The Returns to Bilingualism in the Canadian Labour Market

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INTRODUCTION

The mere mention of the word bilingualism rarely fails to elicit a response from a politically engaged Canadian. For some, bilingualism is one of the defining pillars of the nation, that unique attribute that separates us culturally from our neighbours to the south. For others, bilingualism is a nagging problem, the seed from which grows both Quebec separatism and western alienation. Political opinions aside, linguistic duality is a reality in Canada that has generated discussion in a variety of fields. The purpose of this essay is to examine Canadian bilingualism from an economic perspective, specifically to measure the returns to bilingualism in the Canadian labour market.

When we speak of the returns to bilingualism, several interpretations are possible. First, there is the social benefit derived from having a bilingual society, be it reinforced by public policy or not. This social benefit includes the sum of all private benefits enjoyed by bilingual individuals in the society, in addition to the any positive externalities transmitted to each other and to the rest of the society as a result of their language skills. Additionally, there may be social benefits received from external sources by a bilingual nation if the stock of its linguistic skills give it a competitive advantage in international markets.[1]

Alternatively, we may focus solely on the private benefit derived by an individual from being bilingual. This benefit may be composed of both pecuniary rewards, such as higher wages or access to a wider range of employment opportunities, and non-pecuniary rewards, such as exposure to cultural products produced in the second language or simply the satisfaction of being able to communicate verbally with a greater scope of people.

[1] Breton (1978) and Chorney (1996) make persuasive arguments for the social benefit of bilingualism in a society.

While this is difficult to measure empirically , the extent of these non-pecuniary rewards is likely to be considerable.

Here we will limit ourselves to the measurement of the private pecuniary returns to bilingualism. In particular, we are concerned with a wage premium received by bilingual workers over unilingual workers in Canada, holding other income determining factors equal. As we will see, the existence of such a premium is well established by the literature on language and earnings. The focus here will be to decompose the bilingual premium, to ask: "Which groups of workers, in which industries and in which regions of Canada benefit the most from being able to speak both official languages?"

In order to answer such a question, one must first determine what it means to be bilingual. Obviously some individuals have greater fluency in a second language than others, and so it is somewhat problematic to divide a group of individuals into unilingual and bilingual subgroups. However, this consideration would add an unreasonable complication to the analysis, and therefore we will simply assume that bilingualism is a discrete variable.

The two main groups of workers to whom we will draw our attention are males and females, in order to determine the role and interaction of gender in linguistic wage differentials. It will be shown that females derive a larger earnings advantage from being bilingual than do males, and in particular that this differential mitigates the overall wage disadvantage that women have in the labour market.

With respect to differing bilingual premia across industries, we will consider the private sector as a whole in relation to the public sector, with attention to its component industries: government, education and health and social services. The analysis will be

conducted in reference to public language policy to determine what influence, if any, policy has on these inter-sectoral differences. The analysis will conclude that the highest bilingual premia are found in the private and government sectors. However the largest premium differentials between men and women prevail in education and health and social service industries.

Finally, rather than considering just the Canadian labour market as a whole, we will recognize that there are, in fact, numerous regional labour markets in this country. Such distinctions must be allowed for, especially when language is the topic of discussion. We will see evidence that earnings in the labour market in francophone Quebec are by far the most sensitive to language ability.

This essay is organized as follows. Chapter one will review the relevant literature addressing language and the labour market. Chapter two will present an overview of the theoretical considerations behind earnings and bilingualism. Chapter three will discuss some background issues related to the topic, including the linguistic demography of Canada, the structure of the Canadian labour market and the influence of language policy. Chapter four will present the results of the empirical analysis of 1996 Canadian Census data which will estimate a variety of bilingual premia using regression methods. Chapter five will conclude the essay by summarizing and integrating the observations of the first four chapters.

CHAPTER ONE

LITERATURE REVIEW

The Economics of Language

The literature surveyed in this chapter focuses, for the most part, on the role that language plays in labour markets and in particular, on bilingual ability as an explanatory factor in earnings differentials. These topics are contained within a broader genre of work known as the 'economics of language'. In his thorough survey of the subject, Francois Grin provided the following definition:

> "The economics of language refers to the paradigm of theoretical economics in the study of relationships featuring linguistic variables; it focuses principally, but not exclusively on those relationships in which economic variables also play a part." (Grin 1996b, 18)

Outside of our specific area of interest, writers have addressed such issues as the role of language in product markets (Hocevar, 1975), international trade (Breton, 1978) and development (Arcand 1996). There has also been a fair amount of theoretical work involving the application of economic modelling techniques to language and linguistic phenomena. These include modelling of internal language change (Marschak, 1965), semantics and discourse (Rubenstein, 2000), and language shift and maintenance (Church and King, 1993; Grin, 1992; Selten and Pool, 1991; among others).

Language in the Immigrant Labour Market

Most of the research relating employment earnings to language ability over the past twenty five years has had an empirical orientation and can be divided into two main categories. The first of these concerns the effect that host country language acquisition has on the earnings of immigrants. The work done in this area will be surveyed before

we switch our attention to the focus of this review and the second main category of research: earnings differentials among major language groups in Canada.

The earliest studies conducted by McManus, Gould and Welch (1983) and Grenier (1984) investigated the role of English-language proficiency in the wage determination of Hispanic-American males. Both studies used the 1976 Survey of Income and Education and arrived at similar results: wage differentials between Hispanics and white non-Hispanics were largely attributable to English language deficiencies.

Bloom and Grenier (1992) used 1970 and 1980 Census data to compare the earnings of Spanish speakers in the U.S. based on the concentration of other Spanish speakers in the areas where they lived. They found that the most sizeable earnings differentials between Hispanics and white non-Hispanics occurred in areas where there was a high proportion of Spanish-speaking immigrants and that, overall, the earnings differentials had increased over time. They attributed this trend to a supply shift in the labour market for Spanish speakers.

Chiswick (1991) and Chiswick and Miller (1995) investigated the determinants of host country language fluency in addition to its effect on earnings. The former study used data from a survey of apprehended illegal aliens in the Los Angeles area from 1986 and concluded that reading fluency was a more important factor in earnings determination than was speaking fluency. The latter study investigated the endogeneity of language acquisition and earnings of immigrants in Australia using data from the 1981 and 1986 Censuses. The results were compared to similar analyses conducted in Canada, Israel and the U.S. In all four countries, it was found that immigrants who are older, have

less education, and who live in minority enclaves tend to acquire the host country language less effectively. Additionally, the returns to language-skill investment were found to be highly significant.

Carliner (1996) used 1980 and 1990 U.S. Census data to measure the extent to which improvements in the English language skills of immigrants have narrowed the wage differentials with respect to native-born Americans. It was found that the typical immigrant who arrived in the 1950's or 1960's eventually caught up to the native-born average wage, this occurring more quickly for women and more educated immigrants. English language improvement accounted for between 6% to 18% of the narrowing.

Carnevale,. Fry and Lowell (2001) and Fry and Lowell (2003) used data from the 1992 U.S. National Adult Literacy to determine the language-skill determinants of earnings. The former study decomposed English proficiency into the skills of understanding, speaking, reading and writing and found that understanding English was the most significant of these as an earnings determinant for non-native speakers of English. The latter study investigated the value of knowing a language other than English in the U.S. labour market and found that bilingualism does not make a significant contribution to individuals' wages.

Chiswick and Miller (2003) tested the hypothesis that language skills among adult male immigrants in Canada are complements to other human capital factors such as education and experience. Analyzing data from the 1991 Canadian Census, it was found that official language proficiency is complementary to schooling and pre-immigration experience but is a substitute for post-immigration experience.

While most of the preceding studies used the standard OLS regression wage determination model on cross-sectional data, Dustmann and Van Soest (2002) used German Socio-Economic Panel data on immigrants from between 1983 and 1994. Their methodology attempted to address the problems of random measurement error and unobserved heterogeneity. It was concluded that prior studies using the standard method tended to underestimate the effects of language skills on immigrant earnings.

Earnings Differentials Among Language Groups in Canada

Aside from government studies launched in connection with the Royal Commission on Bilingualism and Biculturalism of 1963, one of the first major investigations of earnings differentials between language groups in Canada was conducted by Veltman, Boulet and Castonguay (1979). Using 1971 census data, they tested the hypothesis that anglophones in Quebec benefited from informal contacts that led to high-paying jobs due to the dominance of American and Anglo-Canadian firms. Extending the methodology used in an earlier study by Boulet and Raynauld (1977), earnings regressions were estimated for men in Montreal using a combination of linguistic attributes, including mother tongue, official language knowledge and language used in the home, as well as other human capital factors as variables. By combining the language variables, ten distinct linguistic groups were identified and their earnings were compared. It was concluded that bilingual language ability commanded a wage premium for every group as compared to their unilingual counterparts and that there were greater returns to learning English than to learning French.

Also using 1971 Census data, Vaillancourt (1980) conducted an in-depth study of earnings differentials among language groups in Montreal and the province of Quebec.

In addition to accounting for the typical human capital variables, the interactions of occupation and industry sector were considered in the analysis. With a restricted sample excluding women, allophones (individuals whose mother tongue is neither French nor English) and non-whites, it was concluded that there were no monetary returns on bilingualism for anglophones but that there were returns to francophones who learnt English. Additionally, anglophones earned a wage premium over francophones in Quebec and in Montreal.

Boulet (1980) analyzed 1961 and 1971 Census data in addition to privately generated survey data from 1977 to track the evolution of earnings differentials among language groups in Montreal. It was concluded that only some of the earnings differentials could be attributed to the differing human capital characteristics of the groups, although, overall, the differentials had decreased over the time period in question. Using a quantile analysis approach, Boulet also determined that a large measure of the earnings advantage enjoyed by anglophones over francophones was the result of a highly-paid anglophone 'elite' occupying the top income echelon of the population.

In Shapiro and Stelcner (1981), the role of language in male-female earnings differentials in Quebec was considered using 1971 Census data. It was concluded that, for both sexes, unilingual francophones earned less than all other language groups. Earnings differentials between the public and private sectors were also examined and it was found that while public sector employees enjoyed an earnings advantage, there was no significant bilingual premium in either industry sector for male or females.

Carliner (1981) developed and tested a competitive market-based theory of linguistic wage differentials using 1971 Census data. His model suggested that in

multilingual societies, if the demand for speakers of a given minority language exceeds the supply, a bilingual premium will result for native speakers of the majority language. Put into the context of the Canadian labour market, the model predicted that a bilingual premium would exist for francophones in Quebec but not for anglophones either in Quebec or English Canada. Regressions were estimated for Montreal, Quebec (province), Toronto, English Canada and Canada and the predictions of the model were largely confirmed. In all of the populations, unilingual and bilingual anglophones and bilingual francophones earned approximately the same average wages, while unilingual francophones and all allophones earned significantly less than those groups.

Grenier (1987) conducted an analysis of 1976 and 1981 Census data using a two-equation model to test whether earnings comparisons among language groups in Quebec suffered from self-selection bias brought about by the out-migration of unilingual anglophones. A probit model was estimated to determine whether an individual was likely to migrate or to stay in Quebec, and then the standard earnings-determination model was estimated, allowing for this bias. It was found that previous studies that did not take this factor into account had underestimated the returns to learning French for anglophones.

Robinson (1988) developed a detailed model in which the choice of language by individuals is endogenously determined by the market. In the simple form of his model, individuals are endowed with a mother tongue and households optimize their earnings by a choosing one of two languages, where the economic return to knowing a particular language is a function of the number of individuals in the population who speak that language. The model was then elaborated to account for bilingual language ability.

Robinson tested the validity of his model with a wage regression equation that accounted for intergenerational human capital transfer and used data from the 1971 and 1981 Censuses and 1973 CARMAC survey data. It was concluded that francophones in Canada are not at a significant disadvantage with respect to earnings and in fact may have an advantage over anglophones since they are more likely to be bilingual.

Bloom and Grenier (1992) developed a model to explain language-wage differentials, where a particular economy is composed of two language groups, each with its own labour market. The supply and demand for labour in each market is determined by the number of individuals who can speak that market's language. The model predicted that the earnings of a linguistic minority would be lower in areas where there was a more sizeable minority language population. To test this hypothesis, Bloom and Grenier used Census data from 1971, 1981 and 1986 and estimated wage regressions for Quebec and English Canada separately. It was concluded that language-earnings differentials were higher in Quebec than English Canada in 1970 but that the reverse was the case in 1980 and 1985. Overall, language-earnings differentials had decreased over the time period in question and the differentials were lower among a subset of the population aged twenty-five to thirty four.

Using 1971, 1981 and 1991 Census data, Shapiro and Stelcner (1997) followed up on their previous work and analyzed the evolution of language-wage differentials in Quebec with specific attention paid to the influence of language policy over that period. They conducted two analyses, one their own, which restricted the sample to full time workers only, and the other based on a methodology used by Vaillancourt (1991), which included both full and part-time workers. It was concluded that the earnings gap between

anglophones and francophones had narrowed over time and that unilingual francophones and allophones were the most economically disadvantaged language groups.

Christofides and Swidinsky (1998) also used 1971, 1981 and 1991 Census data to estimate the Canada-wide returns to bilingualism. They found that the wage differentials between unilingual and bilingual anglophones had increased from 1970 to 1990 and that the returns to bilingualism among Francophones had declined slightly over the same period. Among both language groups, the bilingual premium was the highest for women in all years.

Finally, Pendakur and Pendukur (1998) used 1991 Census data to determine the earnings advantage associated with knowing an additional language (official or non-official) in Montreal, Toronto and Vancouver. It was concluded that there were significant returns to knowing both official languages in Montreal and Toronto for males and females, but no such returns in Vancouver.

Table 1.1 shows a selection of estimates of the 'bilingual premium' calculated from the above studies.

TABLE 1.1 – ESTIMATED BILINGUAL WAGE PREMIA IN CANADA, 1971 TO 1991[2]

Study	Data Source and Sample	Bilingual Premium
Veltman et al. (1979)	1971 Census Montreal males	anglophones - 4.5% francophones – 6.0%
Vaillancourt (1980)	1971 Census White Quebec males	anglophones - not significant Montreal francophones – 6.0% Quebec francophones - 10.5%
Boulet (1980)	1971 Census Montreal males	anglophones - not significant francophones - 3.00%
Shapiro & Stelcner (1981)	1971 Census Canadian males and females	anglophones - not significant francophones - 7.5%
Carliner (1981)	1971 Census Canadian males	anglophones – 2.0% francophones - 10.0%
Grenier (1987)	1981 Census	anglophones – 13.0%

[2] Calculations were made by the author using the available data in the study. These should be considered nothing more than approximations.

	Quebec males	francophones - 4.5%
Robinson (1988)	1981 Census and 1973 CARMAC Canada males and females	1981 Census - 5.5% 1973 CARMAC - 5.0%
Bloom & Grenier (1992)	1986 Census Canada males	anglophones - 4.0% francophones - 5.0%
Shapiro & Stelcner (1997)	1991 Census Canada males and females	male anglophones - not signif. male francophones - 4.5% female anglophones - not signif. female francophones - 9.5%
Christofides & Swidinsky (1998)	1991 Census Canada males and females	male anglophones - 2.5% male francophones - 4.5% female anglophones - 3.5% female francophones - 5.5%
Pendakur & Pendakur (1998)	1991 Census Canada males and females	Montreal males - 5.0% Montreal females - 6.0% Toronto males – 4.5% Toronto females - 3.0%

It can be seen that the results of these studies are ambiguous. However, much of the variety in results may be attributable to the differing sample restrictions and methodologies used by the researchers. Even so, the literature is not completely incoherent and there are a number of generalizations that can be derived from the research. First, there have been significant rewards paid to francophones who learn English but there have not necessarily been rewards paid to anglophones who learn French. However, as suggested by Grenier, the anglophone bilingual premium in Quebec may be underestimated in studies that do not account for self-selection due to out-migration to other provinces. Secondly, the earnings differentials between anglophones and francophones have narrowed over time, possibly as a consequence of federal and Quebec provincial language legislation. In addition, the position of allophones in relation to both these groups has worsened. Third, Canada cannot be characterized as a homogeneous language market. The returns to language skills vary by province and between urban and rural areas. Not surprisingly, language characteristics are most important to earnings determination in Quebec, and in Montreal in particular.

The majority of these studies was primarily concerned with earnings differentials between anglophones and francophones, and so their characterization of a 'bilingual premium' was peripheral to the main focus. Where it was addressed, there was little attention given to the interactive effects of gender and industrial sector to the wage premium enjoyed by bilingual workers. In fact, a good many of the earlier studies omitted women from the analysis altogether and sector variables were generally considered only to 'net out' the effect of industrial wage differentials.

While this survey is not completely exhaustive, the literature reviewed here is a significant sample of the most interesting and influential empirical studies conducted on language and earnings. From this cross-section, we can draw a general picture of the major lines of research in this area over the last twenty-five years.

CHAPTER TWO

THE THEORY BEHIND LANGUAGE AND EARNINGS

According to textbook[3] theory, wages in market economies are determined by the tension between supply and demand in the labour market; the supply being determined by the individual's utility-maximizing trade-off between leisure and consumption, and demand being a reflection of the market value of the productivity of labour. Wage differentials arise as a consequence of the need to compensate workers to varying degrees for the relative qualitative aspects of different jobs as well as the cost that individuals incur by investing in their own productivity-enhancing skills.

Here we are interested in wage differentials attributable to a specific productivity-enhancing skill – that of bilingual ability. Moreover, we want to discuss the possibility that these wage differentials may be of varying magnitudes for different groups of workers and in different industry sectors. The first section of this chapter will outline this issue within the framework of human capital theory and the second section will discuss the market for language skills.

Bilingualism and Human Capital Theory

To the extent that bilingual ability contributes to a worker's productive capacity, that it is embodied in the individual and that it can be acquired through investment of some kind (either directly or through the opportunity cost associated with forgoing other income-producing activity), language skills can be considered a form of human capital. It is from within this framework that most of the theoretical work dealing with language and earnings has been approached.

[3] Much of the information in this chapter is drawn from the relevant chapters on wage differentials in Gunderson and Riddell (1993) and Eastman (1987) as well as Rosen (1987).

Generally speaking, the decision of an individual to invest in human capital is analogous to the investment decision that firms make for physical capital. If the net present value of the returns to investment exceed the direct and indirect costs, a rational individual will make the investment. The returns in the labour market come in the form of a 'compensating wage differential' which is equivalently a reflection of the contribution of the investment to productivity. In the case of language skills, this contribution to productivity may be different according to the occupation and industry in which an individual is employed and thus the returns may vary across the labour market. Furthermore, the costs of investment are not likely to be the same for all individuals, since some may be naturally more adept at acquiring language skills or are simply in an environment that is more conducive to second language learning.

When measuring the contribution of human capital to earnings, there are a few important considerations that must be addressed, perhaps most importantly, the issue of *ability bias*. As with education, it may the case that individuals with certain language skills earn a wage premium not directly because of those skills, but because they are naturally endowed with abilities and intelligence that make them more productive in the labour market while allowing them to acquire language skills with less effort and at less cost. The fact is, if a bilingual premium exists, it is likely a result of both the contribution of language skills to productivity and some unobserved ability bias.

Several empirical studies have attempted to ascertain the extent of ability bias in relation to educational attainment by comparing the earnings of individuals with different levels of schooling who should have the same or similar levels of cognitive and physical ability (such as sets of twins). The limited evidence suggests that, while omitted ability

accounts for wage differentials to some extent, there are still significant returns to education.[4] It is conceivable that a similar relationship exists between language skills and omitted ability.

An issue related to ability bias is *signalling*. A particular attribute such as bilingual ability or educational attainment may act as a signal to prospective employers about an individual's intelligence, attitude or personality that may be otherwise unobservable from a CV or in a job interview. Chorney, in his analysis of bilingualism in employee recruitment (1998) quoted a representative of an Ontario high-tech company:

> "Ability to master a second language shows skills in other areas: social skills, perseverance. It's a good sign."[5]

However, as with omitted ability, the extent to which signalling contributes to linguistic wage differentials is difficult to test empirically.

There are also ways in which language skills differ from other forms of human capital. First, communicating through language is an integral part of the employment search process. In a bilingual society, any individual looking for a job has a competitive advantage if he or she can communicate in both languages regardless of the prevailing workplace language. We would expect this to be the case in areas where there are large numbers of minority language speakers, such as in Montreal or Canada's National Capital Region.

Second, for some individuals, bilingualism is not an acquired skill, rather they grow up speaking two (or more) languages. As a consequence, it cannot be said that they have invested in language skills in an economic sense, since there was little or no

[4] Gunderson and Riddell (1993)
[5] Page 204.

opportunity cost involved in the acquisition of the second language. For these individuals, bilingualism is a form of 'inherited' human capital.

Third, there is a significant political dimension to the issue of language and earnings, particularly in Canada. The federal government is mandated to promote the use of both official languages and the Quebec provincial government has been especially active in protecting the French language through policy. The influence of language policy in the labour market will be discussed at length in chapter three.

The Market for Language Skills

Several of the authors whose work was reviewed in chapter one presented market-based theoretical models to explain the sources of linguistic wage differentials. This section will summarize a few of these proposals and then discuss the theory behind cross-industrial linguistic wage differentials in competitive labour markets.

Carliner (1981) conceptualized an economy with two language groups in which there were three types of jobs: two types requiring knowledge of each language and one type requiring knowledge of both languages. Since it is costly to learn a second language, workers only invest in language training if they are sufficiently rewarded. However, since workers have varying second language acquisition capabilities, the supply curves of each language group for bilingual jobs and jobs in the other language market are upward sloping. In a labour market such as that of the province of Quebec, where the minority language (English) is the majority language of the external economy, Carliner suggested that the demand for workers with knowledge of English would exceed the supply if there was no wage premium paid for English-language and bilingual jobs. Outside of Quebec, there should be no excess demand for French-speakers except in

cases where government policy had increased the number of jobs requiring knowledge of both languages. In short, the model predicted that a bilingual premium would exist for francophones in Quebec and perhaps for some anglophones outside of Quebec employed in the federal public service. Carliner's empirical findings confirmed this observation.

Bloom and Grenier (1992) omitted the possibility of bilingualism in their formulation of a model explaining linguistic wage differentials. They proposed an economy consisting of two language communities each with its own labour market. The supply and demand for labour are determined by the relative size of each language community. Supply shifts may result either from a natural increase of individuals in the community or from immigration of individuals from other localities. The demand for labour in each market is also sensitive to demographic shifts, since some industries (like retail trade and health services) are more likely to hire minority-language speaking workers the greater the size of the minority language community. The authors also hypothesized that minority language speakers may have a lower reservation wage in regions where they are more highly represented. The prediction of the model was that the larger the supply of minority language speakers, the greater would be the wage differential with the majority language community.

Vaillancourt (1992) incorporated the role of public policy into his formulation of a linguistic wage model. In his framework, the demand for workers with knowledge of a particular language is influenced by the language of technology (manuals, operating instructions etc.), the language used by consumers in the market and the language of the firm owners. The supply curve is determined by the language skills of the labour force which are influenced by a variety of demographic, linguistic and educational factors. The

effect of public language policy in this model is observed either in supply-enhancing or demand-enhancing effects. For example, educational policies that promote a minority language would tend to increase the supply of workers with knowledge of that language and drive down wages. On the other hand, policies that promote the use of the minority language in the work place would create a demand effect and increase wages for speakers of that language. Vaillancourt used his model to explain the success of Quebec provincial language policy in narrowing the wage differentials between francophones and anglophones since the 1960s.

With these three models and our discussion concerning language skills as human capital in mind, we may also give some consideration to linguistic wage differentials across industries. Suppose that, bilingual workers in an economy are paid a wage premium commensurate with cost of their investment in linguistic human capital. Assume that bilingual ability is exogenous, or at least that workers cannot quickly acquire language skills in response to wage differentials.

Suppose, then, that there are two sectors in the economy, public and private, between which there is less than perfect labour mobility. The public sector pays a premium to its workers as a result of a variety of factors: union influence, pay equity policies and the relative inelasticity of the demand for labour. There is ample evidence in the literature of such a premium and the supposition of an inelastic public sector labour demand follows from the 'essential service' nature of governmental, educational and health care employees. [6]

If for political reasons, the public sector is motivated to hire bilingual workers beyond the contribution to their productivity of their language skills, the bilingual

[6] See Gunderson and Riddell (1993), pp. 524-536.

premium would be higher in the public sector than the private sector. Furthermore, if we except that labour demand in the public sector is relatively inelastic, the effect of the bilingual premium may be amplified to some extent.

Of course it need not be the case that language policy inflates the relative wages of bilingual individuals in the public sector. In a jurisdiction such as Quebec, which is for official purposes unilingual, the effect on earnings of bilingual ability may be most noticeable in the private sector.

As we will see in chapter three, the Quebec government has taken steps over the past few decades to promote the French language to the exclusion of English in both public and private workplaces. However, in the private sector, depending on the industry, there may be a preference for bilingual workers due to the influence of competitive factors. For example, industries with an orientation towards external (anglophone) markets or industries with a strong concentration of service occupations (such as tourism or hospitality) may increase the demand for workers with knowledge of both languages. In this case, public services would be relatively less susceptible to these competitive influences.

Relative to the wealth of empirical work surveyed in the last chapter, the theoretical basis behind language skills and earnings is still in its infancy. This may due to the complexity of the problem. A comprehensive theory of the role of language in the labour market would have to incorporate such factors as inter-temporal language shift, the influence of external language markets and the cultural or non-pecuniary utility derived from language use, among others. Since this analysis is primarily an empirical endeavour, we will merely make note of this deficiency rather than try to correct it.

CHAPTER THREE

THE ENVIRONMENT OF LANGUAGE AND EARNINGS

Before embarking on the empirical analysis of the economic value of bilingualism to Canadian workers, it is appropriate to first discuss some background issues concerning language in the Canadian labour market. These issues are addressed in three parts. Part one will survey the linguistic landscape of Canada and establish the regional diversity of language use and knowledge in this country. Part two will address the situation of the Canadian economy, focusing on its industrial composition and discussing some important sources of wage differentials between groups of workers. Finally, part three will outline Canadian language policy and its economic implications, historically and as of 1996.

The Linguistic Demography of Canada

It is no exaggeration to state that linguistic duality is one of the defining characteristics of this country. According to the 1996 Canadian Census[7], 59.8% of Canadians claimed English as their first language while French was claimed as a first language by 23.5% of Canadians. Allophones constituted 16.6% of the population. However, as table 3.1 illustrates, the geographic distribution of language groups is far from homogeneous.

TABLE 3.1 – FIRST LANGUAGE SPOKEN AS A PERCENTAGE OF THE POPULATION IN CANADA, QUEBEC AND ENGLISH CANADA 1996

	Canada	Quebec	English Canada
English	59.8%	8.8%	76.6%
French	23.5%	81.5%	4.5%
Other	16.6%	9.7%	18.9%

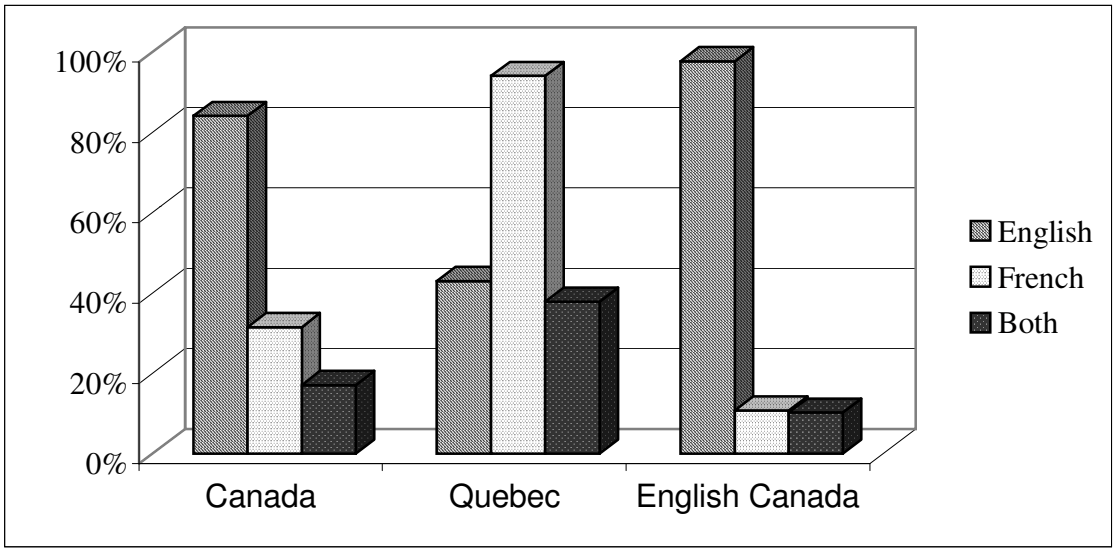
It is evident that the highest concentration of francophones in Canada reside in the province of Quebec, particularly outside of the Montreal metropolitan area. The largest

[7] Unless otherwise stated, all figures in this section are from the 1996 Canadian Census as reported by Marmen and Corbeil (1999).

populations of French first language speakers in 'English' Canada reside in New Brunswick and in eastern Ontario. The share of francophones in the Canadian population as a whole has declined slightly over the last fifty or so years, from 29% in 1951 to its level in 1996 of 23.5%. Over the same time period, the share of the francophone population in Quebec has remained steady at approximately 82%.

The situation of anglophones in Quebec has changed dramatically since 1971. According to the census of that year, they comprised 13.8% of the population of Quebec while by 1996, their share had dropped to 8.8%. It is estimated that the net out-migration of anglophones from Quebec in the period 1976 to 1981 alone was about 105,000[8]. It should be noted that the late 1970's was a period of exceptional political insecurity in Quebec and marked the height the provincial government's legislative efforts to promote the French language. Since 1981, anglophone out-migration has abated.

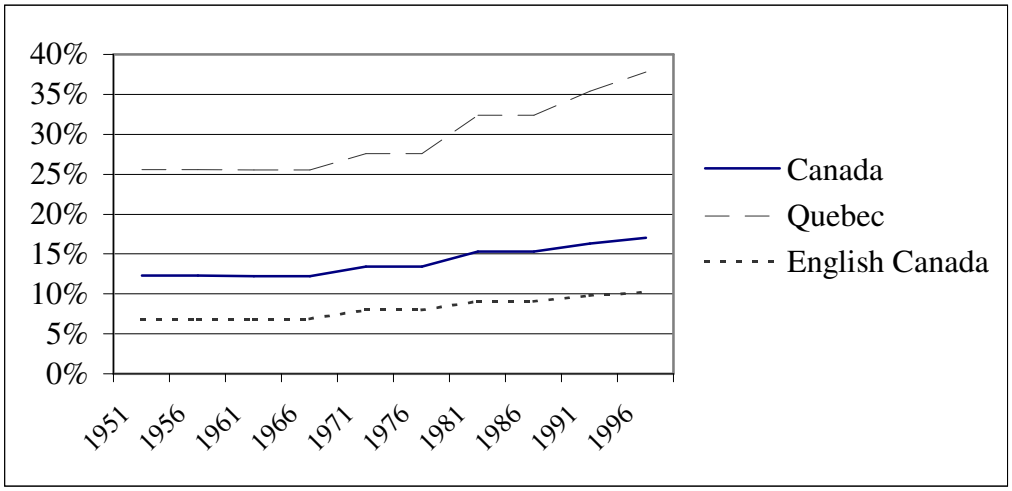
FIGURE 3.1 – KNOWLEDGE OF ENGLISH AND FRENCH IN CANADA, QUEBEC AND ENGLISH CANADA 1996



[8] Churchill (1998), page 12.

In 1995, 17% of the Canadian population was able to speak both official languages. The highest rate of official language bilingual ability prevailed in Quebec where 37.8% of the population was able to speak French and English, whereas in English Canada, only 10.2% was bilingual. However, in every region, the rates of bilingual ability have been steadily increasing since 1951 as illustrated in figure 3.2.

FIGURE 3.2 – PERCENTAGE OF THE POPULATION WITH KNOWLEDGE OF BOTH OFFICIAL LANGUAGES 1951 TO 1996



Across Canada, francophones tended to be bilingual to a greater degree than did anglophones or allophones. In Quebec alone, however, knowledge of both official languages was highest among anglophones. The figures are presented in table 3.2.

TABLE 3.2 – PERCENTAGE OF POPULATION WITH KNOWLEDGE OF BOTH OFFICIAL LANGUAGES BY MOTHER TONGUE AND REGION 1996

	Canada	Quebec	English Canada
Anglophones	9.0%	62.9%	7.0%
Francophones	41.1%	34.0%	83.6%
Allophones	11.3%	46.8%	5.4%

These statistics paint a picture of a linguistically diverse society. It should also be noted that immigration over the last few decades has increased the proportion of allophones in Canada as well as the percentage of Canadians who speak a language other

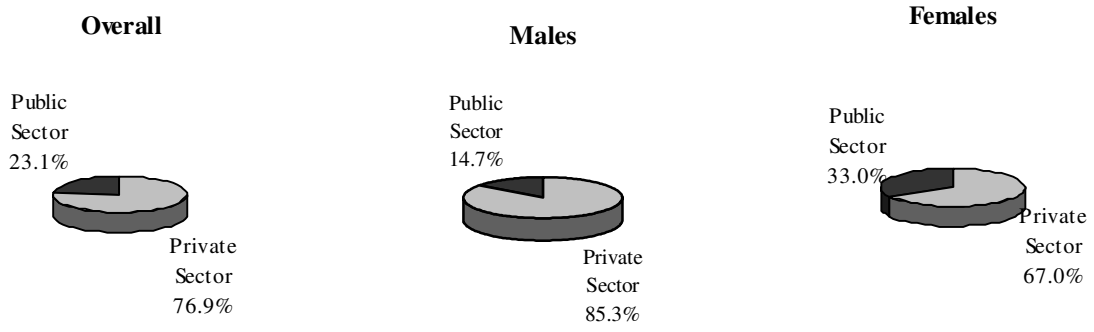
than French or English. Chinese, Italian and German are the three most commonly spoken non-official languages.

The Canadian Labour Market

According to the 1996 Census[9], the Canadian labour force totalled 14,812,700 workers or just over 51% of the entire enumerated population. Of these workers, some 6,804,750 or about 46% were women.

The '1980 SIC' industry classification system used by the 1996 Census categorized the workforce into sixteen mutually exclusive industries. If we consider four of these industries; federal government services, other government services, health and social services and educational services; to be the 'public' sector, it comprised just over 23% of the entire workforce. The distribution of the workforce by public or private sector overall and by sex is illustrated in figure 3.3.

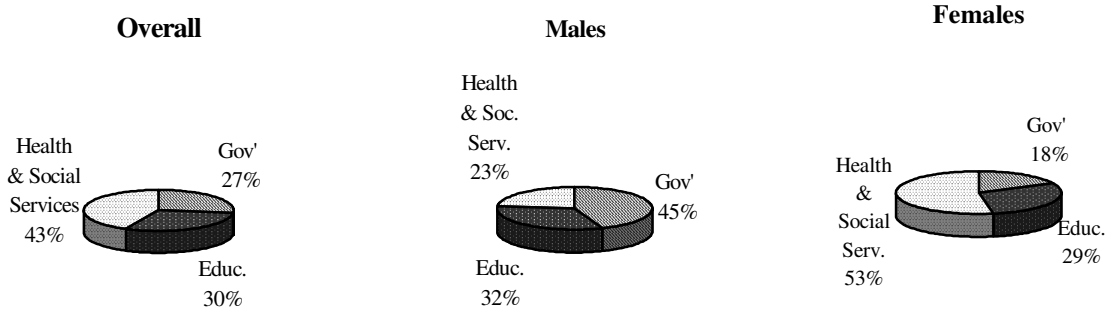
FIGURE 3.3 – COMPOSITION OF THE WORKFORCE BY MAJOR SECTOR OVERALL AND FOR MALES AND FEMALES 1996



It can be seen from these figures that females tend more to be employed in the public sector as compared to males. In order to investigate this observation further, the composition of the public sector is broken for the whole workforce and each sex in figure 3.4.

[9]Unless otherwise stated, figures in this section are taken or calculated from the Nation Series 1996 Census Tables at www.statcan.ca

FIGURE 3.4 – THE COMPOSTION OF THE PUBLIC SECTOR BY INDUSTRY OVERALL AND FOR MALES AND FEMALES 1996



We can see that males in the public sector are heavily represented in government service industries, while more than half of all female public sector workers are employed in health and social service industries. The proportions of male and female public sector workers in the education field are approximately the same. Figures 3.3 and 3.4 then suggest that the high level of representation of females in the public service is largely due to their employment in the health and social service field. Indeed, approximately 17.4% of the female entire female workforce was employed in this industry as compared to just 3.4% of working men.

Gunderson, Hyatt and Riddell (2000) were granted special access to the 1996 Census data in their study on pay differences between the government and private sectors. Using a single regression equation, they concluded that there existed a government sector wage premium at all three levels of government, but none when the public sector is considered to include educational services and health and social services. The estimated government premia were 9.9% at the federal level, 8.7% at the provincial

level and 8.5% at the local level.[10] Also of note are their observations that males earned a 22% premium over females[11] and that there were bilingual premia of 2% over workers who speak only English and 6% over workers who speak only French.[12] While the study did not examine the interaction of gender and industry in wage determination in a statistical way, the authors suggested the possibility that part of the government wage premium was due to pay equity policies in government to the benefit of female workers.

Language Policy in the Canadian Labour Market

The two main objectives of language policy in Canada since the 1960's have been to enshrine the status of English and French as the official languages of the country, a goal pursued mainly by the federal government, and to protect the French language from English domination in Quebec, a goal pursued by the government of that province. While there are historical, political and sociological considerations at the heart of each of these objectives, language policy has developed in response to the economic environment and, as such, has had important implications for the labour market. Some policies, such as those dealing with language in the workplace and public services, have had direct effects on the demand for language skills. Others, such as language-of-education policies, have had indirect supply-side effects.

It is appropriate to view this subject from a historical perspective since many language policies are products of the political environments in which they were adopted. This section will chronicle the main elements of Canadian language policy since the appointment of the Royal Commission on Bilingualism and Biculturalism (B&B

[10] Page 27
[11] Page 25
[12] Page 26.

Commission) in 1963 and describe the policy environment as of 1996 as it relates to the labour market and in particular, the public service.

The Development of Language Policy in Canada

The historical roots of Canadian language policy lie in the period of institutional and societal change in Quebec known as the Quiet Revolution of the late 1950's and early 1960's. Until that time, the French-speaking majority in Quebec had been mired in a situation of economic disadvantage relative to the anglophone minority who held a disproportionate share of private industrial ownership. The Quiet Revolution redefined Quebec society by escaping the traditional structures of the past through a process of modernizing the educational and provincial government systems and expanding francophone control of the private sector. These rapid reforms awakened the nationalist movement in Quebec and francophones began to seek a greater share of the benefits of a modern society.

In 1963, the federal government responded to these aspirations by appointing the B&B Commission which was charged with making recommendations to

> "…develop the Canadian Confederation on the basis of an equal partnership between the two founding races, taking into account the contribution made by the other ethnic groups to the cultural enrichment of Canada."[13]

Acting on the recommendations of the Commission, the government adopted the Official Languages Act, 1969 whose main objectives where to a) extend the ability of Canadians to receive services from federal government agencies in the official language of their choice, b) create equitable opportunities for employment within the public service

[13] As reprinted in Churchill (1997), p. 15.

for francophones and anglophones and c) allow federal employees to work in the official language of their choice in certain regions.[14] The implementation of these objectives required that a balance be struck between increasing the numbers of French-speaking federal employees and ensuring that unilingual anglophone federal employees were not unjustly overlooked for advancement to positions for which they were otherwise qualified. The government's solution was to, rather than discriminate on the basis of language ability, emphasize training measures and to offer free intensive language instruction to unilingual employees whose jobs required bilingual ability.

Meanwhile, in Quebec, nationalistic tensions continued to simmer. In 1974, the Liberal government responded to the Gendron Report (1972) on the status of the French language by passing Bill 22 which made French the official language of Quebec.

In 1977, following the election of the sovereignist Parti Québécois, the Quebec government enacted Bill 101, the Charter of the French Language. The bill's intent was to establish French as the dominant language in the province. Among its provisions were restrictions on English-language education and on the use of English on commercial signs. The law also required that businesses with more than fifty employees operate mainly in French and that members of professional associations demonstrate a certain level of French proficiency. These provisions, especially those dealing with education and commercial signage, were extremely controversial and the so-called 'sign-law' itself was later struck down by the Supreme Court.

In 1982, the Constitution Act converted many of the provisions of the Official Languages Act into constitutional guarantees. In particular, English and French were given permanent official status in all institutions of the federal government and members

[14] Adapted from Churchill (1997)

of linguistic minorities (anglophones in Quebec and francophones in the rest of Canada) were guaranteed the right to have their children receive education in their mother tongue.

In 1988, the federal government updated the Official Languages Act by reaffirming its original commitments and adding the new objective to

> "…support the development of English and French linguistic minority communities and generally advance the equality of status and use of the English and French languages within Canadian society."[15]

In Part VII of the Act, responsibility for implementing the new initiative was extended to all agencies and institutions controlled by the federal government including crown corporations and in 1994, the Department of Canadian Heritage was given responsibility for coordinating federal language policy.

Table 3.3 chronicles the main events in the development of Canadian language policy from 1969 to 1991.

TABLE 3.3 – THE DEVELOPMENT OF CANADIAN LANGUAGE POLICY 1969 - 1991[16]

Year	Federal	Quebec	English Canada
1969	Official Language Act	Bill 63 - Promotes French language	New Brunswick Official Language Act Ontario authorizes French public school
1970	Federal grants for minority and second-language education		
1974		Bill 22 - Official Language Act	
1975			Ontario provide French service in courts
1977		Bill 101 - Charter of the French Language	

[15] As reprinted in Churchill (1997), p. 24.
[16] Adapted from Vaillancourt (1992)

1979	Criminal Code allows for trials in the language of the accused		
1981			New Brunswick Bill 88 enhances French language rights
1982	Constitution Act - French and English enshrined as official languages		
1983		Bill 52 - Amends Bill 101	
1986		Bill 142 - Provides for English language services	Bill 8 - French Language Services Act
1988	C-72 - New Official Languages Act	Supreme Court strikes down Bill 101's 'sign law'	Supreme Court enshrines French legal status in Saskatchewan and Alberta
1989		Bill 178 - Partially reinstates reinstates sign law	
1990			Supreme Court clarifies right of minority-language education
1991		Bill 120 - Reconfirms right to English- language health and social services	

Canadian Language Policy in 1996

As of 1996, the only jurisdiction in Canada that regulated the language of work in the private sector was Quebec. Large firms require a certificate of 'Françisation' which is obtained from the *Office de la langue française* after the firm has demonstrated that certain standards of French use in the work place have been met. Additionally, there are regulations dealing with language use in human resource management functions such as recruitment and promotion. As mentioned above, Quebec also regulates commercial communication. The law as of 1996 was not as stringent as the original stipulation in Bill 101; English is allowed on advertising signs, although French must be given prominence.

While French is the official language of the Quebec government, in most cases provincial services to the public are available in English. Bills 142 (1986) and 120 (1991) guaranteed the right to English-language service in some public social and health organizations.

In line with its commitments to offer services in both official languages, to promote linguistic employment equity and to allow employees to work in the official language of their choice, the federal public service has extensive regulations dealing with language use in its ranks. In 1995, 29% of all federal public service positions required some level of proficiency in both official languages.[17] Additionally, in specific regions of the country, including the National Capital Region and parts of Quebec, Ontario and New Brunswick, federal offices must operate in an environment where English and French are accorded equal status.[18]

As mentioned above, the federal government offers language training to any unilingual employee who is otherwise qualified for a public service position that requires bilingual ability. For those bilingual employees in positions that require knowledge of both official languages, an annual $800 'bilingual bonus' is added to their compensation. However certain groups, including executive staff, translators and stenographers are disqualified from receiving this benefit.

The federal government has succeeded in fulfilling many of its goals as laid out in the Official Languages Act. The proportion of francophones in the federal public service across Canada (29%) is just slightly higher than the national figure. However, in the province of Quebec, anglophones are more under-represented. While they make up

[17] Official Languages in Federal Institutions – Annual Report 1995-96, page 45.
[18] Ibid, 24.

almost 9% of the population, only 5% of federal employees in Quebec, excluding the National Capital Region, were first-language English speakers.

The Treasury Board reported that in 1996 over 90% of incumbents in bilingual positions in the public service met the language requirements of their jobs and, in fact, the percentage of federal employees considered to be bilingual (35%) exceeded the percentage of positions requiring that ability[19]. However,

> '(a) significant portion of the Executive group in bilingual positions in bilingual regions still do not meet the linguistic profile that they must attain by March 31,1998.'[20]

Nonetheless, at all other levels, federal policy appears to have been highly successful in promoting bilingualism within its ranks.

Summary

The three sections in this chapter dealt with subjects that were only marginally related to each other. However, Canada's linguistic demography, the Canadian labour market and language policy in Canada provide the canvas upon which the empirical analysis in the next chapter will be painted. A few points deserve emphasis:

- Canada is a linguistically divided country. The provinces and territories outside of Quebec are overwhelmingly English-speaking and largely unilingual, while Quebec is mostly French-speaking and bilingual.
- About 23% of the Canadian workforce is employed in public sector. Females are over-represented in this sector, largely due their high participation in health and social service fields.

[19] Ibid, 46.
[20] Ibid, 37.

- There is a significant wage premium paid to government sector employees in Canada.[21]
- Language policies in the province of Quebec have the intent of promoting the use of French in both public and private workplaces.
- Federal language policies have the intent of promoting the use of both official languages in the public service both through training and through a direct reward to bilingual employees in the form of a 'bilingual bonus.'

[21] Gunderson, Hyatt and Riddell (2000)

CHAPTER FOUR

THE RETURNS TO BILINGUALISM

The Data

Source and Restrictions

The statistical analysis of the returns to bilingualism in this chapter uses data from the 1996 Census of Canada, Public Use Microdata File (Individuals). The data set contains information on 792,448 Canadian residents (constituting 2.8% of the total enumerated population) who filled out the Census Long Form that includes detailed questions on income, language use, labour market activities and education. The sample that is analysed here is limited to individuals who worked at least twenty-four weeks and who had positive employment income for the year 1995. The size of this restricted sample is 312,279 observations.

Variable Definitions

For our purposes, a 'bilingual' individual is someone who claims knowledge of both English and French, and a 'unilingual' individual is someone who claims knowledge of either English or French. Naturally, a third category is reserved for individuals who have knowledge of neither official language. By the standard convention, 'anglophones', 'francophones', and 'allophones' are individuals whose mother tongues are English, French and some language other than those two, respectively. A small number of census respondents claimed to have dual mother tongues of English and French. Since we are more concerned about language knowledge than linguistic ethnicity here, it was decided to adopt the convenient assumption that these 'franglophones' are merely bilingual francophones.

The 1996 Census coded industries using the 1980 S.I.C. framework where working individuals were considered to be employed in one of sixteen sectors. Here, federal government services, other government services, educational services and health and social services are considered to be the 'public' sector, while the remaining twelve sectors are considered to be the 'private' sector. This is admittedly an imperfect distinction, since the census gives no information on the public or private ownership of firms. Since we are in part concerned with earnings differences among bilinguals within the public sector, here the private sector is used as a reference group with each of the public sector industries accounted for separately.

The census did not ask a question pertaining to work experience, however this variable was estimated using the following calculation:

(AGE) – (YEARS OF SCHOOLING) – 6

In some cases, the 'Years of Schooling' variable was denoted by a range of values, for example *5-8 Years*. In such instances, the median value was selected; thus *7 Years* was assumed for this example.

To reflect the threshold effects of educational attainment, the variable 'Highest Level of Schooling' was chosen over 'Years of Schooling' to account for educational differences among respondents. The census denoted fourteen levels of schooling but here they are conflated into nine categories for the sake of simplicity.

'Legal Marital Status' took one of five values in the census data, however here the 'Married' variable reflects a binary distinction, where 'Married' is equivalent to 'Legally Married, Not Separated' by the census definition.

This analysis retains all fourteen occupational distinctions used by the census according to the N.O.C. 1991 framework. In the regressions here, the designation 'Unskilled Manual Labour' is used as a reference group for the remaining occupational variables. The census variable 'Province or Territory' was converted into five regional variables: 'Atlantic/North', 'Ontario', 'Quebec', 'Prairies' and 'British Columbia', where 'Atlantic/North' is the reference. Also a single dummy variable was created for residents of Census Metropolitan Areas (CMA's), the nineteen most populous urban areas in Canada.

Rather than segmenting or excluding part-time workers from the analysis, a 'Part-Time' dummy variable was created from the census question dealing with Full-time/Part-time employment.

Finally, the variable 'Weekly Wages' was simply calculated by dividing the individual's salary or wage income by his/her weeks worked in 1995.

Methodology

The standard regression model used in this analysis is the familiar semilogarithmic 'human capital' wage determination model, augmented by linguistic variables and estimated using Ordinary Least Squares procedures. Its general form is:

$$\ln Y_i = a + bBIL_i + cX_i + e_i$$

where $\ln Y_i$ is the natural logarithm of the ith individual's weekly wages, a is an intercept term, b is the coefficient of the dummy variable BIL_i which enters as 1 if the individual is bilingual and 0 otherwise and c is a row vector of coefficients of X_i, a column vector containing a variety of human capital control variables. Random errors are captured in the term e_i.

We can interpret the bilingual coefficient using Halvorsen and Palmquist's (1980) procedure whereby the expression $e^b - 1$ is the percentage earnings advantage enjoyed by bilingual workers over the median wage of the control group, unilingual workers, after controlling for other wage determining factors. In other words, this is the bilingual wage premium.[22]

Since the overall bilingual premium is also weighted average of a variety of bilingual premia, this standard model is then elaborated by segmenting the bilingual attribute between sample sub-groups, giving the general equation:

$$\ln Y_i = a + b_J BILJ_i + b_K BILK_i + cX_i + e_i$$

where groups J and K exhaust the sample, such as J = male and K = female. This equation allows us to observe the relative influence on the bilingual premium of each group. Additionally, the effect on earnings of belonging to group J or K not related to language ability is controlled for, so in the case of the males and females, the female dummy variable is retained.

As much as we are interested in the magnitude of each segmented bilingual coefficient, we also want to know their relationship to each other. To test whether the difference in the coefficients is significantly different from zero, the following statistic is calculated:

$$t = (b_J - b_K)/(\text{var } b_J + \text{var } b_K - 2\text{cov}(b_J, b_K))^{.5}$$

If this value exceeds the critical value at a confidence level of 5%, it can be concluded that a significant differential exists between the bilingual wage premium of each group.

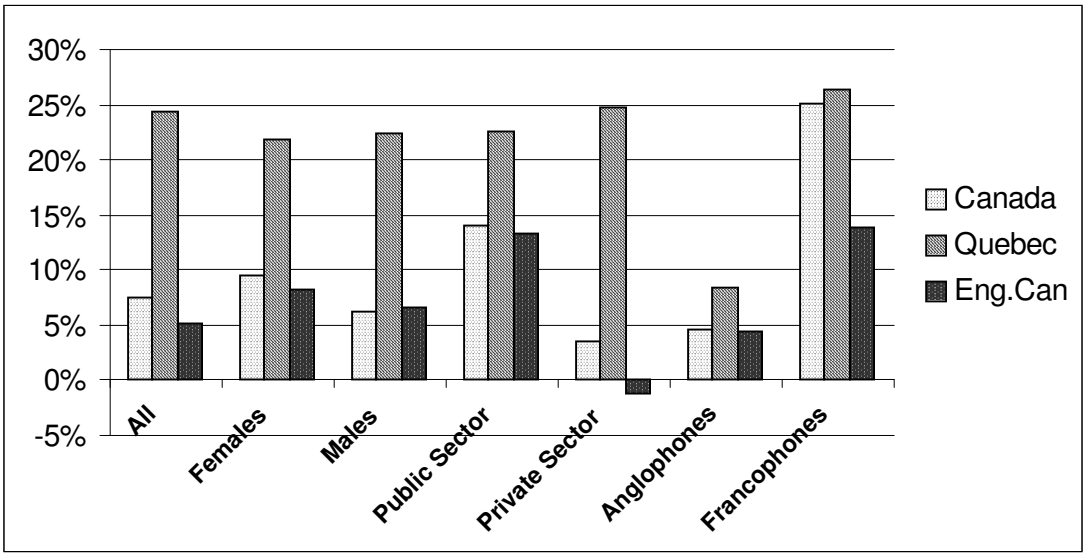
[22] Gujarati (2003), p. 321.

Regressions were estimated for three different samples: Canada as a whole, Quebec, and English Canada in recognition of the fact that the earnings value of bilingual ability may vary across linguistic regions.

Results

Gross Differentials. Before reporting the results of the regression analysis, let us first examine the differences in gross earnings between unilingual and bilingual workers in a variety of sub-samples.

FIGURE 4.1 – PERCENTAGE DIFFERENCE IN AVERAGE GROSS EARNINGS BETWEEN UNILINGUAL AND BILINGUAL WORKERS.



It is evident that the highest gross returns to bilingual ability were to be found in Quebec where among all sub-samples, except anglophones, the differentials exceeded 20%. Substantial gross bilingual returns were also observed among francophones and public sector employees in English Canada and Canada as a whole. However, bilingual private sector employees in English Canada earned on average less than their unilingual colleagues.

Earnings Differences Between Language Groups. A preliminary set of regressions was estimated to determine the net wage differentials between seven language groups: unilingual and bilingual anglophones, francophones and allophones as well as those workers with knowledge of neither official language.

TABLE 4.1 – NET EARNINGS DIFFERENCES BETWEEN LANGUAGE GROUPS[23]

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Unilingual Anglophones	REF	2.41%	REF	-11.28%	REF	2.66%
Bilingual Anglophones	-2.41%		11.28%		-2.66%	
Unilingual Francophones	-3.39%	-7.84%	8.11%	-9.19%	-1.69%	-1.93%
Bilingual Francophones	4.45%		17.30%		0.24%	
Unilingual Allophones	-15.92%	-5.28%	-15.49%	-15.46%	-15.63%	-5.44%
Bilingual Allophones	-10.65%		-0.03%		-10.18%	
Neither Official Language	-35.89%		-37.96%		-35.96%	

In the cross-Canada sample, the highest net wages were enjoyed by bilingual francophones followed respectively by unilingual anglophones, bilingual anglophones and unilingual francophones. The three allophone groups earned the lowest net wages, with the 'neither official language' category being the worst off and bilingual allophones earning more than unilingual allophones. Of note in this sample is the 'negative' bilingual premium earned by anglophones of almost 2.5%. Additionally, the highest difference in earnings between unilinguals and bilinguals was estimated for francophones at almost eight percentage points.

In the Quebec sub-sample, bilingual francophones also earned the highest net wages, followed by bilingual anglophones, unilingual francophones and then unilingual anglophones. The net earnings for the three allophone groups was again the lowest, although the difference in earnings between bilingual allophones and unilingual

[23] Shaded cell indicates that the estimate is not different from zero at a five percent significance level. This applies to all of the tables in this chapter.

anglophones was found to be not statistically different from zero. The bilingual premia for all three mother tongue groups in Quebec were significant and substantial.

In English Canada, the net linguistic wage differences were less apparent. Bilingual anglophones again earned about 2.5% less than unilingual anglophones. Among francophones, the net wage differentials were found to be not statistically significant either from the reference group unilingual anglophones or between bilingual and unilingual workers. Allophones were again at the greatest net earnings disadvantage.

Bilingual Wage Premia. In the following regressions, earnings differences between mother tongue groups were accounted for separately from language knowledge. In this way, the effect on earnings of being French-English bilingual was estimated across the population for each of the three samples.

TABLE 4.2 – WAGE PREMIA FOR CANADA, QUEBEC AND ENGLISH CANADA

	Canada	Quebec	Eng. Can.
Unilingual		Reference Group	
Bilingual	3.55%	9.53%	-0.96%
Neither Official Language	-24.09%	-30.21%	-24.54%
Anglophone		Reference Group	
Francophone	0.77%	6.30%	1.11%
Allophone	-14.93%	-12.28%	-15.05%
Private Sector		Reference Group	
Federal Government	20.02%	23.18%	19.91%
Other Government	16.89%	20.63%	15.42%
Educational Services	3.18%	4.95%	2.69%
Health and Soc. Serv.	7.62%	14.45%	5.30%
Male		Reference Group	
Female	-22.82%	-23.33%	-22.35%

Significant bilingual wage premia were observed in Quebec and Canada as a whole at approximately 9.5% and 3.5% respectively. However, there was no apparent bilingual premium observed in English Canada. Individuals who spoke neither official language were at a severe earnings disadvantage, particularly in Quebec where they earned only about 70% of the unilingual wage.

The net earnings differential between anglophones and francophones was only found to be significant in Quebec, where francophones earned a wage premium of over 6%. Allophones in all samples earned in the range of 12% to 15% less than anglophones.

Compared to private sector employees, the highest wages were enjoyed by those employed by federal, provincial and municipal governments across Canada and in Quebec and English Canada. The estimated premia were as high as 23% for federal government employees in Quebec and no lower than 15%, as in the case of provincial and municipal government employees in English Canada. Among other public sector workers, those employed in health and social service industries earned the next highest wages followed by educational service workers.

In all three samples, the gender wage differential was estimated to be between 22% and 24% of male earnings.

Bilingual Wage Premia By Gender. Across Canada, in Quebec and in English Canada the estimated contribution to the bilingual premium for females was higher than that for males. In the Canada-wide sample, the estimates for each gender were statistically significant at approximately 5.5% and 2% for men and women respectively and the differential between these two premia was found to be significantly different from zero. Bilingual females in Quebec enjoyed a wage premium of almost 13% as compared to just under 7% for bilingual males; this difference was also found to be statistically significant. In English Canada, no significant earnings advantage was observed for bilingual females and bilingual males earned in excess of 2% less than their unilingual counterparts. The difference between these two estimates, although small, was found to be significant.

TABLE 4.3 – BILINGUAL WAGE PREMIA BY GENDER

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Bilingual Females	5.48%	3.54%	12.94%	6.11%	0.35%	2.63%
Bilingual Males	1.94%		6.83%		-2.29%	

Bilingual Wage Premia By Sector. The difference in the contribution to the bilingual wage premium between the private and public sectors was only found to be statistically significant in Quebec. There, bilingual private sector workers earned a premium of just over 11.5% while the bilingual premium in the public sector was estimated at just over 3.5%. In Canada as a whole, both public and private sector workers earned bilingual wage premia in the range of 3% to 4.5% and in English Canada, it was estimated that bilingual workers in the private sector earned less than unilingual workers.

TABLE 4.4 – BILINGUAL WAGE PREMIA BY SECTOR

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Bilingual Public Sector	4.20%	0.90%	3.71%	-7.89%	0.41%	2.02%
Bilingual Private Sector	3.30%		11.61%		-1.62%	

Bilingual Wage Premia By Gender and Sector. In the cross-Canada sample, the highest bilingual wage premium was paid to females employed in the public sector. In the private sector, there were significant premia paid to both males and females, although the difference between the two estimates was deemed to be not significant. For males in the public sector, there was no significant bilingual premium.

In Quebec, females working in the private sector enjoyed the highest bilingual returns at almost 15%. This significantly exceeded the positive wage premia enjoyed by public sector females and private sector males. As with the Canada-wide sample, there was no premium for observed for bilingual males in the public service.

The only significant bilingual earnings advantage observed in English Canada was for females in the public sector. The bilingual male public sector estimate was negative at more than 3%. Additionally, the difference between the female public and private estimates was also found to be significant.

TABLE 4.5 – BILINGUAL WAGE PREMIA BY GENDER AND SECTOR

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Bilingual Female Private	4.28%	-3.12%	14.92%	5.90%	-1.28%	-4.00%
Bilingual Female Public	7.40%		9.02%		2.72%	
Bilingual Female Private	4.28%	1.72%	14.92%	5.57%	-1.28%	0.57%
Bilingual Male Private	2.57%		9.35%		-1.86%	
Bilingual Female Public	7.40%	7.62%	9.02%	12.37%	2.72%	5.97%
Bilingual Male Public	-0.21%		-3.34%		-3.25%	
Bilingual Male Public	-0.21%	-2.78%	-3.34%	-12.69%	-3.25%	-1.39%
Bilingual Male Private	2.57%		9.35%		-1.86%	

Bilingual Premia By Private Sector and Detailed Public Sector Industries. For the remainder of the analysis, the public sector was decomposed into its various sub-sectors: federal government, other government, educational services and health and social services.

TABLE 4.6 – BILINGUAL WAGE PREMIA FOR PUBLIC SECTOR INDUSTRIES AND THE PRIVATE SECTOR

	Canada	Quebec	Eng. Can.
Bilingual Private Sector	3.32%	11.62%	-1.62%
Bilingual Federal Gov' t	4.30%	14.90%	0.87%
Bilingual Other Gov' t	6.57%	8.81%	1.29%
Bilingual Education	1.96%	-1.62%	0.55%
Bilingual Health and S.S.	5.93%	4.25%	-0.57%

In the Canada-wide sample, the bilingual wage premia for all industry designations were found to be positive and significant except for in the educational services field. The estimated premia ranged from 3% to over 6.5%, although none was found to be significantly different from the others.

In Quebec, the only significant bilingual wage premia were observed in the private sector and in the two government sectors. These all lay in the range of 9% and 15% and were also deemed to be not significantly different from each other.

TABLE 4.7 – BILINGUAL WAGE PREMIA DIFFERENTIALS FOR PUBLIC SECTOR INDUSTRIES AND THE PRIVATE SECTOR

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Bilingual Private Sector	3.32%	-0.98%	11.62%	-3.28%	-1.62%	-2.48%
Bilingual Federal Gov' t	4.30%		14.90%		0.87%	
Bilingual Private Sector	3.32%	-3.25%	11.62%	2.81%	-1.62%	-2.91%
Bilingual Other Gov' t	6.57%		8.81%		1.29%	
Bilingual Private Sector	3.32%	1.36%	11.62%	13.24%	-1.62%	-2.16%
Bilingual Education	1.96%		-1.62%		0.55%	
Bilingual Private Sector	3.32%	-2.61%	11.62%	7.38%	-1.62%	-1.05%
Bilingual Health and S.S.	5.93%		4.25%		-0.57%	
Bilingual Federal Gov' t	4.30%	-2.27%	14.90%	6.09%	0.87%	-0.43%
Bilingual Other Gov't	6.57%		8.81%		1.29%	
Bilingual Federal Gov' t	4.30%	2.34%	14.90%	16.52%	0.87%	0.32%
Bilingual Education	1.96%		-1.62%		0.55%	
Bilingual Federal Gov' t	4.30%	-1.63%	14.90%	10.66%	0.87%	1.43%
Bilingual Health and S.S.	5.93%		4.25%		-0.57%	
Bilingual Other Gov' t	6.57%	4.61%	8.81%	10.43%	1.29%	0.75%
Bilingual Education	1.96%		-1.62%		0.55%	
Bilingual Other Gov' t	6.57%	0.64%	8.81%	4.57%	1.29%	1.86%
Bilingual Health and S.S.	5.93%		4.25%		-0.57%	
Bilingual Education	1.96%	-3.97%	-1.62%	-5.87%	0.55%	1.11%
Bilingual Health and S.S.	5.93%		4.25%		-0.57%	

Bilingual Wage Premia By Gender and By Private Sector and Detailed Public Sector Industries. Finally, the public sector industry designations were cross-referenced with gender to give ten distinct bilingual sub groups whose respective wage premia were compared.

TABLE 4.8 – BILINGUAL WAGE PREMIA FOR PUBLIC SECTOR INDUSTRIES AND THE PRIVATE SECTOR BY GENDER

	Canada		Quebec		English Canada	
	Females	Males	Females	Males	Females	Males
Bilingual Private Sector	4.31%	2.57%	15.08%	9.25%	-1.26%	-1.87%
Bilingual Federal Gov' t	5.69%	3.36%	20.95%	10.29%	0.12%	1.36%
Bilingual Other Gov' t	9.06%	4.75%	14.73%	5.05%	3.59%	-1.18%
Bilingual Education	6.37%	-4.54%	5.78%	-10.72%	3.73%	-5.39%
Bilingual Health and S.S.	8.72%	-1.64%	8.14%	-4.88%	2.58%	-11.15%

In both Quebec and Canada, bilingual females in all industry designations earned a wage premium over their unilingual counterparts. In Canada, the only significant premium differential was observed between the private sector and health and social service industries, with the latter's earnings advantage being estimated at about four percentage points higher. In Quebec, the private sector paid a bilingual wage premium to females significantly higher than that in both educational and service and health and social service industries. Additionally, the greatest premium differential was observed between the federal government and educational sectors at almost sixteen percentage points in favour of female federal workers. In English Canada, there was no significant earnings advantage estimated for bilingual women in any industry

TABLE 4.9 – BILINGUAL WAGE PREMIA DIFFERENTIALS FOR PUBLIC SECTOR INDUSTRIES AND THE PRIVATE SECTOR FOR FEMALES

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Female Bilingual Priv.	4.31%	-1.38%	15.08%	-5.87%	-1.26%	-1.38%
Female Bilingual Fed G.	5.69%		20.95%		0.12%	
Female Bilingual Priv.	4.31%	-4.75%	15.08%	0.35%	-1.26%	-4.85%
Female Bilingual Oth G.	9.06%		14.73%		3.59%	
Female Bilingual Priv.	4.31%	-2.05%	15.08%	9.30%	-1.26%	-4.99%
Female Bilingual Educ	6.37%		5.78%		3.73%	
Female Bilingual Priv.	4.31%	-4.41%	15.08%	6.94%	-1.26%	-3.85%
Female Bilingual H & SS	8.72%		8.14%		2.58%	
Female Bilingual Fed G.	5.69%	-3.37%	20.95%	6.21%	0.12%	-3.47%
Female Bilingual Oth G.	9.06%		14.73%		3.59%	
Female Bilingual Fed G.	5.69%	-0.68%	20.95%	15.17%	0.12%	-3.61%
Female Bilingual Educ	6.37%		5.78%		3.73%	
Female Bilingual Fed G.	5.69%	-3.03%	20.95%	12.81%	0.12%	-2.47%
Female Bilingual H & SS	8.72%		8.14%		2.58%	
Female Bilingual Oth G.	9.06%	2.70%	14.73%	8.96%	3.59%	-0.14%
Female Bilingual Educ	6.37%		5.78%		3.73%	
Female Bilingual Oth G.	9.06%	0.34%	14.73%	6.60%	3.59%	1.00%
Female Bilingual H & SS	8.72%		8.14%		2.58%	
Female Bilingual Educ	6.37%	-2.36%	5.78%	-2.36%	3.73%	1.15%
Female Bilingual H & SS	8.72%		8.14%		2.58%	

For men across Canada, the only positive bilingual premium was observed for those employed in the private sector. It was estimated that bilingual males in the educational service industry earned less than unilingual workers and that the premium differentials with this industry and the federal government, other government and private sectors were also significant. In Quebec, a similar situation prevailed, with the private sector and education sectors paying positive and negative premia to their bilingual employees respectively. There were also significant premium differentials observed between the private sector and the two government designations on the high end and educational service and health and social service industries on the low end. In English Canada, male bilingual workers in educational and health and social service industries were at an earnings disadvantage with respect to unilingual workers. Also, significant

differentials were observed between both the private and federal government sectors and health and social services.

TABLE 4.10 – BILINGUAL WAGE PREMIA DIFFERENTIALS FOR PUBLIC SECTOR INDUSTRIES AND THE PRIVATE SECTOR FOR MALES

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Male Bilingual Priv.	2.57%	-0.79%	9.25%	-1.05%	-1.87%	-3.24%
Male Bilingual Fed G.	3.36%		10.29%		1.36%	
Male Bilingual Priv.	2.57%	-2.18%	9.25%	4.19%	-1.87%	-0.70%
Male Bilingual Oth G.	4.75%		5.05%		-1.18%	
Male Bilingual Priv.	2.57%	7.11%	9.25%	19.96%	-1.87%	3.52%
Male Bilingual Educ	-4.54%		-10.72%		-5.39%	
Male Bilingual Priv.	2.57%	4.21%	9.25%	14.13%	-1.87%	9.27%
Male Bilingual H & SS	-1.64%		-4.88%		-11.15%	
Male Bilingual Fed G.	3.36%	-1.39%	10.29%	5.24%	1.36%	2.54%
Male Bilingual Oth G.	4.75%		5.05%		-1.18%	
Male Bilingual Fed G.	3.36%	7.91%	10.29%	21.01%	1.36%	6.76%
Male Bilingual Educ	-4.54%		-10.72%		-5.39%	
Male Bilingual Fed G.	3.36%	5.00%	10.29%	15.18%	1.36%	12.51%
Male Bilingual H & SS	-1.64%		-4.88%		-11.15%	
Male Bilingual Oth G.	4.75%	9.30%	5.05%	15.77%	-1.18%	4.21%
Male Bilingual Educ	-4.54%		-10.72%		-5.39%	
Male Bilingual Oth G.	4.75%	6.39%	5.05%	9.94%	-1.18%	9.97%
Male Bilingual H & SS	-1.64%		-4.88%		-11.15%	
Male Bilingual Educ	-4.54%	-2.91%	-10.72%	-5.83%	-5.39%	5.76%
Male Bilingual H & SS	-1.64%		-4.88%		-11.15%	

The premium differentials between men and women within the industry designations were also analyzed. In all three samples, women enjoyed bilingual premium advantages in excess of nine percentage points in both the educational service and health and social service industries. The most extreme differential was observed in Quebec educational services at more than sixteen percentage points. There was also a significant differential between the premia for men and women in the Quebec private sector in favour of women.

TABLE 4.11 – BILINGUAL WAGE PREMIA DIFFERENTIALS BETWEEN GENDERS WITHIN INDUSTRY SECTORS

	Canada		Quebec		English Canada	
	Premium	Difference	Premium	Difference	Premium	Difference
Female Bilingual Priv.	4.49%	1.83%	15.08%	5.83%	-1.26%	0.61%
Male Bilingual Priv.	2.66%		9.25%		-1.87%	
Female Bilingual Fed G.	5.70%	2.48%	20.95%	10.65%	0.12%	-1.25%
Male Bilingual Fed G.	3.23%		10.29%		1.36%	
Female Bilingual Oth G.	9.02%	4.40%	14.73%	9.68%	3.59%	4.77%
Male Bilingual Oth G.	4.62%		5.05%		-1.18%	
Female Bilingual Educ	6.37%	11.08%	5.78%	16.49%	3.73%	9.12%
Male Bilingual Educ	-4.71%		-10.72%		-5.39%	
Female Bilingual H & SS	8.71%	10.53%	8.14%	13.02%	2.58%	13.73%
Male Bilingual H & SS	-1.82%		-4.88%		-11.15%	

Summary

The main observations of this analysis are as follows:

- For francophones, the returns to knowing English were significant and substantial in the Canada and Quebec samples. The returns for anglophones to knowing French were positive only in Quebec.
- Bilingual workers were paid wage premia in Canada and Quebec of approximately 3.5% and 9.5% respectively.
- The greater portion of the bilingual premia in all three samples was earned by females.
- Across Canada, the returns to bilingualism in the public and private sectors were approximately equal. In Quebec, the private sector bilingual premium was significantly higher than that of the public sector.
- Across Canada, bilingual females in the public sector earned a wage premium greater than all other bilingual groups. In Quebec, the highest bilingual premium went to female private sector workers.

- When the public sector was decomposed, in Canada, all sub-industries except educational services payed significant rewards to bilingual workers. In Quebec, the only bilingual premia were observed in the private and government sectors.
- In Canada and Quebec, females earned significant bilingual wage premia in all sub-industry sectors.
- Men in Canada and Quebec earned a positive bilingual premium only in the private sector after the public sector is broken down.
- In all three samples, the greatest differentials between male and female bilingual premia within industries were observed in the educational services and health and social service fields in favour of women. In Quebec, women also had a bilingual advantage in the private sector.

CHAPTER FIVE
CONCLUSIONS

The analysis reported in chapter four presented a large amount of information for consideration. The purpose of this chapter is to boil down this information and integrate it with the background material from chapters one to three. First we will review some the general observations that are peripheral to the subject at hand. Next, the returns to bilingualism will be analyzed, with specific focus on gender and industry sector interaction. This will be followed by a discussion of factors that, to a certain extent, qualify the results. Finally, some suggestions for future research in this subject area will be offered.

General Observations

Wage Differentials Among Language Groups. As was shown in the literature review in chapter one, the majority of empirical work conducted on language and earnings in Canada has focused on wage differentials between major language groups. Specifically, the interest was with the economic situation of francophones relative to anglophones in the province of Quebec. It is no coincidence that this area of study blossomed during the 1970s and early 1980s when the nationalist movement in Quebec was at its height.

More recent studies have shown that these linguistic wage differentials have diminished over time, partly as a result of language legislation instituted at both the federal and provincial levels. The analysis here confirmed this, showing that across Canada and in English Canada, there was no apparent earnings differential between anglophones and francophones and that in Quebec, francophones actually had the earnings advantage.

Gender-Wage Differentials. The difference in earnings between men and women has generated a substantial amount of academic interest, too much to review here. However, let us just report that it has been estimated that, in the 1990s, women earned between 75% and 80% of men's wages after accounting for other factors.[24] The estimates here agree with this assessment, both in the Canada-wide and regional samples.

Public-Private Sector Wage Differentials. It was also found that there were significant earnings differences between the two main industry sector categories. Government employees, in particular, enjoyed wage premia of between 17% and 20% over the private sector across Canada. This estimate is far higher than the premium reported by Gunderson, Hyatt and Riddell (2000) who also analyzed 1996 Census data. A possible explanation for the discrepancy may lie in the differing sample restrictions of each analysis. Gunderson et al. used a minimum earnings cut-off based on a calculation of the average minimum wage across the country, while here we included all workers with positive earnings in 1995. In doing so, our sample may have included a large number of very low wage earners who where likely to be employed in the private sector.

Workers in educational service and health and social service industries also earned wage premia, although not of the same magnitude as government workers.

Bilingual Premia

Language Groups and Regions. The most significant bilingual wage effects were observed among francophones to the extent that we may have been actually assessing the earnings benefit to French-speakers of also knowing English. Additionally, Quebec appeared to be the region where language knowledge was most salient in the labour market. This should not come as too much of a surprise, considering Quebec's unique

[24] Gunderson and Riddell (1993) p. 554.

linguistic character and the immense influence of English Canada and the United States on its economy. These observations are consistent with the Carliner's (1981) theoretical predictions and a good deal of the empirical evidence in other studies.

Gender. Perhaps the most robust conclusion in this analysis is that women enjoy a bilingual premium to a greater degree than do men. It should be reiterated that this comparison was made after controlling for the male-female wage differential not attributable to linguistic differences or other human capital factors. Considering this, we may state that the bilingual premium mitigates the earnings differential between men and women to some extent.

This conclusion is analogous to the observation that females generally have higher returns to education than men, or to put it another way, relatively uneducated and/or unilingual women suffer the most from gender-based wage discrimination.[25]

Industry Sector. In general, the highest returns to bilingual ability were observed in the private and governmental sectors in Quebec and Canada. Observing that in the English Canada sample the private sector bilingual premium was negative, we may presume that a good deal of the private sector premium in the Canada-wide sample originated from Quebec.

The value of bilingualism in the Quebec private sector stands to reason: hospitality services, business services and fields geared towards external markets naturally would value workers who can speak both French and English, particularly in urban areas such as Montreal.

The insignificant bilingual government premium in English Canada did not lend much credence to the hypothesis that the wages of bilingual federal employees may be

[25] Gunderson and Riddell (1993) p. 463.

relatively inflated next to those of bilingual employees in other sectors, at least when both genders are considered together. Therefore no definitive conclusion can be made with respect to the influence of language policy in the labour market.

Gender and Industry Sector. Dividing the sectoral variables between men and women provided us with a more coherent picture. In Canada and Quebec, women in all industries enjoyed bilingual wage premia, while only men employed in the private sector benefited from being able to speak both languages.

A comparison of the premia for men and women within sectors showed that the largest differentials were apparent in the education and health and social service fields, even in English Canada. We saw in chapter three that the high relative percentage of women in the broadly defined public service was due to their disproportionate representation in these industries. This being the case, we may speculate that the overall premium differential between men and women is substantially attributable to the differential within these fields.

Gunderson and Riddell (1993) reported that women have the higher public sector premium,[26] due in part to pay equity policies and the influence of collective bargaining. In addition, in educational and health and social service industries, women may be more likely to be deployed in 'front-line' positions requiring substantial interaction with the public where bilingual ability may be required to a greater extent. Combining these facts provides us with a partial explanation of the high female bilingual premium.

However, we may note that in Quebec there was also a substantial bilingual advantage in favour of women in the private sector.

[26] p. 533.

Other Considerations

While this analysis has provided us with a number of interesting results, there are a few reasons why we should qualify our estimates of the bilingual wage premia. These issues do not invalidate the conclusions here, but they must be discussed in order to present a more complete picture of the role of bilingualism in earnings determination.

Omitted Ability. The discussion in chapter two accepted that at least some of the unilingual-bilingual wage differential must be attributable to unobserved ability bias. Unfortunately the nature of the data that was analyzed here made it impossible to estimate the extent of its influence.

Furthermore, it is uncertain how much of a factor intellect plays in bilingual ability, since there appears to be a distinction between second language *acquisition*, whereby individuals may passively acquire the other language through environmental exposure, and second language *learning*, a process similar to other types of learning, requiring certain cognitive skills.[27] Complicating the matter is the suggestion that learning a second language contributes to some individuals' cognitive flexibility[28] which raises the question of a 'feedback' effect in the relationship between ability and bilingualism. For our purposes, let us leave these questions to be pondered by psycholinguists.

Selectivity. Two of the more recent studies that were reviewed in chapter one, Shapiro and Stelcner (1997) and Christofides and Swidinsky (1998), built into their methodologies mechanisms to account for the endogeneity of bilingual ability. In short, the mechanism involved estimating a probit regression to determine the likelihood of an

[27] Fromkin, Rodman, Hultin and Logan (2001) p. 445.
[28] Chorney (1998) pp. 188-189.

individual learning a second language and then incorporating the results into the standard log earnings regression. However, in both cases the authors determined that the adjustment for selectivity made no significant difference to the results.

It was also mentioned that Grenier (1987) accounted for selectivity of a different kind in much the same way. He proposed that the exodus of mainly unilingual anglophones from Quebec in the late 1970's contributed to a bias in the estimates of the earnings differential between anglophones and francophones. In this case, the adjustment made a substantial difference to the results. However, since then, the out-migration of anglophones from Quebec has been relatively minimal[29], and so it was presumed that accounting for this kind of selectivity was unnecessary here.

Self-Reporting. The Canadian Census is a highly respected source for social science data, however, as with any self-reported survey, responses are inevitably prone to some error due to the subjective judgements of the respondents. The census defined language knowledge as the ability to 'carry on a conversation of some length on various topics in that language.'[30] Cleary this definition is subject to a certain amount of interpretation. It may be that individuals have differing standards of what it means to 'carry on a conversation of some length', particularly across the linguistic regions of the country. For example, Montrealers, who are likely to be confronted with social situations in either official language on a daily basis, may have a higher standard for language knowledge than those residing in areas where either French or English is predominant.

[29] Marmen and Corbell (1999) reported that the net out-migration of anglophones from Quebec was 22,000 and 24,000 in the periods 1986-1991 and 1991-1996 respectively, compared to over 100,000 between 1976 and 1981. p. 65.
[30] 1996 Census Guide. Statistics Canada.

Directions for Further Research

It was necessary to keep the focus of this study relatively narrow, however there are a few possible ways in which the analysis could be extended. Our primary concern was with differing bilingual wage premia between the public and private sectors and within the public sector. In a similar way, the private sector could be broken down into its components to determine which industries (retail trade, manufacturing, business services etc.) value second language skills the most. As it was shown that there appeared to be no significant bilingual premium in English Canada, such an analysis should logically concentrate on the province of Quebec. In addition to the influence of language policy, industries' differing orientations to external markets (i.e. English Canada and the U.S.) could be considered determining factors.

Alternatively, the returns to bilingualism could be incorporated into the larger framework of minority language survival and obsolescence. This subject has attracted considerable attention from sociolinguists and a number of economists have proposed models to explain the phenomenon. The basic assumption behind these models is that individuals make a rational choice to use one language or the other based on the relative pecuniary and non-pecuniary costs and benefits of doing so. The value of a particular language (or two) in the labour market is a major factor in this calculation.

The possibility for a more fine-grained analysis also exists. In addition to language knowledge, the census also inquires as to the respondents' language use in the home and, as of 2001, language use in the workplace. By incorporating the information on language use, the explanatory value of the analysis in this study or the two proposals above could be greatly enriched.

APPENDIX

REGRESSION RESULTS[31]

[31] The statistical analysis in this study was conducted using SPSS 11.5 software.

Sample:	Canada	Females	Males	Public	Private	Gov' t
Unilingual			Reference Group			
Bilingual	3.94%	1.34%	4.89%	2.39%	4.65%	4.97%
Neither Official Language	-24.04%	-19.90%	-25.56%	-24.79%	-23.62%	-2.63%
Anglophones			Reference Group			
Francophones	0.88%	0.89%	0.68%	4.03%	-0.17%	-1.65%
Allophones	-14.99%	-9.46%	-18.02%	-9.94%	-16.27%	-11.15%
Private Sector			Reference Group			
Public Sector	9.84%	11.20%	6.99%	n/a	n/a	n/a
Males			Reference Group			
Females	-23.39%	n/a	n/a	-17.86%	-24.67%	-15.29%
Unmarried			Reference Group			
Married	12.07%	4.57%	17.30%	9.60%	12.78%	7.43%
Non-CMA			Reference Group			
CMA	8.98%	11.66%	6.81%	4.29%	10.37%	10.49%

Sample:	Canada	Anglo	Franco	Quebec	Eng. Can.
Unilingual			Reference Group		
Bilingual	3.94%	-0.95%	8.98%	9.92%	-0.37%
Neither Official Language	-24.04%	n/a	n/a	-30.08%	-24.44%
Anglophones			Reference Group		
Francophones	0.88%	n/a	n/a	6.70%	0.98%
Allophones	-14.99%	n/a	n/a	-12.16%	-15.12%
Private Sector			Reference Group		
Public Sector	9.84%	6.76%	15.40%	14.11%	8.55%
Males			Reference Group		
Females	-23.39%	-23.64%	-24.56%	-23.65%	-23.03%
Unmarried			Reference Group		
Married	12.07%	14.52%	9.25%	9.06%	13.03%
Non-CMA			Reference Group		
CMA	8.98%	10.65%	7.34%	6.73%	9.24%

Model:	I	II	III	IV	V
Unilingual			Reference Group		
Bilingual	3.94%	2.35%	2.36%	3.44%	3.42%
Male			Reference Group		
Female	-23.39%	-23.95%	-23.93%	-23.38%	-23.67%
Private Sector			Reference Group		
Public Sector	9.84%	9.84%	9.46%	9.40%	9.47%
Bilingual_Female		3.41%	2.33%		
Bilingual_Public Sector				1.69%	-1.25%
Bilingual_Public_Female			2.79%		5.25%

Model:	I	II	III	IV	V
Unilingual			Reference Group		
Bilingual	3.43%	1.87%	1.88%	3.21%	3.21%

Male	Reference Group				
Female	-22.21%	-22.77%	-22.77%	-22.21%	-22.24%
Non-Government	Reference Group				
Government Sector	16.83%	16.83%	16.66%	15.99%	15.99%
Bilingual_Female		3.34%	3.23%		
Bilingual_Government				2.45%	1.85%
Bilingual_Govern._Female			1.19%		1.45%

Sample:	Eng. Can.	Public	Private	Gov' t
Unilingual	Reference Group			
Bilingual	-0.37%	1.31%	-1.22%	2.70%
Neither Official Language	-24.44%	-25.85%	-23.84%	5.61%
Anglophone	Reference Group			
Francophone	0.98%	1.72%	0.98%	-0.05%
Allophone	-15.12%	-10.07%	-16.32%	-11.03%
Male	Reference Group			
Female	-23.03%	-18.05%	-24.16%	-15.73%
Private Sector	Reference Group			
Public Sector	8.55%	n/a	n/a	n/a

Sample:	Quebec	Public	Private	Gov' t
Unilingual	Reference Group			
Bilingual	9.92%	7.07%	10.94%	8.34%
Neither Official Language	-30.08%	-17.74%	-30.40%	-35.12%
Anglophone	Reference Group			
Francophone	6.70%	12.71%	5.37%	-2.83%
Allophone	-12.16%	-4.26%	-14.12%	-13.31%
Male	Reference Group			
Female	-23.65%	-16.63%	-25.57%	-13.32%
Private Sector	Reference Group			
Public Sector	14.11%	n/a	n/a	n/a

Sample:	Canada	Quebec	Eng.Can.
Unilingual	Reference Group		
Bilingual Female	5.84%	13.30%	0.81%
Bilingual Male	2.35%	7.23%	-1.58%
Neither Official Language	-24.00%	-29.81%	-24.43%
Private Sector	Reference Group		
Public Sector	9.84%	14.10%	8.55%
Male	Reference Group		
Female	-23.95%	-25.78%	-23.26%

Sample:	Canada	Females	Males
Unilingual	Reference Group		
Bilingual Private Sector	3.45%	1.36%	3.99%
Bilingual Federal Gov' t	14.60%	11.14%	16.39%
Bilingual Other Gov' t	13.75%	10.36%	16.22%

Bilingual Educational Services	-1.99%	-4.99%	-0.35%
Neither Official Language	4.72%	2.64%	4.32%
Private Sector	Reference Group		
Public Sector	9.09%	10.87%	5.63%
Male	Reference Group		
Female	-23.22%	n/a	n/a

Sample:	Quebec	Female	Males
Unilingual	Reference Group		
Bilingual Private Sector	11.69%	11.76%	10.54%
Bilingual Federal Gov' t	17.53%	14.65%	20.63%
Bilingual Other Gov' t	13.57%	11.43%	17.18%
Bilingual Education	-5.25%	-7.41%	-2.91%
Bilingual Health & Social Services	5.30%	2.41%	7.10%
Neither Official Language	-29.89%	-23.73%	-34.02%

Sample:	Eng. Can.	Females	Males
Unilingual	Reference Group		
Bilingual Private Sector	-1.40%	-3.68%	-1.56%
Bilingual Federal Gov' t	11.68%	7.58%	12.97%
Bilingual Other Gov' t	8.54%	6.17%	7.22%
Bilingual Education	-3.16%	-5.94%	-3.13%
Bilingual Health & Social Services	-2.22%	-1.81%	-8.24%
Neither Official Language	-24.52%	-20.68%	-25.66%

Sample:	Canada	Quebec	Eng Can.
Unilingual	Reference Group		
Female Bilingual Private Sector	4.76%	15.20%	-0.70%
Female Bilingual Federal Gov' t	16.19%	22.88%	11.15%
Female Bilingual Other Gov' t	16.63%	19.00%	11.30%
Female Bilingual Education	2.41%	1.84%	0.10%
Female Bilingual Health & S.S.	7.76%	9.67%	1.07%
Male Bilingual Private Sector	2.49%	9.29%	-1.94%
Male Bilingual Federal Gov' t	13.09%	11.99%	11.82%
Male Bilingual Other Gov' t	11.34%	8.85%	5.39%
Male Bilingual Education	-8.54%	-14.08%	-9.28%
Male Bilingual Health and S.S.	-2.95%	-3.58%	-12.96%
Neither Official Language	-24.01%	-29.41%	-24.49%

Sample:	Montreal	New Brunswick	Ottawa-Hull
Unilingual	Reference Group		
Bilingual	8.59%	0.22%	2.94%
Neither Official Language	-35.03%	-9.23%	-18.66%
Anglophone	Reference Group		
Francophone	7.03%	-1.57%	-0.14%
Allophone	-13.88%	-18.59%	-17.74%

Private Sector	Reference Group		
Public Sector	8.46%	20.36%	9.80%
Males	Reference Group		
Females	-21.17%	-31.78%	-18.56%

Sample:	Montreal	New Brunswick	Ottawa-Hull
Unilingual	Reference Group		
Bilingual Public Sector	3.50%	-0.37%	7.80%
Bilingual Private Sector	10.30%	0.49%	-0.15%
Neither Official Language	-34.69%	-9.15%	-19.48%
Anglophones	Reference Group		
Francophones	7.03%	-1.57%	-0.16%
Allophones	-13.86%	-18.60%	-17.86%
Private Sector	Reference Group		
Public Sector	12.94%	20.77%	5.35%
Males	Reference Group		
Females	-21.17%	-31.78%	-18.56%

Model:	I	II
Unilingual	Reference Group	
Bilingual Males	2.37%	2.37%
Female Bilingual Private Sector	4.76%	4.76%
Female Bilingual Federal Gov' t	16.11%	20.02%
Female Bilingual Other Gov' t	16.62%	18.13%
Female Bilingual Education	2.70%	2.72%
Female Bilingual Health & S.S.	7.82%	7.82%
Neither Official Language	-24.04%	-24.03%
Private Sector	Reference Group	
Public Sector	9.36%	9.37%
Males	Reference Group	
Females	-23.91%	-23.92%
Fem_Bil_FdGov' t_Clerical/Admin		-6.72%
Fem_Bil_OthGov't_Clerical/Admin		-3.11%

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