)			
X21 (MARIT)	0.39532 (2.40)			
X22 (NATSCI)	-0.23742 (-2.05)	-0.32796 (-1.60)	0.32796 (1.60)	
X23 (SOCSCI)	1.34950 (5.61)	0.56022 (1.13)	-0.56022 (-1.13)	
X24 (TEACH)	2.51600 (9.60)	-0.78557 (-2.62)	0.78557 (2.62)	
X25 (HEAL)	1.55160 (6.80)	-0.19944 (-0.42)	0.19944 (0.42)	
X26 (CLERIC)	-0.33464 (-3.30)	-0.17148 (-0.99)	0.17148 (0.99)	
X27 (SERV)	1.24840 (11.80)	-0.34619 (-1.65)	0.34619 (1.65)	
X28 (AGRIC)	-0.10460 (-4.30)	0.30766 (0.54)	-0.30766 (-0.54)	
X29 (PRIM)	-4.86110 (-0.04)	0.95369 (1.80)	-0.95369 (-1.80)	

⁴⁵ OTHLANG is the combined group of X10, X11, X12, and X13.

VARIABLE	GOVERNMENT	ENGLISH CANADA	QUEBEC	MONTREAL
X30 (MANUF)	-0.81771 (-7.00)	-0.02773 (-0.16)	0.02773 (0.16)	
X31 (CONSTR)	-0.40487 (-3.09)	0.10446 (0.46)	-0.10446 (-0.46)	
X32 (TRANSP)	-0.31757 (-2.20)	0.09284 (0.38)	-0.09284 (-0.38)	
X33 (OTHER)	-0.19198 (-1.54)	0.46045 (1.90)	-0.46045 (-1.90)	
ETHNIC1		0.28680 (1.72)	-0.28680 (-1.72)	-0.16797 (-1.14)
ETHNIC2		0.20906 (0.92)	-0.20906 (-0.92)	-0.70714 (-3.95)
ETHNIC3		0.87662 (2.87)	-0.87662 (-2.87)	-0.74280 (-2.80)
BIRTH1	0.20061 (1.22)	0.26898 (1.15)	-0.26898 (-1.15)	-0.43429 (-2.20)
BIRTH2	0.41788 (2.90)	-1.33070 (-7.78)	1.33070 (7.78)	0.36733 (2.52)
BIRTH3	0.26459 (2.47)	1.07420 (4.90)	-1.07420 (-4.90)	-1.38420 (-6.03)
BIRTH4	0.20869 (1.58)	1.14120 (3.72)	-1.14120 (-3.72)	-1.11340 (-4.17)
BIRTH5	0.22222 (1.30)	3.65560 (0.11)	-3.65560 (-0.11)	-4.73210 (-0.04)
CMA	-0.15016 (-2.30)	-0.70985 (-5.28)	0.70985 (5.28)	
MAR				-0.12769 (-1.47)
CONSTANT	-3.05220 (-11.76)	2.54380 (8.76)	-2.54380 (-8.76)	-1.49640 (-10.98)
χ^2	1100	3211	3211	1029

where the variables are defined as in the body of the thesis with the following list of additional variables:

ETHNIC1 = 1 if ancestry is British, 0 otherwise;
 ETHNIC2 = 1 if ancestry is French, 0 otherwise;
 ETHNIC3 = 1 if ancestry is British and French, 0 otherwise;
 BIRTH1 = 1 if place of birth is the Maritimes, 0 otherwise;
 BIRTH2 = 1 if place of birth is Quebec, 0 otherwise;
 BIRTH3 = 1 if place of birth is Ontario, 0 otherwise;
 BIRTH4 = 1 if place of birth is the Prairies, 0 otherwise;
 BIRTH5 = 1 if place of birth is B.C., 0 otherwise;

APPENDIX III
RESULTS EXCLUDING SAMPLE SELECTION

This appendix presents the results found when sample selection variable are not included. Table A-III-1 presents the weighting scheme used to correct for heteroscedasticity, while Tables A-III-2 and A-III-3 present the regression results and calculated wage differentials respectively. The important points to note are as follows. First, the estimated coefficients in the wage equations seem to differ little, although close inspection will show that the coefficients are generally of smaller magnitude in the equations where the selection variables are excluded. This finding is consistent with what Gronau (1974) suggests.

Second, the computed t-ratios are generally higher in the equations which do not include sample selection variables. There are several possible reasons why this would occur and it is impossible to isolate the particular cause. One reason is that the variance computed using OLS on an equation which includes sample selection variables is overstated, therefore, the t-ratios will be understated in these models. Another possible reason is that the exclusion of relevant variables will allow the remaining variables to incorrectly "explain" some of the variance in the dependent variable, thereby leading to a lower standard error.

TABLE A-III-1
MODELS OF THE HETEROSCEDASTIC ERROR TERM⁴⁶
Sample Selection Variables Excluded

VARIABLE	CANADA	ENGLISH CAN.	QUEBEC	MONTREAL
EDUC (X1)	-0.549	-0.603	-0.417	-0.333
EDSQ (X2)	0.015	0.018	0.010	0.008
EXP (X3)	-0.097	-0.085	-0.126	-0.088
EXPSQ (X4)	0.001	0.001	0.001	0.001
EDEXP (X5)	0.005	0.005	0.006	0.004
EDUC*D (X1*D)	-0.406	-0.436	-0.060	-0.274
EDSQ*D (X2*D)	0.013	0.013	0.005	0.012
EXP*D (X3*D)	-0.092	-0.090	-0.068	-0.047
EXPSQ*D (X4*D)	0.001	0.001	0.002	0.001
EDEXP*D (X5*D)	0.001	0.001	-0.003	0.001
D	3.573	3.937	0.559	1.680
Constant	2.276	2.468	1.787	0.763
F-Stat.	204.08	158.45	40.55	14.85

⁴⁶ In each case the dependent variable is $\ln(\text{RESID}^2)$ where RESID is the residual value of the regression of Equation 9 without any correction for heteroscedasticity.

TABLE A-III-2A
REGRESSION RESULTS
CANADA SAMPLE
SAMPLE SELECTION EXCLUDED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Quantitative Variables					
X1 (Education)	0.167	8.52	X34 (D*X1)	-0.092	-2.31
X2 (Educ. ²)	-0.003	-4.92	X35 (D*X2)	0.002	2.09
X3 (Experience)	0.073	15.55	X36 (D*X3)	-0.016	-1.69**
X4 (Exp. ²)	-0.0008	-16.50	X37 (D*X4)	-0.00002	-0.18*
X5 (Educ.*Exp.)	-0.002	-7.58	X38 (D*X5)	0.001	3.05
Qualitative Variables					
<u>Language</u>					
X7 (Engbil)	-0.012	-0.47**	X40 (D*X7)	0.006	0.14*
X8 (Fremono)	-0.142	-3.87	X41 (D*X8)	0.140	2.07
X9 (Frebil)	-0.012	-0.38**	X42 (D*X9)	0.037	0.66*
X10 (OtherEng)	-0.219	-7.91	X43 (D*X10)	0.081	1.32*
X11 (OtherFre)	-0.455	-3.52	X44 (D*X11)	-1.838	-4.98
X12 (OtherBil)	-0.151	-2.46	X45 (D*X12)	0.303	2.47
X13 (OtherNone)	-0.165	-1.69**	X46 (D*X13)	0.081	0.20*
<u>Immigration</u>					
X14 (1984-86)	-1.852	-18.54	X47 (D*X14)	-0.392	-1.66**
X15 (1976-83)	-0.183	-5.40	X48 (D*X15)	-0.029	-0.33*
X16 (1961-75)	-0.069	-2.96	X49 (D*X16)	0.009	0.21*
X17 (Pre 1961)	0.035	1.40	X50 (D*X17)	-0.031	-0.71*
<u>Region</u>					
X18 (B.C.)	0.086	2.90	X51 (D*X18)	-0.035	-0.65*
X19 (Prairies)	-0.196	-6.89	X52 (D*X19)	0.142	2.78
X20 (Quebec)	-0.071	-1.96	X53 (D*X20)	0.045	0.71*
X21 (Maritimes)	-0.096	-3.50	X54 (D*X21)	0.044	0.96*
<u>Occupation</u>					
X22 (Nat. Sci.)	0.073	2.81	X55 (D*X22)	-0.131	-2.79
X23 (Soc. Sci.)	-0.280	-3.67	X56 (D*X23)	0.172	1.93
X24 (Teaching)	0.038	0.24*	X57 (D*X24)	-0.151	-0.92*
X25 (Health)	-0.079	-0.78*	X58 (D*X25)	-0.335	-3.05
X26 (Clerical)	-0.258	-12.81	X59 (D*X26)	-0.060	-1.26*
X27 (Service)	-0.602	-18.42	X60 (D*X27)	0.458	10.28
X28 (Agric.)	-1.347	-25.17	X61 (D*X28)	0.908	7.76
X29 (Primary)	-0.067	-1.40*	X62 (D*X29)	-0.485	-2.25
X30 (Manuf.)	-0.157	-7.93	X63 (D*X30)	-0.089	-1.41*
X31 (Constr.)	-0.190	-7.51	X64 (D*X31)	-0.065	-1.04*
X32 (Transp.)	-0.246	-8.71	X65 (D*X32)	-0.138	-1.65**
X33 (Other)	-0.176	-6.96	X66 (D*X33)	-0.073	-1.35*

TABLE A-III-2A
CONTINUED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
<u>Census Metro Area</u>					
CMA1 (Montreal)	0.160	5.97	DCMA1 (D*CMA1)	-0.107	-2.26
CMA2 (Ott./Hull)	0.069	1.83**	DCMA2 (D*CMA2)	0.105	1.99
CMA3 (Toronto)	0.132	6.35	DCMA3 (D*CMA3)	-0.047	-1.11*
CMA4 (Ham./Kit.)	0.096	3.42	DCMA4 (D*CMA4)	-0.073	-1.21*
CMA5 (Winnipeg)	0.217	4.98	DCMA5 (D*CMA5)	-0.062	-0.81*
CMA6 (Reg./Sas.)	0.086	1.58*	DCMA6 (D*CMA6)	0.164	1.82**
CMA7 (Calgary)	0.332	8.21	DCMA7 (D*CMA7)	-0.236	-2.91
CMA8 (Edmonton)	0.336	8.28	DCMA8 (D*CMA8)	-0.146	-2.08
CMA9 (Vancouver)	0.032	0.89*	DCMA9 (D*CMA9)	-0.045	-0.65*
Married	0.174	11.57	DMAR (D*Mar)	0.018	0.61*
Constant (Priv.)	0.180	1.12*	Constant (Pub.)	0.781	2.22
R ² Adjusted	0.07753				
F Statistic	79.2				
# Observations	79104				

* Insignificant at the 10% level.

* Insignificant at the 5% level, but significant at the 10% level.

TABLE A-III-2B
REGRESSION RESULTS
ENGLISH CANADA SAMPLE
SAMPLE SELECTION EXCLUDED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Quantitative Variables					
X1 (Education)	0.173	7.60	X34 (D*X1)	-0.074	-1.57*
X2 (Educ. ²)	-0.003	-4.53	X35 (D*X2)	0.002	1.35*
X3 (Experience)	0.071	13.63	X36 (D*X3)	-0.018	-1.67**
X4 (Exp. ²)	-0.0008	-14.56	X37 (D*X4)	0.00004	0.42*
X5 (Educ.*Exp.)	-0.002	-6.44	X38 (D*X5)	0.001	2.56
Qualitative Variables					
X6 (CMA or Not)	0.138	9.80	X39 (D*X6)	-0.023	-0.92*
<u>Language</u>					
X7 (Engbil)	-0.009	-0.31*	X40 (D*X7)	0.037	0.88*
X8 (Fremono)	-0.037	-0.23*	X41 (D*X8)	0.047	0.10*
X9 (Frebil)	-0.084	-1.85**	X42 (D*X9)	0.008	0.11*
X10 (OtherEng)	-0.215	-7.70	X43 (D*X10)	0.073	1.18*
X11 (OtherFre)	-1.546	-2.25	X44 (D*X11)	-	.47
X12 (OtherBil)	-0.212	-2.13	X45 (D*X12)	0.364	2.00
X13 (OtherNone)	-0.108	-1.03*	X46 (D*X13)	-0.035	-0.08*
<u>Immigration</u>					
X14 (1984-86)	-1.756	-16.93	X47 (D*X14)	-0.343	-1.40*
X15 (1976-83)	-0.161	-4.56	X48 (D*X15)	-0.092	-1.04*
X16 (1961-75)	-0.034	-1.40*	X49 (D*X16)	-0.048	-1.04**
X17 (Pre 1961)	0.064	2.48	X50 (D*X17)	-0.071	-1.58*
<u>Occupation</u>					
X22 (Nat. Sci.)	0.072	2.52	X55 (D*X22)	-0.120	-2.34
X23 (Soc. Sci.)	-0.292	-3.40	X56 (D*X23)	0.205	2.04
X24 (Teaching)	0.002	0.01*	X57 (D*X24)	-0.108	-0.62*
X25 (Health)	-0.097	-0.91*	X58 (D*X25)	-0.195	-1.64**
X26 (Clerical)	-0.250	-11.19	X59 (D*X26)	-0.011	-0.20*
X27 (Service)	-0.583	-15.92	X60 (D*X27)	0.450	8.99
X28 (Agric.)	-1.332	-23.29	X61 (D*X28)	0.943	7.61
X29 (Primary)	0.011	0.22*	X62 (D*X29)	-0.720	-3.06
X30 (Manuf.)	-0.128	-5.86	X63 (D*X30)	-0.144	-2.06
X31 (Constr.)	-0.221	-8.05	X64 (D*X31)	-0.030	-0.42*
X32 (Transp.)	-0.231	-7.36	X65 (D*X32)	-0.178	-1.94**
X33 (Other)	-0.169	-6.08	X66 (D*X33)	-0.111	-1.82**

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE A-III-2B
CONTINUED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Mar	0.169	10.14	DMAR (D*Mar)	0.049	1.48*
Constant (Priv.)	0.113	0.61*	Constant (Pub.)	0.662	1.62*
R ² Adjusted	0.07855				
F Statistic	86.15				
# Observations	59936				

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE A-III-2C
REGRESSION RESULTS
QUEBEC SAMPLE
SAMPLE SELECTION EXCLUDED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
<u>Quantitative Variables</u>					
X1 (Education)	0.149	4.11	X34 (D*X1)	-0.0008	0.01*
X2 (Educ. ²)	-0.002	-1.87**	X35 (D*X2)	-0.0003	-0.13*
X3 (Experience)	0.084	8.22	X36 (D*X3)	-0.0007	0.02*
X4 (Exp. ²)	-0.001	-8.69	X37 (D*X4)	-0.0002	-0.62*
X5 (Educ.*Exp.)	-0.002	-4.13	X38 (D*X5)	0.0009	0.68*
<u>Qualitative Variables</u>					
X6 (Cma or not)	0.158	5.74	X39 (D*X6)	-0.072	-1.11*
<u>Language</u>					
X7 (Engbil)	-0.002	-0.03*	X40 (D*X7)	0.067	0.29*
X8 (Fremono)	-0.137	-1.93**	X41 (D*X8)	0.342	1.62*
X9 (Frebil)	-0.009	-0.13*	X42 (D*X9)	0.244	1.18*
X10 (OtherEng)	-0.309	-2.39	X43 (D*X10)	0.422	0.93*
X11 (OtherFre)	-0.299	-2.10	X44 (D*X11)	-0.718	-1.43*
X12 (OtherBil)	-0.041	-0.43*	X45 (D*X12)	0.303	1.05*
X13 (OtherNone)	-0.360	-1.37*	X46 (D*X13)	0.680	0.50*
<u>Immigration</u>					
X14 (1984-86)	-2.486	-9.16	X47 (D*X14)	-1.090	-1.06*
X15 (1976-83)	-0.276	-2.99	X48 (D*X15)	0.474	1.14*
X16 (1961-75)	-0.186	-2.78	X49 (D*X16)	0.214	1.30*
X17 (Pre 1961)	-0.031	-0.40*	X50 (D*X17)	0.121	0.60*
<u>Occupation</u>					
X22 (Nat. Sci.)	0.096	1.75**	X55 (D*X22)	-0.150	-1.00*
X23 (Soc. Sci.)	-0.245	-1.63*	X56 (D*X23)	0.006	0.03*
X24 (Teaching)	0.346	0.81*	X57 (D*X24)	-0.538	-1.23*
X25 (Health)	0.018	0.07*	X58 (D*X25)	-0.626	-2.23
X26 (Clerical)	-0.277	-6.67	X59 (D*X26)	-0.081	-0.62*
X27 (Service)	-0.626	-9.69	X60 (D*X27)	0.455	4.12
X28 (Agric.)	-1.399	-11.37	X61 (D*X28)	0.833	2.13
X29 (Primary)	-0.346	-3.11	X62 (D*X29)	0.272	0.41*
X30 (Manuf.)	-0.214	-5.21	X63 (D*X30)	0.151	0.83*
X31 (Constr.)	-0.093	-1.69**	X64 (D*X31)	-0.081	-0.49*
X32 (Transp.)	-0.280	-4.91	X65 (D*X32)	0.164	0.68*
X33 (Other)	-0.187	-3.52	X66 (D*X33)	0.004	0.03*

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE A-III-2C
CONTINUED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Married	0.185	5.96	DMAR(D*MAR)	-0.054	-0.69*
Constant (Priv.)	0.112	0.36*	Constant(Pub.)	-0.105	-0.12*
R ² Adjusted	0.06855				
F Statistic	24.12				
# Observations	19119				

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE A-III-2D
REGRESSION RESULTS
MONTREAL SAMPLE
SAMPLE SELECTION VARIABLES EXCLUDED

<u>PRIVATE SECTOR</u>			<u>PUBLIC</u>		
<u>SECTOR</u>					
<u>VARIABLE</u>	<u>COEFFICIENT</u>	<u>T-RATIO</u>	<u>VARIABLE</u>	<u>COEFFICIENT</u>	<u>T-RATIO</u>
<u>Quantitative Variables</u>					
X1 (Education)	0.119	2.65	X34 (D*X1)	-0.101	-0.95*
X2 (Educ. ²)	-0.001	-0.87*	X35 (D*X2)	0.001	0.49*
X3 (Experience)	0.073	5.82	X36 (D*X3)	-0.023	-0.75*
X4 (Exp. ²)	-0.001	-6.43	X37 (D*X4)	-0.0001	-0.17*
X5 (Educ.*Exp.)	-0.001	-4.41	X38 (D*X5)	0.002	1.32*
<u>Qualitative Variables</u>					
<u>Language</u>					
X7 (Engbil)	0.0004	0.01*	X40 (D*X7)	0.312	1.61*
X8 (Fremono)	-0.149	-1.93**	X41 (D*X8)	0.541	2.94
X9 (Frebil)	-0.047	-0.66*	X42 (D*X9)	0.496	2.82
X10 (OtherEng)	-0.261	-2.00	X43 (D*X10)	0.464	1.18*
X11 (OtherFre)	-0.195	-1.33*	X44 (D*X11)	-1.625	-2.89
X12 (OtherBil)	-0.032	-0.34*	X45 (D*X12)	0.412	1.69**
X13 (OtherNone)	-0.353	-1.32*	X46 (D*X13)	0.878	0.70*
<u>Immigration</u>					
X14 (1984-86)	-2.617	-9.94	X47 (D*X14)	2.416	2.31
X15 (1976-83)	-0.305	-3.22	X48 (D*X15)	0.541	1.55*
X16 (1961-75)	-0.224	-3.29	X49 (D*X16)	0.262	1.76**
X17 (Pre 1961)	-0.080	-1.01*	X50 (D*X17)	0.133	0.76*
<u>Occupation</u>					
X22 (Nat. Sci.)	0.023	0.34*	X55 (D*X22)	-0.166	-0.93*
X23 (Soc. Sci.)	-0.215	-1.21*	X56 (D*X23)	0.039	0.17*
X24 (Teaching)	0.591	1.10*	X57 (D*X24)	-0.652	-1.20*
X25 (Health)	0.001	0.00*	X58 (D*X25)	-0.581	-1.62*
X26 (Clerical)	-0.287	-5.52	X59 (D*X26)	-0.001	-0.01*
X27 (Service)	-0.583	-7.17	X60 (D*X27)	0.348	2.64
X28 (Agric.)	-0.954	-3.71	X61 (D*X28)	1.095	2.17
X29 (Primary)	-0.767	-1.49*	X62 (D*X29)	0.863	0.67*
X30 (Manuf.)	-0.233	-4.24	X63 (D*X30)	0.111	0.49*
X31 (Constr.)	-0.104	-1.31*	X64 (D*X31)	0.094	0.48*
X32 (Transp.)	-0.301	-3.92	X65 (D*X32)	-0.023	-0.09*
X33 (Other)	-0.309	-4.57	X66 (D*X33)	0.124	0.67*

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE A-III-2D
CONTINUED

PRIVATE SECTOR			PUBLIC SECTOR		
VARIABLE	COEFFICIENT	T-RATIO	VARIABLE	COEFFICIENT	T-RATIO
Married	0.219	5.48	DMAR (D*Mar)	-0.120	-1.40*
Constant (Priv.)	0.545	1.40*	Constant (Pub.)	0.738	0.74*
R ² Adjusted	0.07932				
F Statistic	14.58				
# Observations	9251				

* Insignificant at the 10% level.

** Insignificant at the 5% level, but significant at the 10% level.

TABLE A-III-3A
SUMMARY WAGE DIFFERENTIALS CANADA SAMPLE
SAMPLE SELECTION EXCLUDED

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.099	0.126	-0.052	0.225	1.391	-0.129	0.138
LANGUAGE	0.006	0.002	-0.025	0.138	2.293	-0.152	0.084
EDUCATION	-0.043	0.038	-0.020	0.026	0.122	-0.018	0.208
EXPERIENCE	0.027	-0.012	0.014	-0.051	-0.063	-0.028	-0.178
IMMIGRATION	0.002	-0.007	-0.004	0.080	0.200	0.060	0.056
REGION	-0.001	0.012	0.010	-0.003	0.012	0.002	0.000
OCCUPATION	-0.021	0.029	-0.012	0.031	0.037	0.037	0.050
CMA	-0.020	0.033	0.008	-0.019	0.011	-0.007	-0.027
MARRIED	0.007	0.003	0.003	-0.004	-0.016	0.001	-0.030
TOTAL	-0.043	0.098	-0.026	0.197	2.596	-0.106	0.163

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.077	0.302	-0.006	0.325	0.602	0.186	0.548
LANGUAGE	0.012	0.142	0.012	0.219	0.455	0.151	0.165
EDUCATION	-0.056	0.092	-0.016	0.061	0.205	-0.003	0.292
EXPERIENCE	0.019	-0.016	0.000	-0.080	-0.153	-0.026	-0.236
IMMIGRATION	-0.003	-0.008	-0.007	0.093	0.140	0.075	0.204
REGION	0.004	0.029	0.025	-0.017	0.027	0.015	-0.029
OCCUPATION	-0.026	0.026	-0.012	0.039	0.059	0.023	0.131
CMA	-0.021	0.032	-0.007	-0.036	-0.068	-0.062	-0.041
MARRIED	0.003	-0.001	-0.003	-0.009	-0.026	0.008	-0.024
TOTAL	-0.068	0.296	-0.008	0.270	0.638	0.181	0.463

TABLE A-III-3B
SUMMARY WAGE DIFFERENTIALS ENGLISH CANADA SAMPLE
SAMPLE SELECTION EXCLUDED

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.124	0.275	0.076	0.234	N/A	-0.281	0.126
LANGUAGE	-0.028	-0.010	0.076	0.142	1.546	-0.152	0.143
EDUCATION	-0.085	0.158	-0.006	0.044	0.714	-0.166	0.398
EXPERIENCE	0.026	-0.001	0.027	-0.045	0.180	-0.007	-0.180
IMMIGRATION	0.004	-0.011	-0.003	0.093	-0.011	0.105	0.068
OCCUPATION	-0.024	-0.008	-0.004	0.028	-0.138	-0.012	0.056
CMA	-0.011	0.028	0.005	-0.030	0.055	-0.022	-0.047
MARRIED	0.008	0.039	0.005	-0.005	0.173	-0.004	-0.032
TOTAL	-0.111	0.196	0.100	0.228	2.519	-0.258	0.407

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.012	0.367	0.029	0.584	0.635	0.248	1.026
LANGUAGE	0.009	0.037	0.084	0.215	1.546	0.212	0.108
EDUCATION	-0.070	0.258	0.057	0.069	0.326	-0.091	0.335
EXPERIENCE	0.019	-0.141	-0.015	-0.074	-0.160	-0.004	-0.218
IMMIGRATION	-0.003	-0.005	-0.001	0.070	0.279	0.083	0.166
OCCUPATION	-0.023	0.001	0.004	0.037	0.074	0.008	0.133
CMA	-0.010	0.060	0.034	-0.040	-0.066	-0.041	-0.052
MARRIED	0.003	-0.016	0.000	-0.009	-0.044	0.005	-0.025
TOTAL	-0.074	0.195	0.163	0.268	1.955	0.171	0.446

TABLE A-III-3C
SUMMARY WAGE DIFFERENTIALS QUEBEC SAMPLE
SAMPLE SELECTION EXCLUDED

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.486	-0.362	-0.564	-0.363	0.905	-0.516	-0.253
LANGUAGE	-0.065	-0.205	-0.235	-0.113	1.017	-0.262	-0.320
EDUCATION	-0.040	0.123	-0.017	0.255	0.318	0.096	0.494
EXPERIENCE	0.058	0.008	0.050	-0.119	-0.090	-0.047	-0.040
IMMIGRATION	-0.033	-0.017	-0.015	-0.078	0.155	-0.078	-0.091
OCCUPATION	-0.040	-0.021	-0.056	-0.040	-0.013	0.038	-0.072
CMA	0.012	0.053	0.035	0.005	0.025	0.006	0.022
MARRIED	-0.005	-0.007	-0.007	-0.018	-0.020	-0.007	-0.037
TOTAL	-0.113	-0.066	-0.245	-0.108	1.392	-0.254	-0.043

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.079	0.162	0.141	0.316	1.380	0.187	0.492
LANGUAGE	0.002	0.137	0.009	0.309	0.299	0.041	0.360
EDUCATION	-0.043	0.118	-0.022	0.130	0.251	0.045	0.371
EXPERIENCE	0.108	0.072	0.093	-0.072	-0.105	0.045	-0.241
IMMIGRATION	-0.042	-0.063	-0.061	0.141	0.187	0.092	0.407
OCCUPATION	-0.008	0.029	0.003	0.095	0.088	0.055	0.161
CMA	0.003	0.093	0.042	-0.010	-0.006	-0.011	-0.017
MARRIED	0.002	-0.001	-0.004	-0.012	-0.028	0.009	-0.016
TOTAL	0.022	0.384	0.060	0.580	0.687	0.276	1.025

TABLE A-III-3D
SUMMARY WAGE DIFFERENTIALS MONTREAL SAMPLE
SAMPLE SELECTION EXCLUDED

PUBLIC SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.664	-0.524	-0.728	-0.451	0.523	-0.518	-0.525
LANGUAGE	-0.312	-0.392	-0.449	-0.203	1.820	-0.380	-0.525
EDUCATION	-0.031	0.106	0.012	0.158	0.272	0.107	0.243
EXPERIENCE	0.111	0.043	0.088	-0.092	-0.141	-0.009	0.058
IMMIGRATION	0.010	0.023	0.023	-0.040	-0.056	-0.038	-0.111
OCCUPATION	-0.020	0.022	-0.021	0.026	-0.009	0.074	0.055
MARRIED	-0.007	-0.002	-0.007	-0.013	-0.020	-0.009	-0.031
TOTAL	-0.250	-0.200	-0.353	-0.165	1.867	-0.255	-0.311

PRIVATE SECTOR

	ENGBIL	FREMONO	FREBIL	OTHENG	OTHFRE	OTHBIL	OTHNONE
OBSERVED WAGE DIFFERENTIAL	-0.032	0.317	0.029	0.596	0.598	0.280	1.100
LANGUAGE	0.000	0.149	0.047	0.261	0.195	0.032	0.353
EDUCATION	-0.047	0.163	-0.013	0.171	0.330	0.076	0.457
EXPERIENCE	0.102	0.059	0.081	-0.100	-0.127	0.033	-0.248
IMMIGRATION	-0.053	-0.077	-0.078	0.167	0.207	0.100	0.441
OCCUPATION	-0.010	0.059	0.011	0.090	0.085	0.058	0.156
MARRIED	0.001	0.004	-0.003	-0.021	-0.037	0.009	-0.020
TOTAL	-0.007	0.358	0.046	0.568	0.654	0.308	1.138

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AUTHOR: STEPHEN J. ROBERTS


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