A COMPARATIVE ANALYSIS OF LABOUR SUPPLY BEHAVIOUR AMONG THE IMMIGRANT AND THE CANADIAN-BORN POPULATION IN THE LIGHT OF THE IMMIGRANT SELECTIVITY HYPOTHESIS

by

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This dissertation is dedicated to all

working mothers.

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A B S T R A C T

Research on the economic performance of immigrants relative to the native-born population since 1978 has revolved around Chiswick's immigrant selectivity hypothesis, which argues that immigrants generally possess "superior motivation, initiative and drive". However, most of the studies on the subject have focused on earnings without much meaningful attempt to apply the hypothesis within the context of labour supply.

The purpose of this dissertation is to analyze the differences in labour supply between immigrant and Canadian-born populations, looking at both total labour supply and the effect of underemployment constraints, and moonlighting activity. We estimated labour supply functions based on weekly hours and annual hours in 1987 using Heckman's two-step regression procedure for correcting selectivity biases due to participation and underemployment. The regression results were then utilised for a Blinder-Oaxaca type decomposition analyses of the hours differences, in the light of the immigrant selectivity hypothesis.

We found that there is no significant difference in the structure of the labour supply functions, with respect to the intercept and wage coefficients, and that the difference in the means of weekly and annual hours is explained fully by the differences in the means of the demographic characteristics included in the estimation equations.

The analyses of moonlighting behaviour also revealed that hours worked at the primary job were a strong factor in determining who moonlights.

In general the dissertation underlined the importance of labour market constraints in analyzing the differences in the labour supply and moonlighting behaviour between groups of individuals.

Acknowledgements

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Chapter 1

GENERAL INTRODUCTION

The economic performance of immigrants has been the subject of many research studies particularly since Chiswick (1978). The purpose of these studies has in essence revolved around Chiswick's "cross-over hypothesis" and the role of immigrant self-selection and labour market or cultural assimilation in this process.

The cross-over hypothesis states that on average recent immigrants earn lower income than comparable native-born but with time their earnings become equal and then exceed that of native-born workers. Two basic explanations for this phenomenon have been offered. The first is the hypothesis of "immigrant self-selection", which explains that the migration process pre-selects individuals who have superior labour market characteristics such as education, age, and skills as well as superior motivation to work compared to the average worker in either the host country or the country of origin (Chiswick 1978; Borjas 1985, 1988). The second is the hypothesis of immigrant assimilation, which attributes the steep immigrant earnings profile to the process of learning new labour market skills, languages, etc. which are directly linked with the length of stay of the immigrant in the host country (Borjas 1985, 1991; Kossoudji 1989; Merg 1987).

Another issue which has occupied researchers has been the apparent decline in the earnings profile of immigrants in recent times. (Borjas 1985, 1988; Chiswick 1980; Abbott and Beach 1992). To the "assimilation school" this decline may be attributed to the decline in the "quality" of

immigrants arising from shifts in the origin-mix of immigrants from the traditional sources in Western Europe to new sources in Asia, Africa and the Caribbean (Borjas 1985) or to the general shifts in the age-earnings profiles in the overall North American economy resulting from the entry of baby boomers into the labour market (Chiswick 1986).

It is remarkable that in most of these studies "economic performance" or the labour market activity of immigrants has been measured solely in terms of earnings. Only occasionally have other aspects of economic performance such as occupational status (Kossoudji, 1989) and labour supply (Economic Council of Canada 1991; deSilva 1992) been mentioned.

A recent survey paper prepared by Vaillancourt (1992) shows that out of a list of over thirty articles published on the subject of immigrant economic performance only three addressed the issue of labour supply, and out of those three only one touched on hours worked. The remaining two only discussed participation rates.

In both deSilva and the Economic Council of Canada's paper labour supply was given a brief treatment, alongside other indicators of immigrant economic performance. The Economic Council paper concluded that "[Census] data for 1986 show that immigrants and the native-born worked roughly the same number of hours- 39.85 and 39.57 hours per week, respectively" (p.87). These figures are repeated in deSilva's paper, also based on Census data (1992:18).

However, evidence from the Labour Market Activity Survey, which contains more detailed information on individual's work and job patterns, indicates that immigrants work significantly longer hours on both annual and weekly bases.

In the Canadian labour market, earnings for the paid labour force are simply the product of wage rates and hours of work supplied. Hence, the practice of ignoring labour supply in the discussion of the earnings of immigrants is paradoxical. Consideration of the labour supply perspectives could significantly enhance our understanding of immigrant earnings behaviour. For example, if immigrants are observed to work longer hours than Canadian-born workers, then earnings differentials between the two groups would be due not only to the "quality" of the immigrant labour force, where "quality" is measured by the average wage rate, but also to the "quantity" of labour supplied at each wage rate.

We could also ask, "if immigrants work longer, do they work at the same job, with the same employer or do they work at several jobs?".

The objective of this dissertation is to expand the analyses of immigrant labour market performance to include labour supply perspectives by considering immigrants' supply of hours of work (both on an annual hours basis and on weekly hours basis) and by examining the sources of the differences in hours worked between immigrants and Canadian-born workers in the light of the immigrant selectivity hypothesis. In particular we test the hypothesis that hours differences are due to "unobservable" superior characteristics against the alternative hypothesis that hours differences are due to "observable" demographic characteristics.

We also examined the determinants of moonlighting activity in the Canadian labour market, and attempted to explain the observation that immigrant workers moonlight less than their Canadian-born counterparts inspite of the supposition that immigrants have superior taste for work.

The structure of the dissertation is as follows:

1) There are two parts, one on total labour supply of immigrant and Canadian-born workers, and the other on the moonlighting behaviour in the Canadian labour market.

2) The first part, covering chapters two to five, attempts to examine the influence of observed and unobserved differences in the characteristics between immigrants and Canadian-born population on the differences in their labour supply.

3) The second part compares moonlighting rates in the Canadian labour market and examines the influence of "foreign-ness" on the probability of an individual engaging in moonlighting activity.

Details on moonlighting rates, so sparse in the literature pertaining to Canada, are provided for various demographic groups.

In chapter two the differences and similarities in the structure of labour supply, in terms of means and variations, between immigrants and Canadian-born are examined and statistically tested for equality. In chapter three we examine various theoretical frameworks for explaining the differences in the means of hours of work between immigrants and Canadian-born workers. In chapter four attempts are made to estimate the supply of hours of work functions for immigrants and Canadian-born, using ordinary least squares procedures without and with correction for sample selectivity bias. Two types of biases are dealt with, namely, participation or sample selectivity bias and underemployment or labour supply bias.

The aim of the labour supply estimations is not only to obtain regression and wage elasticity estimates but also to enable us to evaluate the contribution of unobserved factors to the difference between immigrant hours of work, relative to that of observable factors, using Blinder-Oaxaca decomposition techniques. The results of the estimations are summarised in chapter five.

The study on moonlighting behaviour begins in chapter six with the computation of the relative concentration of moonlighting activity among various demographic groups, and continues in chapter seven with the theoretical analyses of moonlighting behaviour. In chapter eight the procedure for estimating the probability of moonlighting and the supply of moonlighting hours are discussed and in chapter nine the results presented.

General conclusions from the two essays are summarised in the final chapter, chapter ten.

Dataset

The data used for the estimations were drawn from the Labour Market Activity Survey (LMAS) conducted and published by Statistics Canada. The LMAS which was designed as a replacement for the Annual Work Patterns Survey (AWPS) has information relating to the annual work effort and patterns of 63432 Canadians and the major characteristics of the jobs held by them in 1987. The new wave LMAS 1989-90 was not used because it was not available in the public domain at the time the study started.

An important advantage of the LMAS dataset over other sources of labour market activity of Canadians, such as Censuses, is that it has both hours

and wage information on all the jobs held by the respondent, up to a maximum of ten jobs in 1987. Such information is crucial for studying moonlighting behaviour.

Furthermore, wage information was directly solicited from respondents per pay period and converted to hourly wages for each paid-job, up to a maximum of ten jobs. This is in contrast with Census wage values which must be computed as a quotient of total earnings over usual hours worked, and thus introduces division bias in regression estimates which include wage rates as independent variables.

Thus, the IMAS data help to minimise the possibility of correlation between the standard errors in the annual hours worked variable and the hourly wage and hence erhance the unbiasedness of the estimates of the wage coefficient.

The 1987 dataset is composed of 30916 male and 32516 female individual valid cases, of which there are 27275 and 28720 Canadian males and females respectively, and 3479 and 3651 foreign-born males and females, respectively.

The foreign-born population was determined directly from respondents' answer to the question, "In what country was ... born?". "No response" cases (145 or 0.45% of the 32516 total female cases and 162 or 0.52% of the 30916 total male cases) were excluded from the estimation. "Foreign-born" and "immigrant" are used interchangeably throughout the study.

We recognise that not all "foreign-born" are immigrants, since there are some Canadians who were born outside Canada. However, we believe that

the number of such cases would be insignificant within the sample used.

It should be mentioned, however, that the LMAS has two main disadvantages as far as this paper is concerned. First, data on the date of entry of foreign-born into Canada are not available. Therefore, it is not possible to test the impact of "immigrant cohorts" on the hours of work and moonlighting behaviour, in line with recent developments in the study of immigrant earnings, as advanced by Borjas, Abbott and Beach, and other economists.

The second problem is that the LMAS provides no estimates of the non-labour incomes of individuals and there are no actual values for transfer earnings such as unemployment insurance and welfare assistance. Rather these sources of transfer earnings are treated as dichotomous variables, with a value of one if respondent benefitted from a particular scheme, and zero if not. Thus, it is not possible to estimate income effects in general, and the effect of non-labour income on actual hours worked, in particular.

Also there are no wage rates for self-employed people. Therefore, in the estimation sample we excluded all self-employed individuals in order to avoid biased results.

Furthermore, the LMAS, in the public-use data, does not link individual respondents to their households, thereby hindering our ability to examine the impact of spouses' income, in particular, and the household decision-making process, in general, on actual hours worked by married individuals.

Notwithstanding these setbacks, it is our considered opinion that the LMAS is a suitable database for this paper as it provides a unique source

of information about wage and work patterns and also assures a minimal measurement error in the wage variable.

Chapter 2

INTRODUCTION TO LABOUR SUPPLY DIFFERENCES

The structure of labour supply in a population may be described in terms of its distributional characteristics, notably, central tendency and the degree of dispersion among sub-elements of the population. It may also be expressed in terms of the degree of responsiveness of labour supply to changes in its determinants, notably, wage rates and demographic characteristics. Both approaches are used in this dissertation to illuminate not only the differences in the labour supply between immigrants and Canadian-born workers, but also the importance of differences in demographic characteristics in explaining the observed differences in the labour market performance between immigrants and the Canadian-born population.

Evidence from Statistics Canada's Labour Market Activity Survey (1986-87) indicates significant differences in the structure of the supply of hours of work, as measured by the mean and the coefficient of variation of the annual hours of work, between Canadian-born and foreign-born populations.

Broadly speaking, these differences are expected in the light of the immigrant selectivity hypothesis. Nevertheless, a detailed study is needed to appreciate the influence of the interaction between immigrant selectivity and demographic characteristics such as age, sex, marital status, and visible minority status on immigrant labour supply performance in relation to that of Canadian-born workers.

In this chapter we highlight some of the differences and similarities in the distribution of annual hours of work between Canadian-born and immigrant workers according to selected demographic characteristics. Various time-related concepts of hours of work, namely, daily hours, days per week, weekly hours, annual weeks, weeks per month and annual hours could be used in this analysis. However, we focus on annual hours because it encompasses all the other measures. The means and standard deviations of some of these concepts of hours of work have been shown for immigrants and Canadian-born workers in Table 2.1 below.

It may be concluded from Table 2.1 that hours worked by immigrants are greater than those by Canadian-born workers regardless of the time-concept used. We therefore turn our attention to annual hours worked, being the most comprehensive dimension of labour supply, for detailed discussion below.

2.1 Differences in the Means and Coefficients of Variation in Annual Hours Among Immigrant and Canadian-born Workers (1986 & 1987)

Two basic statistics are used, namely, mean and coefficient of variation of annual hours based on the sample of those who worked at least one hour in 1986 or 1987. The mean statistic is used to measure group performance, while the coefficient of variation, defined as the quotient of standard deviation and the mean expressed in percentage terms, is used as a measure of the relative dispersion of annual hours within the group. A lower coefficient of variation implies that the

Table 2.1.

MEANS OF SUPPLY OF WORK (VARIOUSLY DEFINED) FOR IMMIGRANT AND CANADIAN-BORN WORKERS 1987 (Standard deviations in parenthesis)

	MALE			FEMALE		
Definition	FB	CB	RATIO FB/CB	FB	CB	RATIO FB/CB
Hours per day 1987	6.72 (3.4)	6.27 (3.9)	1.07	5.91 (3.4)	5.63 (3.5)	1.05
Hours per week 1987	33.34 (18.2)	31.16 (20.9)	1.07	27.07 (17.3)	25.53 (17.9)	1.06
Days per week 1987	4.05 (2.0)	3.73 (2.2)	1.09	3.66 (2.0)	3.45 (2.2)	1.06
Weeks per year 1987	46.15 (14.3)	44.07 (15.5)	1.05	43.37 (16.7)	41.61 (17.6)	1.04
1986	46.58 (13.5)	42.93 (16.2)	1.08	42.51 (17.1)	40.0 (18.3)	1.06
Weeks per month 1987	3.96 (0.3)	3.93 (0.4))	1.01	3.14 (1.6)	3.00 (1.7)	1.05
Hours per year 1987	1882 (713)	1791 (824)	1.05	1512 (780)	1393 (780)	1.08

Source: Computed from the LMAS 1986-87 Database.
CB= Canadian-born; FB= foreign-born (immigrant).

observed mean for the group is more widespread among the group while a high coefficient of variation implies that the mean may be due to the high performance of a few. Workers aged 16-24 and 55-64 as well as those with some post-secondary and post-secondary education were excluded in the analysis in this section due to the small numbers of immigrants in these groups.

Before we examine the differences in the structure of annual hours between Canadian-born and immigrant workers, it may be necessary to note that, broadly speaking, certain fundamental similarities exist between them, notably the pattern of relationship between age, education, and marital status on one hand and individual supply of hours of work, on the other.

It may be noted from Tables 2.2 and 2.3 that for both Canadian-born and immigrants annual hours appear to increase as age and education increases, generally. This is consistent with life-cycle and human capital models of labour supply. It is noted also that married workers had higher annual hours than single workers, which is also consistent with home economics models of labour supply. One implication of these observations is that the labour supply of immigrants could be analyzed in terms of standard labour supply theories.

The differences in the means and coefficients of variation among male and female workers are shown below in Table 2.2 and Table 2.3, respectively. In Table 2.2 it is observed that for the overall population of workers, immigrant males supplied 7.84% and 5.02% more annual hours than their Canadian-born counterparts in 1986 and 1987, respectively. The

overall coefficients of variation are smaller for immigrant male workers, at 41.3% and 37.9% in 1986 and 1987, respectively, than for Canadian-born male workers, at 48.4% and 46.0% in the respective years. The same pattern is observed of the female workers as shown in Table 2.3.

The mean annual hours of work supplied by immigrant females in 1986 and 1987 exceeded that of Canadian-born female workers by 6.0% and 8.5%, respectively, while the coefficients of variation of annual hours among immigrant female workers in those years were smaller than for their Canadian-born counterparts by 4.1 and 4.6 percentage points.

Differences in annual hours in terms of age, education, marital status and visible minority status, shown in both Table 2.2 and Table 2.3, appear to confirm the observed general pattern shown by the overall sample population with one main exception, namely, female workers with university education. In both 1986 and 1987, this group of immigrant workers had a lower mean annual hours than Canadian-born workers. Incidentally, it is the only group in which the coefficient of variation among immigrant workers exceeded that of Canadian-born workers in 1986.

For male workers the mean annual hours supplied by immigrants was greater than that by Canadian-born, and the difference increased with age, from a difference of 0.01% and 1.29% for those aged 25-34 years in 1986 and 1987, respectively, to 6.25% and 3.60% for those age 45-54 years. Also, the difference in relative dispersion, as measured by the coefficients of variation of annual hours, increased with age, from 3.0 and 1.8 percentage points for those aged 25-34 years in 1986 and 1987, respectively, to 5.6 and 9.8 percentage points for those aged 45-54

Table 2.2

DIFFERENCES IN THE MEANS AND COEFFICIENTS OF VARIATION (IN PARENTHESES) OF ANNUAL HOURS WORKED BY SELECTED DEMOGRAPHIC GROUPS OF CANADIAN-BORN AND IMMIGRANT MALE WORKERS (1986 & 1987)

	1986		1987	
	CB	FB	CB	FB
OVERALL	1722	1857	1791	1881
	(48.4)	(41.3)	(46.0)	(37.9)
Age Group				
25-34 yrs.	1878	1879	1940	1965
	(40.2)	(37.2)	(38.4)	(36.6)
35-44	1960	2025	1979	2039
	(37.4)	(31.9)	(37.2)	(28.1)
45-54	1920	2040	1946	2016
	(36.4)	(30.8)	(38.3)	(28.5)
Education				
Elementary	1626	1886	1692	1852
	(54.3)	(36.4)	(53.3)	(38.9)
High School	1688	1741	1768	1830
	(50.8)	(44.3)	(47.6)	(39.7)
University	1999	2124	2029	2057
	(33.8)	(36.1)	(32.3)	(31.7)
Marital Status				
Married	1915	1966	1954	1976
	(38.7)	(34.7)	(38.5)	(33.0)
Single	1295	1424	1425	1499
	(66.8)	(65.7)	(61.1)	(55.2)
Visible Minority?				
YES	1548	1736	1774	1803
	(56.0)	(43.8)	(48.5)	(39.0)
NO	1724	1899	1791	1909
	(48.3)	(40.3)	(46.0)	(37.4)

CB= Canadian-born; FB= immigrant. Coefficients of variation are expressed in percentage terms.
Source: Computed from LMAS 1986 & 1987 Database.

years in the respective years, the Canadian-born coefficients being greater.

Among the female workers, in both 1986 and 1987, the mean annual hours of the selected immigrant age-groups was greater than the hours worked by their Canadian-born counterparts. As was the case with the sample of male workers, the difference appeared to increase with age. For example, in 1987, the difference in annual hours for those aged 25-34 years was 6.85%, compared to 7.13% and 7.34% for those aged 35-44 and 45-54 years, respectively.

Coefficients of variation, measuring the variation in the distribution of hours of work relative to the mean hours, were also smaller among immigrant female workers than among Canadian-born females in 1986. In 1987, however, these coefficients were greater among immigrant females aged 35-54 years, indicating an increase in the relative dispersion of annual hours among immigrant females.

Comparison of annual hours based on education reveals some interesting patterns. First, it is observed that among immigrants high school graduates had the lowest annual hours of work, compared with elementary and university graduates in 1986 and 1987, for both females and males. For example, among immigrant male workers, high school graduates recorded annual hours of 1741 in 1986, compared with 1886 and 2124 for elementary and university graduates, respectively.

Among Canadian-born workers, however, elementary school graduates had the lowest annual hours in 1986 and 1987, for both females and males, with annual hours increasing with education. Furthermore, high school

TABLE 2.3

DIFFERENCES IN THE MEANS AND COEFFICIENTS OF VARIATION (IN PARENTHESES) OF ANNUAL HOURS WORKED BY SELECTED DEMOGRAPHIC GROUPS OF CANADIAN-BORN AND IMMIGRANT FEMALE WORKERS. (1986 AND 1987)

	1986		1987	
	CB	FB	CB	FB
OVERALL	1350	1431	1393	1512
	(58.1)	(54.0)	(56.0)	(51.6)
Age				
25-34 years	1426	1451	1444	1543
	(52.9)	(52.9)	(53.9)	(48.3)
35-44	1479	1536	1501	1608
	(53.2)	(48.6)	(50.3)	(56.6)
45-54	1498	1541	1498	1608
	(50.2)	(45.4)	(50.2)	(54.3)
Education				
Elementary	1230	1463	1224	1502
	(64.8)	(47.2)	(61.9)	(50.6)
High School	1288	1401	1336	1482
	(61.0)	(54.4)	(58.9)	(53.3)
University	1609	1498	1647	1608
	(47.6)	(50.6)	(45.7)	(48.9)
Marital Status				
Married	1386	1437	1399	1508
	(55.4)	(51.6)	(54.7)	(49.8)
Single	1212	1300	1318	1429
	(66.2)	(62.8)	(60.2)	(55.5)
Visible Minority?				
YES	1206	1421	1374	1554
	(60.4)	(53.5)	(55.3)	(45.9)
NO	1352	1435	1393	1497
	(58.1)	(54.2)	(56.0)	(53.5)

CB= Canadian-born; FB= immigrant. Coefficients of variation are measured in percentage terms.
Source: Computed from LMAS 1986 and 1987 Database.

graduates had the greatest coefficients of variation among immigrant workers. However, the mean annual hours of all immigrant education groups exceeded that of comparable Canadian-born groups, with the exception of female university graduates.

Secondly, it is observed that annual hours increase and relative dispersion of annual hours fall sharply as education level rises for Canadian-born workers. The slow increase in the annual hours for immigrant workers may be attributed to restricted labour market opportunities due to employment discrimination or keener competition from Canadian-born graduates for available positions.

In terms of marital status, it is observed that married and single immigrant workers, both male and female, supplied more hours than their Canadian-born counterparts in 1986 and 1987. The difference in means was, however, generally greater among females than among males. For example, in 1986 and 1987 the mean annual hours from married immigrant females exceeded that of their Canadian-born counterparts by 3.68% and 7.79%, respectively, compared with a difference of 2.66% and 1.12% for married immigrant males in the respective years.

Among visible minorities, the mean annual hours of immigrant workers exceeded that of their Canadian-born counterparts by 17.8% and 13.1% in 1986 and 1987, respectively, compared with a difference of 6.1% and 7.5% among non-minority female workers in the respective years. In contrast, the difference in annual hours between visible minority males was 12.14% in 1986 and 1.63% in 1987, (immigrant males having the greater hours) compared with a difference of 10.15% and 6.59% for non-minority males in the respective years.

It is also observed that coefficients of variation are lowest among immigrant visible minorities than among all other groups, namely, immigrant non-minorities, Canadian-born minorities and Canadian-born non-minorities.

From the above analyses, it could be concluded that immigrants generally supply more hours of work than do Canadian-born workers and that the degree of variation in hours is greater among Canadian-born workers. This conclusion holds even for groups, such as visible minorities, which were expected to have lower labour supply in view of apparent restrictions they face in the labour market.

2.2 TESTS FOR EQUALITY OF MEANS AND VARIANCES OF ANNUAL HOURS AMONG CANADIAN-BORN AND IMMIGRANT WORKERS

Though marked differences exist between the means and coefficients of variation of annual hours between Canadian-born and immigrant workers, we consider it appropriate to test for equality of these statistics to assure ourselves that the differences observed from the samples are "statistically significant". That is, we need to test whether the two distributions of annual hours among immigrants and among Canadian-born do not "come from the same population" and are not similar.

There are two hypotheses to be tested, namely, equality of means and equality of variances. For the test of means the null hypothesis may be written as:

$$\text{Null } H_o : \mu_c = \mu_i$$

$$\text{Alternate } H_a : \mu_c \neq \mu_i \quad \text{(2-tailed alternative)}$$

where μ is the mean annual hours for Canadian-born workers c and immigrant workers i. Under the assumption that the two samples are independently and normally distributed with the same variance σ^2, the test statistic is given by:

$$T = \frac{\mu_c - \mu_i}{S \sqrt{[(1/N_c) + (1/N_i)]}} \qquad (2.1)$$

$$\text{where } S = \sqrt{\{[(N_c - 1)S_c^2 + (N_i - 1)S_i^2]/[N_c+N_i-2]\}}$$

with degrees of freedom $r = N_c + N_i - 2$, where S and N are the standard deviations of annual hours and the sample size of the Canadian-born c and immigrant i populations, respectively.

The pooled variance test (2.1) is used in this paper when the hypothesis of equality of variances cannot be rejected. The test statistic for the null hypothesis:

$$H_o : \sigma_c^2 = \sigma_i^2$$

against the alternate 2-tailed hypothesis:

$$H_a : \sigma_c^2 \neq \sigma_i^2$$

is given by the F statistic:

$$F = S_c^2 / S_i^2 \approx F(N_c-1, N_i-1) \qquad (2.2)$$

At the level of significance $\alpha=.05$, the rejection of the null hypothesis (of equal variances) leads us to an alternative test statistic (separate variance test) for the test of equality of means. This alternative test statistic is given by:

$$T = \frac{\mu_c - \mu_i}{\sqrt{[(S_c/\sqrt{N_c})^2 + (S_i/\sqrt{N_i})^2]}} \qquad (2.3)$$

where S_c, S_i are the square roots of the standard deviations of annual hours of work of Canadian-born and immigrant populations, respectively.

For both T-tests the level of significance chosen is 0.05, such that the null hypothesis of equal means is rejected if the probability that the means are similar is less than 5%.

The results of the tests are shown in Tables 2.4 (for males) and Table 2.5 (for females). The T-values shown are based on the assumption of equal variances when the corresponding F-value is insignificant as indicated by the probabilities (set in parenthesis below the F-values), otherwise the T-values are based on the separate variance test (2.3). The value of these probabilities indicates the level of chance that one might see a difference at least as large as the one observed in the sample if the means or variances, as the case may be, are equal in the parent population and if the distribution of annual hours is normal.

The F- and t-values shown in Table 2.4 for the overall population indicate that the observed differences in the means and variances of annual hours between immigrant and Canadian-born male workers are

statistically significant. In 1986 and 1987, the overall t-values were -8.230 and -5.820, respectively. In the case of the female population, as shown in Table 2.5 below, t-values at -4.480 and -6.540 in 1986 and 1987, respectively, were highly significant, while the F-values in both years were insignificant.

Thus, for the overall male population we may reject both null hypotheses of equal mean and equal variances for the distribution of annual hours between Canadian-and immigrant workers. For the overall female population, however, the hypothesis of equal variance cannot be rejected, though the means are significantly unequal.

In terms of the selected demographic groups, it may be observed from Tables 2.4 and 2.5 that the observed differences in the means of annual hours in 1986 were statistically significant, with the exception of male and female workers aged 25-34 years, and also for married females and females aged 45-54 years.

For prime aged (25-34 years old) males and females in 1986 the computed t-value was a low -0.020 and -0.710, indicating that among prime aged workers the observed difference in annual hours between Canadian-born and immigrants was not statistically different. The 1986 t-values for all the age groups indicate equality of means and variances in annual hours between immigrant females and their Canadian-born counterparts.

It may also be observed from the 1986 results for the age groups that the difference in the mean annual hours between immigrant males and their Canadian-born counterparts increased with age, with probabilities

TABLE 2.4

TESTS FOR EQUALITY OF MEANS AND VARIANCES OF ANNUAL HOURS BETWEEN SELECTED DEMOGRAPHIC GROUPS OF CANADIAN-BORN AND IMMIGRANT MALE WORKERS (1986 & 1987)

	1986		1987	
	F-values	T-values	F-values	T-values
OVERALL	1.180	-8.230	1.340	-5.820
	(0.000)*	(0.000)*	(0.000)*	(0.000)*
Age Group				
25-34 yrs.	1.170	-0.020	1.080	-0.710
	(0.021)*	(0.985)	(0.280)	(0.477)
35-44	1.290	-2.430	1.650	-2.470
	(0.000)*	(0.015)*	(0.000)*	(0.014)*
45-54	1.230	-4.010	1.680	-2.460
	(0.002)*	(0.002)*	(0.000)*	(0.014)*
Education				
Elementary	1.650	-6.280	1.570	-3.620
	(0.000)*	(0.000)*	(0.000)*	(0.000)*
High School	1.230	-2.100	1.340	-2.540
	(0.000)*	(0.036)*	(0.000)*	(0.011)*
University	1.290	-3.400	1.010	-0.880
	(0.000)*	(0.001)*	(0.912)	(0.380)
Marital Status				
Married	1.180	-2.970	1.320	-1.310
	(0.000)*	(0.003)*	(0.000)*	(0.191)
Single	1.170	-2.940	1.110	-1.770
	(0.015)*	(0.003)*	(0.146)	(0.077)
Visible Minority?				
YES	1.300	-2.750	1.500	-0.430
	(0.020)*	(0.006)*	(0.000)*	(0.664)
NO	1.190	-9.370	1.330	-6.620
	(0.000)*	(0.000)*	(0.000)*	(0.000)*

2-tailed probabilities are shown in parentheses. * indicates that the corresponding T- or F-value is significant at the 5% level.
Source: Computed from LMAS 1986 & 1987 data.

TABLE 2.5

TESTS FOR EQUALITY OF MEANS AND VARIANCES OF ANNUAL HOURS BETWEEN SELECTED DEMOGRAPHIC GROUPS OF CANADIAN-BORN AND IMMIGRANT FEMALE WORKERS (1986 & 1987)

	1986		1987	
	F-values	T-values	F-values	T-values
OVERALL	1.030	-4.480	1.000	-6.540
	(0.379)	(0.000)*	(0.976)	(0.000)*
Age Group				
25-34 yrs.	1.030	-0.670	1.090	-2.660
	(0.607)	(0.500)	(0.202)	(0.008)*
35-44	1.110	-1.690	1.130	-3.510
	(0.081)	(0.091)	(0.045)*	(0.000)*
45-54	1.150	-1.020	1.350	-2.300
	(0.082)	(0.308)	(0.000)*	(0.022)*
Education				
Elementary	1.330	-4.770	1.000	-5.330
	(0.004)*	(0.000)*	(0.947)	(0.000)*
High School	1.060	-4.210	1.010	-5.360
	(0.218)	(0.000)*	(0.853)	(0.000)*
University	1.020	2.420	1.090	0.840
	(0.822)	(0.016)*	(0.272)	(0.401)
Marital Status				
Married	1.070	-2.400	1.040	-5.090
	(0.074)	(0.016)*	(0.371)	(0.000)*
Single	1.030	-2.040	1.000	-2.580
	(0.661)	(0.041)*	(0.971)	(0.010)*
Visible Minority?				
YES	1.090	-3.540	1.130	-2.970
	(0.470)	(0.000)*	(0.274)	(0.003)*
NO	1.020	-3.990	1.060	-5.000
	(0.621)	(0.000)*	(0.148)	(0.000)*

2-tailed probabilities in parentheses. * indicates the corresponding F- or T-values are significant at the 5% level. Positive t-values indicates cases where Canadian-born mean annual hours are greater than that of comparable immigrant female workers.
Source: Computed from LMAS 1986 and 1987 database.

of means being equal declining from 98.5% for ages 25-34 years to 1.50% and 0.00% for those aged 35-44 and 45-54 years, respectively.

A similar result is obtained from the 1987 data, with the observed probabilities declining from 47.7% for males aged 25-34 years to 1.40% for those aged 35-44 and 45-54 years.

The 1987 results for female age groups appear to be sharply different from those of 1986. While in 1986 none of the T- or F-values was significant, indicating a high probability of both the means and variances of annual hours between the corresponding ages in the two sub-groups being equal, in 1987 the t-values for all the age groups were significant, implying that we cannot accept the hypothesis of equal means. The F-values were also significant, except for those aged 25-34 years, indicating rejection of the hypothesis of equal variances in annual hours among the age groups.

For the educational groups, the t-values for 1986 were significant for both males and females. In the case of females, this result indicates, among other things that, among university educated workers, Canadian-born workers supplied significantly more hours of work, though the F-value of 1.02 with a probability of 82.2% indicated no significant differences in the variances.

In 1987, the mean and variance of annual hours for males with university education appeared to be similar, noting that the T- and F-values at -0.880 and 1.010, respectively, were insignificant.

In terms of marital status, the results appear to be clear for females but a bit mixed for males. For married females, the difference in the means was significant with t-values of -2.400 and -5.090 in 1986 and 1987,

respectively, while for married males the t-values were significant (-2.970) in 1986 but insignificant (-1.310) in 1987. In the case of single males, both t-values and F-values are significant in 1986 but in 1987 none was significant.

Furthermore, it is observed that whilst the means of annual hours appeared to be unequal among the female marital groups, the variances were insignificantly different in both 1986 and 1987, with the probability of the variances being equal being higher among single females at 66.1% and 97.1% in 1986 and 1987, respectively.

In terms of visible minority status, we observe that in 1986 both T-values and F-values for the two groups (minority and non-minority) were significant for males. For females, the F-values were not significant in both 1986 and 1987, indicating variances were probably similar, though means of annual hours were significantly different in both 1986 and 1987.

In sum, the observed differences in the means and variances of annual hours between Canadian-born and immigrant males were statistically significant in both 1986 and 1987. For female workers, it is observed that while the hypothesis of equal means in annual hours of work between Canadian-born and immigrants cannot be accepted, the hypothesis of equal variances in annual hours cannot be rejected.

In general, for females, there appeared to be no significant differences in the variances in annual hours on the basis of education, marital status, and minority status.

It is also observed that some of the above results were sensitive to the year under consideration, that is, differences in results appeared for

some demographic groups between 1986 and 1987. For example, both t-values and F-values were significant for single males in 1986 but were insignificant in 1987. Age groups 35-44 and 45-54 years had significant t-values and F-values in 1986, for females, but the same were insignificant in 1987. Why these differences? Were labour market conditions in 1986 different from those in 1987, and how do market conditions influence the distribution of annual hours in a population? Or are these differences due to changing composition of the respective labour force?

These are questions which might need careful consideration in the future.

Finally, it may be observed that the result that Canadian-born workers work as much as immigrant workers may be subject to the sample used. For example if one chooses a sample of female workers in 1986 classified by age or if one takes a sample of only males aged 25-34 years one may observe no significant difference in the means of annual hours between Canadian-born and immigrant workers.

Chapter 3

EXPLANATIONS FOR THE DIFFERENCES IN LABOUR SUPPLY BEHAVIOUR BETWEEN IMMIGRANTS AND CANADIAN-BORN WORKERS

In the neoclassical choice-theoretic framework the differences in the labour supply behaviour between individuals, given the same wages, may be ascribed to differences in the taste for work which results in different marginal rates of substitution between work and leisure. Taste for work is itself unobservable but Pollak and Wales (1980) explain that it could be influenced by the demographic characteristics of the individual. Thus, from the neoclassical perspective differences in hours worked may be traced to differences in demographic as well as "unobservable" characteristics.

Within the framework of neoclassical international migration theory, therefore, the differences in the economic performance of immigrants and native-born population are explained by the "immigrant selectivity hypothesis" in terms of observable differences in demographic characteristics as well as unobservable characteristics.

For the purposes of this paper we distinguish two versions of the immigrant selectivity hypothesis, namely, the "pure" version which places emphasis on the "unobserved" labour market qualities of immigrants and the "enhanced" version which places emphasis on the process of "direct immigrant sorting" through immigration policy and, hence, on the observable aspects of immigrant quality. In a sense the "enhanced" version provides a link between the selectivity hypothesis and the demographic approach to labour supply.

3.1 The Immigrant Selectivity Hypothesis

One of the major explanations for the observed differences in the economic performance of immigrants vis-a-vis native-born workers is the "immigrant selectivity hypothesis", first formally introduced into the earnings literature by Chiswick and further advanced by Borjas and others. The idea, however, originated in the migration literature.

3.1.1 The "Pure" Immigrant Selectivity Hypothesis

According to Chiswick (1976), for the same amount of schooling, age, and other demographic characteristics, immigrants have more abilities relevant to the labour market than the average native-born. This is due simply to the fact that immigrants are a non-random sample of the population from which they migrate (Borjas 1988; Kossoudji 1988).

In the words of Borjas (1988:3), "the migration decision [leads] to the self-selection of individuals who have a little more initiative, drive and motivation than the average person in the population of the host country". Thus, immigrants have greater hours worked because they possess "superior" taste for work; that is, immigrants are more willing to work at any wage than do Canadian-born workers.

It is this aspect of the immigrant selectivity hypothesis we refer to as the "pure" version, which has more currency in the international migration literature.

The determinants of the immigrant self-selection process may be

discerned from the human capital theory of migration as described by Herzog and Schlottman (1983) or by Borjas (1988).

As elaborated by Sjaastad (1962) and further extended by Yezer and Thurston (1976) and Herzog and Schlottman (1983), the human capital theory of migration states that an individual would migrate from country i to country j if the discounted value of the earnings in country j exceeds that in country i by an amount at least equal to the sum of the costs of relocation; that is, if the net discounted value of earnings is positive.

Yezer and Thurston have shown that the net discounted value is equal to:

$$\int_{t_j}^{T} [W_j \exp(-rt)dt] - Pij - C_{ij} - S_j(st) - \int_{0}^{T} [W_i \exp(-rt)dt] \tag{3.1}$$

where W_i, W_j are the wage rates per time t in country i and j, respectively; P_{ij} is the income-compensated psychic cost of moving from i to j; C_{ij} is the moving cost; S_{ij} is the search cost in country j, dependent upon search time, st; T is the total working life of the individual; and t_j is the length of employment in country j.

All other things equal, the probability of an individual migrating from i to j, $P(M_{ij})$, according to Herzog and Schlottman (1983), will be a function of the net discounted value of moving from i to j, that is:

$$P(M_{ij}) = f(NPV_{ij}), \quad f'(NPV_{ij}) > 0. \tag{3.2}$$

The net discounted value of earnings NPV_{ij}, it could be seen, would be an increasing function of (expected) wages in the host country and a decreasing function of the wages in the home country, the psychic cost, the moving cost and the search time.

Assuming that individuals have imperfect information on the wage distributions in the host country; then, the probability of migration would be influenced largely by the individual's own expectations in the host country. Herzog and Schlottman argue that since the likelihood of migration is an increasing function of wage goals, optimists (that is, those whose wage goals exceed the acceptance wage) are more likely to move. "Consequently, this selectivity brought about by imperfect information will increase the incidence of optimists within any set of migrants from country i to j" (Herzog and Schlottman 1983:45).

Furthermore, under the framework of the job-search model of migration, also advanced by Yezer and Thurston (op cit.), and Farber (1983) with the acquisition of better information about the true wage distributions in the host country, those whose expectations are met remain and those who fail leave or re-migrate. Thus, within the current immigrant population there would be fewer "failures" due to the possibility of remigration than are found among the native-born population.

In summary, within the framework of the "pure" immigrant selectivity hypothesis, the explanation for the differences in economic performance including, perhaps, labour supply differences may be the "extra drive" of immigrants due to unobservable factors.

3.1.2 The "Enhanced" Immigrant Selectivity Hypothesis

Borjas (1988, 1991), on the other hand, explains that the superior skill and motivation of the immigrant population are due to "double self-selection"; that is, the selection of high quality persons is assisted both by the immigration process and by immigration policies. Thus, the composition and quality of the migrant flow are determined by the economic conditions in and the immigration policies of the host country. It is this aspect of immigrant selectivity hypothesis that we refer to as the "enhanced" version.

Within the framework of the economic model for immigrant sorting, attributed to Roy (1951) an individual would migrate from country i to country j if the net earnings from moving is positive, that is:

$$I = (W_j - C) - W_i > 0 \qquad (3.3)$$

where W_i, W_j represent earnings in country i and j, respectively; and, C represents the cost of moving.

Following the human capital model of the determination of earnings, let the earnings function in country i and j be written as follows:

$$W_i = X\delta_i + \epsilon_i \qquad (3.4)$$

$$W_j = X\delta_j + \epsilon_j \qquad (3.5)$$

where X is the vector of personal characteristics; δ_i, δ_j are earnings parameters; and, ϵ_i, ϵ_j are unobserved characteristics (or innate

abilities) receiving some positive or negative reward.

Let ρ be the correlation coefficient between ϵ_i and ϵ_j, such that $\rho>0$ implies that the unobserved characteristics of the individual is positively rewarded both in country i and j; and $\rho<0$ implies some unobserved characteristics of the individual is positively (or negatively) rewarded in country i but negatively (or positively) rewarded in country j. Assuming ϵ_i and ϵ_j are independent of X and normally distributed with mean zero and variance σ_i^2, σ_j^2, respectively.

Then the conditional means of earnings will be given by

$$E(\ln W_i \mid X, I > 0) = X\delta_i + \tau(\rho - \sigma_i/\sigma_j) \tag{3.6}$$

$$E(\ln W_j \mid X, I > 0) = X\delta_j + \tau(\sigma_j/\sigma_i - \rho) \tag{3.7}$$

where the first term on the right-hand side of (3.6) and (3.7) gives the mean of the earnings distribution in country i and j; the second term gives the extent to which the earnings of migrants differ from the means of the earnings distribution in the country of origin (3.6) and in the country of destination (3.7); and τ is a positive number.

It may be observed from the first term on the right-hand side of (3.6) and (3.7) that the selection of individuals with observable personal characteristics X to migrate from country i to country j would depend on the magnitude of the difference between the rate of return on personal characteristic X in country j and in country i, $(\delta_j - \delta_i)$. Furthermore,

since X is observable it could be influenced by immigration policy in various ways, for example, by targeting particular characteristics or countries or imposing quotas.

The second terms $(\rho - \sigma_i/\sigma_j)$, called Q_i, and $(\sigma_j/\sigma_i - \rho)$, called Q_j, measure the extent of the immigrant selectivity-bias; that is, the extent to which immigrant self-selection leads to a foreign-born population that is "non-average" in terms of unobservable personal characteristics in the country of destination.

According to Borjas, the necessary and sufficient conditions for "positive selection", that is, where $Q_i>0$ and $Q_j>0$, are:

$$\rho > k,$$
$$\text{and } \sigma_j > \sigma_i$$

where $k = \min(\sigma_j/\sigma_i , \sigma_i/\sigma_j)$ and it is a measure of the dispersion of earnings in country i relative to that of country j.

Thus, if the correlation coefficient in the earnings across the two countries is sufficiently high, and if earnings dispersion is greater in the host country j than in the country of origin i, immigrants arriving in the host country will be selected from the upper tail in the country of origin's earnings distribution, and will outperform native-born upon arrival in the host country.

Similarly, the necessary and sufficient conditions for "negative selection", that is, where $Q_i<0$ and $Q_j<0$, are:

$$\rho > k$$

and $\sigma_j < \sigma_i$

That is, if correlation coefficients in earnings between the host country and the country of origin are sufficiently high but earnings distribution are less dispersed in the host country than in the country of origin the "pure" immigration process would select mainly those with "negative" unobservable characteristics, compared with the average in the host country or the country of origin of immigrants.

Thus, depending upon the favourableness of the system of rewards in the host country relative to that of the country of origin, immigrants from particular origins may have superior labour market quality to the typical individual in either the host country or the country of origin.

From Borjas' point of view, Canadian immigration policy has until recently favoured individuals with "positive characteristics", that is, individuals with particular human or financial capital endowments and, hence, a high probability of succeeding generally in the Canadian society.

3.1.3 Canadian Immigration Policy Since Confederation

Canadian immigration policy has been influenced by two apparently conflicting perceptions: perceptions based on needs of the macro-economy with respect to labour supply and the exploitation of natural resources, and perceptions based on socio-cultural needs with respect to the protection of the Euro-ethnic identity of the country. However, both the

actual annual flows of immigrants and the type of immigrants allowed entry into Canada have been dictated not only by domestic economic conditions but also by international socio-political conditions, particularly the international refugee problem.

The pre-Depression years (1867 up to the 1920s) were characterised generally by immigration policies that were non-restrictive towards immigrants from Western Europe but discriminatory against all other immigrants, particularly from Asian or African backgrounds. Two Acts of Parliament in 1906 and 1910 gave immigration officers the power to reject "undesirable" immigrants, that is, immigrants of "suspicious" character. An amendment of the 1910 act formally imposed restrictions on immigrants on the grounds of race, nationality or occupation.

During the Great Depression of the 1930s entry of immigrants of all classes and occupations was prohibited by an Order-in-Council unless they could provide proof that they were subjects of the British Commonwealth or citizens of the United States and had sufficient funds to maintain themselves until employment could be secured.

In the early post-War years, Canada's immigration policy was reviewed in two principal ways, namely, the widening of sponsorship privileges and the narrowing of the range of admissible occupations. The most-preferred-country status was extended to France and some other European countries, notably, Belgium, Luxembourg, Norway, Denmark, Sweden and Switzerland. Other Europeans with acceptable occupations could be admitted if sponsored by a legal resident of Canada.

In the late 1950s the seed for incorporating the perceived needs of the Canadian labour market as an objective of immigration policy was sown. The

traditional origin of immigrants, namely Western Europe, as a source of supply of high-skill labour was weakening and there was the need to attract such immigrants from other sources. New regulations were adopted in 1962 which sought to change the emphasis from country of origin to occupational skills, marking a formal introduction of labour market needs as one of the basic building blocks for Canadian immigration policy.

In 1967 the "point system" was introduced, which was subsequently revised by the Immigration Act of 1976 (passed in 1978) and further amended in 1985- the main points of the 1967 and 1985 selection criteria are shown in tables 3.1 and 3.2 below.

The revised system espoused three fundamental objectives of Canadian immigration policy, namely, labour market needs, family reunifications and humanitarian concerns, and formally classified three types of immigrants, namely, family class, refugees, and independents. It also gave less emphasis to general educational attainment but more to occupational experience. It required the target levels of immigrant inflow to be integrated with Canada's demographic and labour market conditions.

Family class immigrants and refugees did not require points to enter; however, their skills and their ability to adapt to the Canadian economic environment are generally taken into consideration. In the case of refugees, these considerations may be waived in situations of strong humanitarian concerns (Employment and Immigration Canada, 1990). The selection criteria for independents were based on the personal capacity of applicants to establish themselves successfully in Canada. Points were assigned on the basis of age, education, occupational demand, occupational skill, language ability etc.

The changes in Canadian immigration policy as outlined above have helped to generate an immigrant population that is in many respects different from the native population but particularly in terms of country of origin and race, educational attainments and occupations. It has been observed that as a result of changes in immigration policy since 1962, the proportion of immigrants of European background declined from over 70% in the preceding period to barely 40% in the 1970s whilst the proportion of immigrants from Asia increased from under 8% to nearly 30%. (See, for example, Economic Council of Canada 1991: Tables 7-1, 7-2, 7-3, 7-4 and 7-5; Borjas 1988: p.14). Consequently, the proportion of immigrants whose first language spoken was English or French in 1986 was only 60% compared with 86% for the native born population, according to 1986 Census data.

Since independents, who still form the majority of immigrants (52% of all immigrants according to 1986 Census estimates), are admitted on the basis of lack of domestic supply of particular occupational skills, it is reasonable to expect significant differences in the occupational distribution of immigrants and native-born workers.

Generally the requirement that immigrants, irrespective of class, must demonstrate ability to succeed in the Canadian society implies that those who eventually arrive in Canada would have greater than the average "abilities" in either their home or host country, that is, to the extent that this requirement is enforced.

Table 3.1

IMMIGRANT SELECTION CRITERIA UNDER THE 1967 POINT SYSTEM

	Points
Independent applicants	
Short-term factors	
Arranged Employment or designated occupation	0, or 10
Knowledge of English and/or French	0-10
Relative in Canada	0, 3, or 5
Area of destination	0-5
Long-term factors	
Education and training	0-20
Personal qualities	0-15
Occupational demand	0-15
Occupational skill	0-10
Age	0-10
Potential Maximum	100
Nominated Relatives	
Long-term factors (same as for independents)	1-70
Short-term settlement arrangements provided by relative in Canada	15, 20, 25 or 30
Potential maximum	100
Sponsored dependents	
Close relative in Canada willing to take responsibility for care and maintenance	No points required

To qualify for selection independents and nominated relatives had to earn 50 or more of the potential maximum points. In addition, they had to have at least 1 point for the occupational-demand factor, to have arranged for employment, or to have a designated occupation.

Source: Economic Council of Canada 1991: page 15.

Table 3.2

SELECTION CRITERIA FOR PERMANENT IMMIGRANTS UNDER THE 1985 SYSTEM

	MAXIMUM POINTS	REMARKS
Education	12	1 point for each year of primary & secondary education
Specific vocational preparation	15	
Experience	8	
Occupational demand	15	
Arranged employment or designated occupation	10	
Location	5	If person intends to proceed to an area designated by the minister
Age	10	10 points if aged between 18-35; 1 point deducted for each year over 35 years
Knowledge of English or French	10	10 points if fluently bi-lingual; 5 points if fluent in English or French
Personal suitability	10	
Bonus for family class or assisted relatives	5	
TOTAL	100	

The order of priority for processing immigrant applications is as follows:
1) members of the family class, Convention refugees, and certain designated classes of persons;
2) entrepreneurs;
3) qualified persons willing to work in a designated occupation;
4) persons with prearranged employment;
5) retired or self-employed persons;
6) persons who are awarded more than 8 points under occupational demand;
7) persons awarded from 4-8 points under occupational demand; and
8) all other immigrants.

Source: Economic Council of Canada 1991: page 18.

3.2 DEMOGRAPHIC APPROACH TO LABOUR SUPPLY DIFFERENTIALS

In view of the selectivity of the immigration process and, particularly, of immigration policy the characteristics of the population of immigrants and their geographical location tend to differ from those of the native (Canadian-born) population. Generally, demographic characteristics, such as marital status, age and education, of individuals affect their labour supply in many ways. They influence their taste for work, availability of time for market work, and the opportunity cost of working or not working. The location of an individual may also determine the type of labour demand constraints he or she faces. Thus, demographic characteristics may explain labour supply differentials between individuals or groups of individuals to the extent that they determine the willingness (and availability) to work and the demand-side constraints on the ability to work.

Below we outline some of the important demographic factors that could cause differences in the labour supplied by different people, with the view of drawing attention to the possibility that the labour supply differential between immigrant and Canadian-born workers could be attributed, at least, in part to the differentials in their demographic characteristics.

3.2.1 Age

The life-cycle model of labour supply states that the amount of labour supplied by an individual increases with age up to a point, and then declines, as the age of retirement approaches. As Killingsworth (1983:216)

explains:

> ..., the behaviour of labour supply over time in a dynamic equilibrium is the net result of three forces: an "efficiency" effect, making individuals work more in periods [during their youth] when the wage is higher; an "interest rate" effect, making individuals work much at first, and less later on; and a "time preference" effect, making individuals work little at first, and more later on.

For a typical male individual, life-cycle models predict that the efficiency effect will exceed the time preference effect early in the life cycle and so hours of work will be greater in early life and fall in later life. How many hours of work an individual would do at any point in time will, therefore, depend both on the desired average lifetime level of work and on where the individual is in his life cycle. According to empirical evidence, as examined by many researchers, for example, Heckman (1971), DaVanso et al.(1976) and Nakamura and Nakamura (1981), there is stronger labour force attachment among prime aged (25-34 years old) individuals than among other age groups.

For a typical female, empirical studies by Heckman (1978), Heckman and MacCurdy (1980), Mincer and Ofek (1979) and others indicate a not-so-smooth age-hours profile. The reason for this discontinuity in the female age-hours profile has been attributed to the changing home production versus market production possibilities females face in their life cycle- a cycle of work, child bearing and child rearing.

In Tables 3.3 the distribution of Canadian-born and foreign-born populations by age and other characteristics are shown. It is observed from Table 3.3 that significant differences in age exist between the

males, with the foreign-born males being older, at an average age of 43.2 compared with 37.9 for Canadian-born. Among the female population, the average age of the foreign-born was 43.2 years against 38.2 for Canadian-born. However, the proportion of prime-aged males and females in the population is greater among Canadian-born workers, at 31.1% and 31.5% for males and females, respectively, compared with 20.3% and 23.4% among immigrant males and females, respectively.

3.2.2 Education

The effects of education on an individual's labour supply may be analyzed from both demand-side and supply-side perspectives of the labour market.

On the demand side, screening formulations of the job-search model (Arrow, 1973) indicate that employers subject to imperfect information about their prospective employees take the individual's level of education as signal for his or her unobserved ability and productivity. Thus, individuals with higher education may have greater employment opportunities than those with lower education.

Furthermore, education plays an informational role in terms of matching jobs and individuals' interests and abilities, as discussed by Davies and MacDonald (1984). Thus, the higher one's education the greater the chances of securing the preferred job. In general, the higher one's education the lower would be demand-side constraints on the supply of hours of work.

On the supply side, basic neoclassical models of labour supply suggest that education increases the opportunity cost of not working, since higher education is associated with high-wage jobs. Furthermore, according to the

"taste" hypothesis (Morris, 1976), higher education creates opportunities for securing more pleasant jobs which enhance the taste for work and thereby increase the willingness to work.

However, others such as Morris (1976) have argued that education may increase the productivity of non-market work or the utility from leisure-time activities, such as playing golf or reading, and thereby reduce the amount of time allocated to the market.

3.2.3 Family and Household Status

In the family utility-family budget version of the family labour supply model developed by Kosters (1966), the individual labour supply decision results from the maximization of the joint family utility, subject to the pooled family budget constraint. The hours equation for the individual is, therefore, a function of not only of his or her own wage and non-labour income but also the wage and non-labour income of his or her spouse and other household members.

Thus, in the context of the family labour supply model, there are two substitution effects of a wage change on the individual's labour supply. These are the own-substitution effect, that is the direct effect on one's own hours decision, and the cross-substitution effect, that is the effect on the hours decision of other household members which in turn affects the hours' decision of the individual whose wage has changed.

The own-substitution effect is always negative but the cross-substitution effect may be positive or negative (Ashenfelter and

TABLE 3.3.
DISTRIBUTION OF THE SAMPLE OF CANADIAN-BORN AND IMMIGRANT WORKERS ACCORDING TO SELECTED PERSONAL CHARACTERISTICS (1986/87)

	MALES		FEMALES	
	FB(N=2412)	CB(N=19238)	FB(N=2007)	CB(N=16900)
MEAN AGE (1986)	40.73 (12.71)	35.06 (12.43)	38.66 (12.32)	33.90 (11.96)
Age Group 16-24	13.3 (0.34)	25.0 (0.43)	15.7 (0.36)	27.2 (0.44)
25-34	20.3 (0.40)	31.1 (0.46)	23.4 (0.42)	31.5 (0.46)
35-44	28.7 (0.45)	22.5 (0.42)	31.5 (0.46)	22.8 (0.42)
45-54	22.6 (0.42)	13.4 (0.34)	18.3 (0.39)	12.5 (0.33)
55-64	13.9 (0.35)	7.5 (0.35)	9.9 (0.30)	5.7 (0.23)
Elementary	13.0 (0.34)	12.8 (0.34)	12.8 (0.33)	6.7 (0.25)
High School	41.4 (0.49)	53.0 (0.50)	44.9 (0.50)	52.9 (0.50)
Some Post-Sec	10.4 (0.30)	10.5 (0.31)	11.2 (0.32)	12.2 (0.33)
Post-Secondary	14.2 (0.35)	12.5 (0.33)	15.3 (0.36)	17.2 (0.38)
University	21.0 (0.26)	11.2 (0.31)	15.7 (0.36)	11.1 (0.31)
Married	76.3 (0.42)	65.9 (0.47)	71.0 (0.45)	64.2 (0.48)
Single	19.0 (0.39)	30.0 (0.46)	17.6 (0.38)	26.7 (0.44)
Other	4.7 (0.21)	4.1 (0.20)	11.4 (0.32)	9.1 (0.29)
No.of children				
5 yrs & below	0.28 (0.62)	0.30 (0.64)	0.24 (0.55)	0.26 (0.58)
Above 5 yrs.	1.13 (1.24)	1.06 (1.22)	1.13 (1.23)	1.04 (1.20)

FB=immigrants; CB=Canadian-born; standard deviations in parentheses.
Source: Computed from the LMAS 1986/87.

Heckman 1974).

So long as the cross-substitution effect of a wage change is non-zero, an individual's marital status would have an impact on his or her labour supply. This means that if the distribution of two populations according to marital status is different, then, the labour supply responses of those two populations are likely to differ due to the impact of the cross-substitution effects, that is, if individuals take into account the labour supply behaviour of their spouses.

In the household production model, originated by Becker (1965) with independent contributions from Mincer (1962), individuals are assumed to derive satisfaction not only from market goods and services but also from "household commodities". These household commodities, for example, eating, watching television, and bearing children, require both time and market goods and services to produce.

The object of household choice under this model is, therefore, "activities" Z_i (i=1,...,n), which may be measured in terms of goods- or time-intensity of the activity, i. The basic notion of the model is that households attempt to combine inputs of market goods and services X and household time T to produce activities Z which yield satisfaction U. Thus, the utility function could be written as U=U(Z). Expressing the household production function as Z=Z(X,T,E), where E is the household production environment or the production technology, utility may be written, by substituting in the production function Z(.), as a function of X and T, that is, U=U(X,T,E).

Given that E is fixed and constant, the household attempts to maximize

U(X,T;E) subject to two constraints, namely, time constraint and the budget constraint, where the time constraint may be written as:

$$T = t_m + \Sigma t_h,$$

where t_m=market time and t_h=time allocated to home activity, h(=1,...,n) and the budget constraint may be expressed as:

$$\Sigma P_i X_i = Y,$$

where Y=household income and P_i=price of market good i needed as input for household production.

The solution to the maximization problem yields the derived demand for activity i, in terms of time and goods inputs, as well as the function for the amount of time spent in the market. The market time function:

$$\begin{aligned} t_m &= T - \Sigma t_h \\ &= t_m(W_m, W_h, P), \end{aligned}$$

where W_m=market wage; W_h=home wage, which is defined as the household's valuation of time and is unobservable; and P=prices of market goods.

Under the household production model, therefore, time allocated to the market will depend, not only on market wage and goods prices but also, on:

1) the household valuation of time, and

2) the marginal productivity of home production.

The household's valuation of time is influenced by the demographic characteristics of the household, such as size of the household, number and ages of children, and the presence of sick relatives. On the other hand, the marginal productivity of home production is a function not only of the quality and availability of X and T but also on the "state of the art of home production".

Worswick and Beach (1990) have suggested that the effects of age and marital status on immigrant women's labour market activity are significantly influenced by the nature of the partnership within the family whereby married immigrant women work more hours to support the education of their husbands and then partly withdraw from the labour market for household production as their husbands enter the labour market. Therefore, we could conjecture that the household production environment and valuation of time, and, hence, family and household influences on individual labour supply, might be different between immigrants and Canadian-born workers.

3.2.4 Institutional Factors - Labour Force Distribution

Characteristics of individuals such as their occupations, region of residence, minority status, and union membership could also affect their respective labour supply as these factors influence their chances of securing and retaining employment.

Thus, the distribution of the labour force according to the institutional characteristics of individuals could explain, at least, part of the differences in the labour supply between two population groups.

3.2.4.1 Occupational and Industrial Distribution

Hours of work between individuals and groups of individuals may differ because economic conditions in the industries or occupations in which they work may differ. Differences in technological conditions among industries and occupations may also cause differences in employment utilisation rates among industries and occupations. As Hameed (1975) has noted, capacity utilisation in one industry may take the form of greater employment (of more workers) but in another industry capacity utilisation may take form of more hours (for the same employees).

Furthermore, administrative regulations and traditions, and the presence or absence of unionism, etc. may also cause differentials in the average hours available to the typical worker in various industries.

Labour Canada statistics indicate that the average weekly standard hours of work in the Canadian labour market varies from 37 hours in the Financial and Public Administration sectors to about 40 hours in the Forestry and Manufacturing sectors (Aw, 1986).

Therefore, the dissimilarity in the distribution of the labour force between immigrants and Canadian-born could be a source of the differences in their average hours of work.

In Table 3.4 we have presented the distribution of Canadian-born and

TABLE 3.4
(%) DISTRIBUTION OF WORKERS ACCORDING TO INDUSTRY, OCCUPATION, AND UNION STATUS OF THE FIRST JOB OF INDIVIDUALS IN 1986/87

	MALES		FEMALES	
	FB	CB	FB	CB
INDUSTRY:				
PRIMARY SECTOR	6.1 (0.24)	11.1 (0.31)	3.5 (0.18)	3.7 (0.19)
MANUFACTURING	36.1 (0.48)	28.0 (0.45)	15.2 (0.36)	10.6 (0.31)
GOVERNMENT	7.2 (0.26)	10.0 (0.30)	6.0 (0.24)	8.2 (0.27)
SERVICE	26.1 (0.44)	19.6 (0.40)	51.6 (0.50)	48.8 (0.50)
TRADE	12.7 (0.33)	17.4 (0.38)	15.5 (0.36)	18.4 (0.39)
FINANCE	3.6 (0.19)	2.6 (0.16)	5.6 (0.23)	6.3 (0.24)
UTILITY	8.0 (0.27)	11.0 (0.31)	2.4 (0.15)	3.9 (0.19)
OCCUPATION:				
FARMING	2.9 (0.16)	7.2 (0.26)	2.3 (0.15)	2.5 (0.16)
MANAGERIAL & PROFESSIONAL	31.0 (0.46)	22.6 (0.42)	30.1 (0.46)	28.6 (0.45)
BLUE COLLAR	43.5 (0.50)	45.7 (0.50)	13.4 (0.34)	8.5 (0.28)
SERVICE OCCUP.	17.7 (0.38)	18.4 (0.39)	29.7 (0.46)	29.2 (0.45)
OFFICE	4.9 (0.22)	6.0 (0.24)	24.4 (0.43)	31.2 (0.46)
UNION MEMBERS.	33.9 (0.47)	31.8 (0.47)	26.6 (0.44)	25.6 (0.44)
# of Observations	2412	19238	2007	16900

FB= immigrants; CB= Canadian-born; standard deviations in parentheses
Source: Computed from the LMAS 1986/87

immigrant workers according to the industry and occupations in which they work. We have also shown whether their jobs were unionised or subject to collective agreements. The figures indicate that immigrants are more concentrated in a few key industries, namely, manufacturing, service and trade where standard hours are traditionally high, whilst Canadian-born workers, especially males, are more evenly spread out.

In Table 3.5 below the industrial and occupational indices of dissimilarity are shown. The figures indicate that the Canadian-born and foreign-born populations have varied distribution of their labour force among the major occupations and industries in Canada. For males, the all-occupation and the all-industry dissimilarity indices are 20.0% and 19.5%, respectively; while for females, the extent of dissimilarity was smaller at 11.1% and 12% for all-industries and occupations, respectively. These differences appear to be substantial enough to suggest that the observed differences in the annual hours of work between foreign-born and Canadian-born could be partly due to the differences in the distribution of their labour force.

3.2.4.2 Distribution According to Union Membership

Differences in the union-membership distribution of the working population between the two groups could also affect their respective hours of work. Depending on demand conditions, union objectives may vary between wage maximisation and union membership, depending upon the degree of information available to members, heterogeneity of preferences among union members and the nature of the union political decision-making process (Gunderson and Riddell, 1988:261-339).

TABLE 3.5

INDICES OF DISSIMILARITY (%) IN THE DISTRIBUTION OF WORKERS ACCORDING TO INDIVIDUAL'S FIRST JOB IN 1986-87

	MALE	FEMALE
ALL OCCUPATIONS	20.0	11.1
ALL INDUSTRIES	19.5	12.0
NON-AGRIC.OCCUPATIONS	16.0	10.7
NON-AGRIC.INDUSTRIES	15.8	11.4

Agricultural (Agric.) occupations refer to farmer and farming management, horticulture, fishing, hunting, forestry and logging. Agricultural industries refer to agriculture, forestry, fishing and trapping.

Index of Dissimilarity is calculated as $(\Sigma|F_i - C_i|/2) * 100$, where Fi and Ci are the proportions of the labour force of foreign-born and Canadian-born in industry or occupation i, respectively, based on the first occupations of individuals in the sample in 1986-87.

Source: Computations are based on LMAS (1986-87) data on respondents' first job only.

Unions, such as craft unions and professional associations, may restrict labour supply in order to increase the real wages of their members. But at the same time, unions may ensure a minimum number of scheduled hours of work for their members. Thus, the general impact of union membership on the average hours of work of a population sub-group would be dependent on the proportions of the population desiring restricted hours or desiring extended hours.

3.2.4.3 Regional Distribution

Regional distribution of the population may also contribute to the differences in the mean annual hours because of differences in regional economic structures and conditions as well as regional differences in the regulations regarding standard hours of work.

It is noted that standard hours of work, that is, the legislated number of hours of work in excess of which overtime rate has to be paid, differs among the eleven labour jurisdictions in Canada, ranging from forty hours per workweek in British Columbia, for example, to forty-eight hours per workweek in Prince Edward Island and New Brunswick, according to Labour Canada statistics (quoted in Benimadhu, 1987:6).

Unemployment rates also differ significantly, being greatest in the Atlantic provinces and Quebec and lowest in Ontario. Table 3.6 below shows both legislated standard hours and the unemployment rates in Canada according to provinces.

Evidence from the IMAS indicates generally that the distribution of immigrant workers by region or residence is more skewed than that of the Canadian-born population. Among females, the figures indicate that while

TABLE 3.6

STANDARD HOURS AND UNEMPLOYMENT RATES ACCORDING TO PROVINCES (1986)

PROVINCE	LEGISLATED STANDARD HOURS per Week	UNEMPLOYMENT RATES (%)
Newfoundland	40(Shops) 44(others)	20.0
Prince Edward Is.	48	13.4
Nova Scotia	48	13.4
New Brunswick	44 (48 maximum)	14.4
Quebec	44	11.0
Ontario	44 (48 maximum)	7.0
Manitoba	40	7.7
Saskatchewan	40 (44 maximum)	7.7
Alberta	44	9.8
British Columbia	40	12.6
Federal/Canada	40 (48 maximum)	9.6

Sources: Benimadhu (1987) Table 6. for the standard hours.
Statistics Canada, Canadian Statistical Review, 1986, for the unemployment rates.

54.1% of immigrants lived in the two most economically favourable regions, namely, Ontario and British Columbia and only 15% lived in Quebec and the Maritimes, less than 28% of Canadian-born female workers lived in those regions and slightly more than 40% in the disadvantaged regions. Among males, over 54% of immigrants lived in the favourable regions and only 18% in the disadvantaged regions, while less than 27% of Canadian-born males lived in the favourable regions, according to the evidence from LMAS.

3.2.4.4 Distribution According to Minority Status

In a labour economy where discrimination on the basis of physical or visible characteristics is possible, differences in the physical or visible characteristics of the two populations may be a reason for the differences in their supply of annual hours of work.

Discrimination may be seen as a negative factor that is more likely to reduce foreign-born hours of work rather than increase it and, therefore, could be rejected as one of the cogent reasons for the higher mean of annual hours for foreign-born. However, the literature on economic discrimination (see, for example, Schmid in Schmid and Weitzel, 1984) portrays that there are many forms of labour market discrimination, including employment discrimination and wage discrimination.

It is observed that more than a quarter of immigrants has visible minority backgrounds against only 1% of Canadian-born; and, whilst over 50% of immigrants had a first language that was neither English nor French only about 5% of Canadian-born workers had this "deficiency".

3.3 Immigrant Selectivity and the Structure of Labour Supply

As Pollak and Wales (1980) and others (such as Sandell, 1977; Nakamura and Nakamura, 1981; and Robinson and Tomes 1985) have demonstrated, the labour supply decisions of individuals depend not only on observable pecuniary factors such as wages but also on the demographic characteristics of individuals, particularly, those characteristics which affect their "consumption needs", as well as on their unobservable characteristics. Thomas Willard Harrell (1949) wrote:

> Men work for various reasons. One man will work because he needs the money to feed his family. Another who has a million dollars will work because he likes the power, the social position, or the self-respect that doing a useful job of work brings. From time to time motives for working change. One week the reason will be different from what it was last week. It may no longer be financially necessary for a winner of the Irish Sweepstakes to continue to work, but he may do so because he is in the habit of working. Another man may gradually accumulate enough money to retire but may go on working because he wants to beat out a competitor. A third may not have to work for money but works because he enjoys it. It is necessary to consider the total situation at a given time to understand...[p.266]

However, the basic neoclassical static labour supply model results from the notion of utility maximisation subject to a budget and time constraint. Under a set of assumptions, notably, competitive markets with free and flexible prices, the maximisation of the individual's utility function U (which is assumed to be continuous and quasi-concave in its arguments, namely, goods and "leisure") yields a labour supply function H, which has wage rate and non-labour income as its main elements.

Let us specify the individual's utility function as:

$$U = U(C, L) \qquad (3.8)$$

which is to be maximised subject to:

$$PC = WH + V \quad \text{(which is the budget constraint)} \qquad (3.9)$$

$$T = H + L \quad \text{(which is the time constraint)} \qquad (3.10)$$

where C = the amount of the Hicksian composite good, with price P;

L = "leisure" or non-market time

W = the wage rate or shadow price of leisure;

H = the number of (annual) hours of work or market activity;

V = non-labour or property income;

T = the maximum potential hours available to be distributed between L and H measured on an annual basis. Thus

L = T - H; and

α, β = fixed and positive constants.

The optimisation problem can be specified as:

$$Z = U(C,T-H) + \lambda [PC - WH - V] \qquad (3.11)$$

Taking the first derivatives of (3.11) with respect to C, H and λ and equating them to zero, we obtain:

$$dZ/dC = U_c(C,T-H) + \lambda P = 0$$

$$dZ/dH = U_H(C,T-H) - \lambda W_H = 0 \qquad (3.12)$$

$$dZ/d\lambda = PC - WH - V = 0$$

Solving (3.12) yields the labour supply for the individual i, H_i, as a function of W, P and V as follows:

$$H_i = H_i(W, P, V) \qquad (3.13)$$

We notice that (3.13) does not include an explicit term for demographic characteristics. However, following, Pollak and Wales (1980), we may incorporate demographic characteristics X of the individual as a given in the hours equation as follows:

$$H_i = H_i(W, P, V; X) \qquad (3.14)$$

Thus, the amount of hours of work supplied by the individual will depend on wages, prices, non-labour income, given personal demographic characteristics, such as age, marital status, education and number of children.

The relevance of demographic characteristics for individual labour supply derives from the fact that they influence both the willingness to work and the extent of constraints on the ability to work.

Following (3.14), we may write the labour supply function for Canadian-born Hc and foreign-born Hf, respectively, as:

$$H_c = H_c\ (W,\ V,\ P,\ X)$$

$$H_f = H_f\ (W,\ V,\ P,\ X) \qquad (3.15)$$

Assuming the two populations face the same general price level P, the relevant factors determining the mean annual hours of work for each population are the means (and the variations) of their wage rates, non-labour income and personal characteristics.

Totally differentiating (3.15) and assuming dP=0 yields:

$$dH = (\delta H/\delta W)dW + (\delta H/\delta V)dV + (\delta H/\delta X)dX; \qquad (3.16)$$

The responsiveness of the supply of hours of work H to the wage rate W, non-labour income V, and demographic characteristics X may be evaluated by considering the magnitude of the partial derivatives in (3.16).

The LMAS does not have any information on the non-labour income of respondents, therefore, we focus our analyses on the wage and demographic derivatives in (3.16).

First, the wage effects. The effect of a wage change on the supply of work may be measured as follows, utilising the Slutzky decomposition equation:

$$dH/dW = (\delta H/\delta W)|u + H(\delta H/\delta V) \qquad (3.17)$$

$$= \lambda D_{HH}/D + HD_W/D \qquad (3.18)$$

where the first and the second terms on the right-hand side are the substitution effect and income effects of a wage change; D is the determinant of the matrix of the derivatives of (3.12) with respect to W and V; and the subscripts of D are the cofactors.

The assumption of the concavity of U(C,L) implies that the expression D_{HH}/D must be negative. Since λ is a negative constant, the term $\lambda D_{HH}/D$, that is, the substitution effect is non-negative, implying that a compensated increase (decrease) in the wage rate must lead to an increase (decrease) in the supply of hours of work.

Since H hours of work is non-negative, the direction of the income effect HD_W/D would be negative, if leisure L is a normal good and hence D_W/D has a negative sign.

The magnitude of the "total" wage effect dH/dW will depend on the size of the substitution effect relative to the income effect. As W rises and H increases, the weight attached to the substitution effect diminishes relative to the income effect, bending the labour supply curve backwards as the income effect begin to dominate. Both the magnitude of the wage effect and the point at which the labour supply curve bends backwards are subject to the taste for work.

For individuals with superior taste for work, the substitution effect of a wage change will be smaller, since the absolute value of the ratio D_{HH}/D in (3.18) is smaller, and the income effect greater, since H is higher at low wages, relative to those with inferior taste for work. For the latter, the income effect is relatively unimportant at low wages; therefore, wage increases account for greater labour supply.

Microeconomic theory and empirical studies (for example, Ehrenberg and

Smith 1982:165; Deaton and Muellbauer 1980:276; Carliner 1980; and Robinson and Tomes 1985) show that the main result of an assumed differential taste for work among demographic groups is differences in the structure of the labour supply curve, notably, in terms of wage elasticities. Thus the leading explanation for observed differences in the wage elasticities between male and female workers has relied "on the relative magnitudes of the countervailing income and substitution effects arising from a wage change" and hence on the notion of taste for work (Robinson and Tomes 1985:156).

For us, the hypothesis that immigrants have superior taste for work thus implies that immigrant workers would have smaller wage coefficients and, hence, lower wage elasticity coefficients than their Canadian-born counterparts. The greater response of hours of work to increases in wage rates for Canadian-born workers would arise not only from those who already work but also as wage rate changes more Canadian-born individuals would offer themselves for market work, compared with the immigrant population. That is the dominant substitution effect among Canadian-born workers, as wage rates increase, would generate a stronger positively sloped labour supply curve.

3.4 Summary of the Theoretical Explanations for the Supply of Hours Worked Differentials Between Immigrants and Canadian-born Workers

Two broad factors may account for the differences in the mean annual hours of work between immigrants and Canadian-born workers. These factors

are observable demographic characteristics and unobservable labour market characteristics. Differences in age, education, marital status, average number of children of various ages, labour force distribution according to region, occupations, industries, racial background and union membership are some of the observable demographic factors that could explain the hours supplied differentials.

Also we recognise the hypothesis that immigrants have superior taste for work and that may explain why immigrants supply more hours of work than the average Canadian-born. However, we also recognise that "taste for work" may be influenced not only by the fact that one is an immigrant but, perhaps, more importantly, by the observable demographic characteristics of the individual such as his or her educational background and occupation.

Our primary purpose, therefore, is to examine empirically the implications of the "pure immigrant selectivity hypothesis"- the idea that immigrants possess superior taste for work- for the relative magnitudes of the wage elasticity of labour supply of Canadian-born workers vis-a-vis that of immigrant workers against the alternative hypothesis that differences in hours worked are mainly due to differences in demographic characteristics.

Ceteris paribus, wage elasticities indicate the relative responsiveness of the supply of hours of work of the two populations to wage changes and, hence, reflect the strength of non-pecuniary factors (or taste for work) in the determination of their respective supply of hours of work. The smaller the effect of non-pecuniary factors (or taste for work) on the

supply of hours of work the greater the magnitude of the wage elasticity of the supply of hours of work that should be expected.

We realise that taste for work may be influenced by many factors other than being an immigrant, for example one's marital status, age and education. Therefore it would be an error to attribute lower wage elasticities for immigrants entirely to their "foreign-ness". In view of this, we employ Blinder and Oaxaca's decomposition technique to estimate the relative contributions of "unexplained" factors as measured by the differences in the coefficients, and "observable" differences in the demographic characteristics between Canadian-born and immigrants to the hours differentials between the two groups.

We assume that the "taste" factors and, hence the "pure immigrant selectivity" factor, would have their effect through the "unexplained shift in coefficients" in the Blinder and Oaxaca decomposition analyses.

CHAPTER 4

ECONOMETRIC MODEL

Following general practice in the literature we express the estimation equation for the supply of hours of work in terms of the wage rate W, and personal characteristics X as:

$$H = H(W, X) + e \qquad (4.1)$$

where H is the hours worked; W is the hourly wage rate; X is a vector of demographic characteristics k (=1...K) and e is the random error term, with mean zero and variance σ.

As outlined in the introductory section, the primary objective of this dissertation is to examine the sources of the differences in the supply of hours of work between immigrants and Canadian-born workers in the light of the immigrant selectivity hypothesis which put emphasis on unobservable factors (against the alternative hypothesis that differences are due to demographic factors) and also to find out if the estimated wage coefficients of the labour supply equation H(.) for immigrants vis-a-vis that for Canadian-born confirm the implications of that hypothesis.

Thus within the statistical frame, we would test the hypotheses that:

1) $H_o : \beta_{wi} = \beta_{wc}$

$H_a : \beta_{wi} < \beta_{wc}$

where β_w is the estimated wage coefficients of the hours of work functions for immigrant workers i and Canadian-born workers c; and the null

hypothesis follows from the view that non-wage factors (taste for work) are more prominent among immigrant workers than among Canadian-born workers, according to the immigrant selectivity hypothesis.

Also, since the immigrant selectivity hypothesis states that immigrants have superior taste for work, that is, they would work more at any given wage, we expect that the estimated intercept term of the hours equation for immigrants would be greater than that for Canadian-born workers. Therefore, we also look at the following statistical hypothesis:

$$2)\ H_o : \beta_{oi} = \beta_{oc}$$
$$H_a : \beta_{oi} > \beta_{oc}$$

that is, the intercept of the labour supply equation for immigrants would be greater than that for Canadian-born workers.

The estimation of an empirical labour supply function for an entire population is usually beset with two main empirical problems, namely, the lack of information about the wage rates for those who did not work and the lack of information about the hours of work desired by those who worked. The use of a sample of those who have positive observed hours and hence wage information in the estimation of the labour supply function leads to "truncation bias", as first observed by Tobin (1958).

Moreover, for those who worked, information about desired hours are not available. Only the observed hours are available. However, since desired hours may diverge from observed hours the use of observed hours may introduce "labour supply bias" (due to underemployment or overemployment),

as shown by Ham (1982), Kahn and Lang (1991) and Osberg and Phipps (1993).

In the presence of truncation bias or underemployment bias, the application of ordinary least squares procedure is likely to lead to biased and inconsistent estimates of the parameters.

Kmenta (1986:561) has argued that the truncation bias could be ignored if only a small proportion of the population do not have positive hours. However, the LMAS data show that for 23.1% and 38.7% of the male and female populations, respectively, hours worked was zero in 1987. Therefore, we consider that the possible bias resulting from our sample selection rule (that is, individual i is included in the sample if $H_i>0$) would be significantly high enough to require explicit treatment.

Dealing with the problem of selectivity bias is also necessary considering the fact that participation decisions may be jointly made with the hours decision.

The nature of the sample selection bias has been described (for example, by Heckman 1976, 1979; Wales and Woodland 1980; and Amemiya 1986) as follows:

Consider the true (population) hours equations:

$$H_i = X_i'\beta + \mu_i \qquad (4.2)$$

where μ_i is a white-noise error term and X_i is a vector of independent variables (wage rate and observed personal characteristics of individuals $i(=1,\ldots,N)$); and an observed hours equation H whose conditional mean could be expressed as:

$$E(H_i \mid X_i \text{ ; i in sample}) = X_i'\beta + E(\mu_i \mid \text{i in sample})$$
$$= X_i'\beta + E(\mu_i \mid \mu_i > -X_i'\beta) \qquad (4.3)$$

As (4.3) shows if the sample selection rule is not random given the observed characteristics of the population, then the expected value of the error term (the second term on the right-hand side of 4.3) would not necessarily be zero, even though $E(\mu_i)=0$. It has been shown that (Johnston and Kotz 1970):

$$E(\mu_i \mid \text{i in sample}) = \sigma \lambda_i \neq 0 \qquad (4.4)$$

$$\text{where } \lambda_i = f(-X_i'\beta/\sigma) \;/\; [1 - F(-X_i'\beta/\sigma)] \qquad (4.5)$$

and $f(.)$ and $F(.)$ are the standard normal density and distribution functions, respectively.

The problem of estimation then is how to deal with the selectivity bias arising from the non-zero error term in the observed hours equation (4.3). A number of proposals for dealing with the problem have been made since Tobin (1958), a detailed account of which may be found in Killingsworth (1983), Wales and Woodland (1980), and Amemiya(1986).

Two of these approaches appear to be the most commonly used in labour supply studies, namely the Tobit (single-step) estimation model and Heckman's two-step model. However, the latter has in recent times obtained much favour among labour supply researchers apparently in view of the fact that it takes account of possible discontinuities in the labour supply schedule and also due to its computational and presentation advantages

(Smith and Stelcner 1988). Unlike the single stage Tobit approach, Heckman's two-stage model separates the participation-decision and the hours-decision, presuming that the variables affecting the decision to work and those affecting the decision to work a certain number of hours are not necessarily the same. In view of its advantages, we chose Heckman's two-stage estimation procedure. We observe that this approach is also common among studies which compare the labour market performance of Canadian-born and immigrant workers (Abbott and Beach, 1988; Worswick and Beach 1990).

Heckman's two-step estimation procedure specifies the selectivity bias-corrected hours equation of the form:

$$H_i = X_i'\beta + \sigma\,\lambda(X_i'\beta/\sigma) + \epsilon_i, \qquad \text{for } i \tag{4.6}$$

such that $H>0$ and σ may be interpreted as the covariance between the errors of the sample selection probit and the hours equation, and:

$$E(\epsilon_i) = H_i - E(H_i|H_i>0) = 0 \tag{4.7}$$

$$V(\epsilon_i) = \sigma^2 - \sigma^2 X_i'\beta/\sigma\;\lambda(X_i'\beta/\sigma) - \sigma^2\lambda(X_i'\beta/\sigma)^2 \tag{4.8}$$

According to Barnow et al.(1980:48), the inclusion of $\lambda(.)$ as an explanatory variable in the estimation equation (4.6) would free X_i from the "contamination" which leads to selectivity bias.

The first step thus is to obtain an estimate of β/σ by probit maximum likelihood estimation method using all observations. The second step is to regress H_i on X_i and $\lambda(X_i'\beta/\sigma)$ by least squares using only observations

with positive H.

The resulting estimators of ß using the sample of workers would be consistent and asymptotically normal but the truncated nature of the error term, according to Amemiya (1984,1986), would lead to heteroscedasticity of an unknown form and, hence, to biased and inconsistent calculated standard errors. However, as pointed out by Lee (1982), the asymptotic variance-covariance matrix of Heckman's estimator can be consistently estimated using White's (1980) heteroscedasticity-consistent covariance estimator to correct for the heteroscedasticity problem in the second step of the Heckman's regression estimates.

Therefore, we used Heckman's two-step regression technique with White's heteroscedasticity-consistent covariance matrix estimator.

The traditional empirical labour supply estimates assume implicitly that desired hours equalled actual hours for those who worked, which further implied that individuals did not face any "underemployment constraints". As has been pointed out by some researchers, for example, Osberg and Phipps (1993), such an assumption leads to an underemployment bias which could be corrected using the same two-step (Heckman's) procedure for correcting sample selectivity bias due to participation in the labour force.

For the correction of the labour supply bias due to underemployment, first, we obtain the probit estimates of the probability of being underemployed (equation 4.10 below) based on the full sample of workers and derive the inverse Mills ratio.

$$P_u = \text{prob}\,[H^* > H^a] = Z'ß + e \qquad (4.10)$$

where P_u = 1 if the individual was not satisfied with the number of weeks worked in 1987; H^* and H^a are the desired and actual hours worked in the year; Z is a vector of personal characteristics and other independent variables; and e is zero-mean and unit-variance error term.

Second step is to estimate the labour supply function (equation 4.11 below) including the inverse Mills ratio λ_2 as an independent variable, based on the sample excluding the underemployed.

$$H^a = F(W,X) + \sigma_2 \lambda_2 + e \qquad (4.11)$$

where W is the wage rate; X is a vector of personal characteristics and other independent variables influencing labour supply; e is the random error term; and λ_2 is given by the ratio $f(Z'\beta)/F(Z'\beta)$ where f(.) and F(.) are the standard normal density and distribution functions, respectively.

4.1 Research Strategy

The first step was to estimate the hours of work equation using the ordinary least squares (OLS) approach, based on the sample of workers. Tests for inclusion of various groups of demographic variables in the estimation equation were done. The groups of demographic variables were age, education, marital status, region of residence, industry, occupation, union membership, and visible characteristics.

The second step was to correct for the two biases, namely, participation bias and the underemployment bias, which began with the estimation of separate probit equations for selection into the sample of workers and for selection into the sample of underemployed workers, using

the maximum likelihood estimation procedure. From these estimated equations we computed the bias-correction variable (β/σ), or the inverse Mill's ratio, for both participation and underemployment.

Separate probit equations were estimated for each sample of Canadian-born male and female, foreign-born male and female, and the pooled sample of workers.

For purposes of comparison, the uncorrected ordinary least squares (OLS) results are shown alongside all the bias-corrected results.

Estimates of wage elasticities were obtained from the various estimation procedures and are shown in the last row of each table containing the regression results.

Finally, we used the separate results to estimate the contributions of the various sources of the difference in labour supply between immigrant workers and Canadian-born workers, using the Blinder-Oaxaca decomposition technique.(Blinder 1973; and Oaxaca 1973).

All the estimation samples excluded self-employed persons because they do not have recorded wage rates.

4.2 Description of Variables Used in the Hours of Work Estimation Equations

Although our focus is on total hours worked, we use two alternative dependent variables, namely, (the log of) annual hours worked at all jobs in 1987, denoted by the variable HOURS87, and the weekly hours at the first job worked in 1987, denoted by HRSPWK, to test the robustness of the

results.

The independent variables included the following:

4.2.1 Pecuniary Variables:

The principal variable in this category is the wage rate. In the LMAS, there is more than one wage rate depending on how many jobs the individual held during the year. There are hourly wage rates for the maximum of ten jobs worked during the year. For the annual hours equation we computed an average of these wage rates, weighted by the number of hours done at each job, that is,

$$AVWAGE = \Sigma_i \ (H_i/H) * W_i$$

where AVWAGE is the average hourly wage rate; H_i and W_i are the annual hours of work done and the hourly wage rate, respectively, at job i(=1,..,10); and H is the total annual hours of work at all jobs.

The natural log of AVWAGE was used in the annual hours equation while HWAGE1 the hourly wage at the first job in 1987 was used in the weekly hours equation because the latter is based on the first job only.

To test the hypothesis of backward-bending labour supply curve, we also estimated the quadratic form of the weekly hours equation by including the term HWAGESQ (i.e., $HWAGE^2$). According to some observers, such as Stern (1986), the inclusion of the quadratic term introduces more flexibility in the estimated labour supply function.

Since the LMAS database does not have information on the property or

non-labour income of respondents we excluded this variable from the estimations. Some researchers have used transfer earnings, notably, unemployment benefits and worker's compensation to compensate for the lack of information on non-labour income. We did not follow this practice because of the problem of interdependence between these types of earnings and hours worked. Thus, their omission was simply to avoid simultaneity problems.

The lack of data in the IMAS database on interest and property income is not considered a serious problem since these sources contribute only a minor proportion of the non-labour income of a typical worker.

Another tradition in the literature which has been omitted in this study is the effect of income taxes on labour supply. The omission is simply because Canadian-born and immigrants workers face the same income tax laws and because we assumed that immigrants and Canadian-born workers would not account for the impact of income taxes in their hours decisions differently.

4.2.2 Human Capital Variables:

The major human capital variables usually included in labour supply estimates are age, education and work experience. Detailed data on the latter are however, not available from the IMAS database, and, therefore could not be included in the estimation. Since information on the demographic characteristics in the IMAS are in grouped form, continuous forms of the human capital variables could not be considered.

Five age dummy variables were used, namely, AGE1624 (equal to one if the individual is 16-24 years old), AGE2534, AGE3544, AGE4554, and AGE5564.

AGE3544 was used as the reference age group in all the estimations.

Five education dummy variables were included, namely, ELEMENT (elementary or no education), HISCHO (high school education), SMPSTSEC (some post-secondary education), POSTSEC (post-secondary certificate or diploma) and UNIV (university education). HISCHO was used as the reference group in all the estimations.

4.2.3 Marital Status and Number of Children

There were three dummy variables for marital status, namely, MARRIED (=1 if married and 0 otherwise), SINGLE (=1 if single and 0 otherwise) and OTHERM (=1 if separated, widowed or other, and 0 otherwise). MARRIED was used as the reference group in all the estimations.

To account for the differential impact of the ages of children on hours of work two separate variables KIDAGEDV (number of children aged five and below) and KIDSABFV (number of children above 5 years and below 24) were included.

4.2.4 Visible Characteristics:

Two dummy variables representing the visible characteristics that may influence the labour demand facing the individual were included. These were MINORITY (=1 if visible minority and 0 otherwise), and LANGDIF (=1 if first language spoken was neither English nor French, and 0 otherwise).

4.2.5 Institutional Variables:

Three groups of "institutional" variables were considered in the estimation, namely, industrial and occupational variables, union membership, and region of residence.

Industrial and Occupational Variables:

Seven dummies PRIMARY, MANUFAC, GOVSERV, FINANCE, UTILITY, TRADE and SERVICE representing industry (with SERVICE as the reference group) and five dummies FARMING, MANPROF, BLUE, OFFICE and SERVER representing occupational variables (with SERVER as the reference variable) were used.

The dummies were generated as follows:

PRIMARY (=1 if the individual worked in an industry corresponding to LMAS code SIC01-SIC08, and 0 otherwise);

MANUFAC (=1 if the individual worked in an industry group corresponding to LMAS code SIC09-30, and 0 otherwise);

GOVSERV (=1 if the individual worked in an industry group corresponding to LMAS code SIC48-51, and 0 otherwise);

FINANCE (=1 if the individual worked in an industry group corresponding to LMAS code SIC37-39, and 0 otherwise);

UTILITY (=1 if the individual worked in an industry group corresponding to LMAS code SIC31-34, and 0 otherwise);

TRADE (=1 if the individual worked in an industry group corresponding to LMAS code SIC35-36, and 0 otherwise);

SERVICE (=1 if the individual worked in an industry group corresponding to LMAS code SIC40-47, and 0 otherwise);

FARMING (=1 if the individual worked in an occupation corresponding to LMAS code SOC29-32, and 0 otherwise);

OFFICE (=1 if the individual worked in occupation group corresponding to LMAS code SOC17-22, and 0 otherwise);

BLUE (=1 if the individual worked in occupation group corresponding to LMAS Code SOC33-50, and 0 otherwise);

SERVER (=1, if the individual had a service occupation corresponding to LMAS code SOC23-28 , and 0 otherwise); and

MANPROF (=1 if the individual worked in occupation group corresponding to LMAS Code SOC01-15, and 0 otherwise).

Union Membership:

Union membership was represented by the dummy variable UNION1 (=1 if individual's first job was unionised or covered by a collective agreement, and 0 otherwise) and UNIONM (=1 if the individual held any union jobs or, his or her employment was subject to group collective bargaining at any of the first three jobs held in 1986-87, and 0 otherwise).

UNION1 was used in the weekly hours equation while UNIONM was used in the annual hours equation because weekly hours were based on the first job held and annual hours were based on all jobs held.

Region of Residence

So far as economic conditions differ among regions in Canada, region of residence would have an effect on annual hours of work; regions with higher or lower employment rates than the national average would show a positive or negative effect on hours worked.

Therefore we included the following regional dummy variables: ATLANTIC (comprising Newfoundland, Nova Scotia, New Brunswick and Prince Edward Island), QUEBEC, ONTARIO, PRAIRIE (comprising Manitoba, Saskatchewan and Alberta) and BC, with ONTARIO as the reference region.

In view of the small sample of immigrants in certain provinces, for example, Newfoundland, we chose to use regions instead of provinces.

4.3 Description of Variables Used in the Estimation of the Probability of Participation in the Labour Force

The dependent variable was the index RESPONSE (=1 if the individual worked at least one hour at any job in 1987, and 0 if otherwise). Based on the literature on the probability of participation in the labour force the following were used as independent variables.

4.3.1 Human Capital Variables

Age and education were included in the probit estimates to account for human capital effects on participation in the labour force.

Five age dummies AGE1624, AGE2534, AGE3544, AGE4554 and AGE5564, were considered with AGE3544 as the reference group.

The five education dummies considered were ELEMENT,HISCHO, SMPSTSEC, POSTSEC, and UNIV, with HISCHO as the reference group. Also included is the variable STUDENT (=1 if the individual was a full-time student during the year, and 0 otherwise).

4.3.2 Marital Status and Children

MARRIED, SINGLE, and OTHERM were the marital status variables, with MARRIED as the reference group.

In addition KIDAGEDV and KIDSABFV were included to account for the impact of the ages and the number of children on the individual's participation decision.

4.3.3 Region of Residence

Regional dummies ATLANTIC, QUEBEC, ONTARIO, PRAIRIE, and BC were considered with ONTARIO as the reference group.

4.3.4 Visible Characteristics

To test whether minorities are more likely to participate in the labour force we included the two variables MINOR and LANGDIF in the probit estimates.

4.3.5 Transfer Earnings

To test the effect of transfer earnings on the probability of participating in the labour force we included PENSION (=1 if individual received pension during the year, and 0 otherwise) and WELFARE (=1 if individual received social assistance or welfare benefits during the year, and 0 otherwise).

4.4 Description of Variables Included in the Estimation of the Probability of Being Underemployed

We defined two dependent variables: the index NOTSATIF (=1 if the individual was not satisfied with weeks worked in 1987, and 0 otherwise) from which the underemployment-bias correction variable for inclusion in the annual hours equations was derived, and the index NOTSAT1 (=1 if the individual was not satisfied with hours worked at the first job in 1987 and desired additional hours, and 0 otherwise) from which the

underemployment-bias correction variable for inclusion in the weekly hours equations was derived.

Since the weekly hours variable was based on hours at the first job, while annual hours was based on all jobs, some of the independent variables included in the underemployment equations were defined to reflect this difference.

Following Osberg and Phipps (1993) the following were included in the underemployment probit estimations as independent variables:

4.4.1 Age

The five age dummies (AGE1624, AGE2534, AGE3544, AGE4554 and AGE5564) were included, with AGE3544 as the reference age group.

4.4.2 Deficiency in Labour Market Attributes

Deficiency in the labour market attributes of the individual such as lack of skill, education, experience or labour market information may be a primary factor determining the probability of an individual being underemployed. The LMAS provides some information about the possible causes for the individual not achieving his or her desired weeks of work. From this information we generated the following dummies which were included in the annual hours underemployment probit estimation:

LACKINFO = 1 if the individual cited "lack of information" as one of the reasons why he or she did not achieve desired weeks of work, and 0 otherwise;

LACKSKIL = 1 if the individual cited "lack of skill" as one of the reasons

for underemployment and 0 otherwise;

LACKEDUC = 1 if the individual cited "lack of education" as a cause for his or her underemployment, and 0 otherwise; and

LACKEXP = 1 if the individual cited "lack of experience" as one of the reasons for his or her underemployment..

The corresponding variables included in the weekly hours underemployment probit equations were LACKINF1 (=1 if the lack of market information was cause for not working additional hours at the first job, and 0 otherwise), LACKSKL1 (=1 if lack of skill was a cause for not getting additional hours at the first job, and 0 otherwise), LAKEDUC1 (=1 if lack of education was a cause, and 0 otherwise), and LACKEXP1 (=1 if lack of experience was a cause for not getting additional hours at the first job, and 0 otherwise).

4.4.3 Unemployment

For working individuals unemployment spells and duration may be the major cause of the inability to achieve desired hours in a particular year. We therefore included the number of weeks unemployed in 1987 WKOU87 as an independent variable in the annual hours underemployment probit equations.

For the weekly hours underemployment probit equations we used the variable NTERRUPT denoting the number of job interruptions at the first job in 1987, instead of number of weeks of unemployment.

4.4.4 Other Labour Market Constraints

Other external constraints on labour supply such as low or differential demand for the services of the individual are represented by the variable

JOBSHORT (= 1 if the individual cited job shortage as a reason for his or her underemployment), and by regional dummies ATLANTIC, QUEBEC, ONTARIO, PRAIRIE, and BC, with ONTARIO as reference region.

JOBSHORT1 (=1 if the individual cited job shortage as a reason for his or her underemployment at the first job, and 0 otherwise) was used in the weekly hours underemployment probit equations, instead of JOBSHORT which was used in the annual hours underemployment probit equations.

4.4.5 Disincentives to work

A major source of disincentive to work in a market economy is the availability of transfer earnings. Since actual values are not available in the IMAS dataset these earnings are represented by dummy variables WELFARE (=1 if the individual received social assistance or welfare benefits and 0, otherwise); UIB (=1 if the individual received unemployment insurance and 0 otherwise); COMPENS (=1 if the individual received workers compensation and 0 otherwise); and PENSION (=1 if the individual received pension benefits and 0 otherwise).

4.4.6 Job Attributes

The tendency to be underemployed may be influenced by the attributes and the environment in which work is done. To account for these factors two dummy variables UNIONM (=1 if any of the jobs worked in 1986-87 was a unionised job or covered by a collective agreement, and 0 otherwise) and PARTTIME (=1 if the first job in 1987 was a part-time job, and 0 otherwise) were included in the annual hours employment equation.

UNION1 (=1 if the first job in 1987 was a unionised job, and 0 otherwise) was used in the weekly hours underemployment probit equation together with PARTTIME.

4.4.7 Visible Characteristics

We assumed that minorities face employment discrimination and are more likely to be underemployed. We therefore included the two visible characteristics, MINOR(=1 if a minority by race or colour) and LANGDIF (=1 if first language spoken was neither English nor French).

Chapter 5

RESULTS AND CONCLUSIONS FROM THE LABOUR SUPPLY ESTIMATIONS

Various functional specifications of the labour supply model, notably, linear, quadratic, semi-logarithmic, and logarithmic forms, were estimated, to test the robustness of the results. For each of the estimated equations, we attempted to correct for sample selectivity bias due to participation and due to underemployment, separately. Both the participation-bias and underemployment-bias correction procedure used White's heteroscedasticity-consistent covariance matrix (to correct for heteroscedasticity of an unknown form introduced by the inclusion of the inverse Mill's ratio derived from the first stage maximum likelihood probit estimates).

The results on the hours estimations presented in this text refer to only those specifications in which the coefficient of the principal variable, wage rate, was statistically significant and had stable signs for all the samples with and without bias-correction. For example, we noticed that for the immigrant male labour supply, the quadratic specification is not quite appropriate since the linear wage term is insignificant, though the quadratic term is, except in the underemployment bias-corrected results, while for the immigrant female labour supply the linear wage term is insignificant except for the uncorrected estimates.

These results were also utilised to obtain estimates of the contribution of the various determinants of labour supply to the difference in the mean hours of work between immigrants and Canadian-born workers, using Blinder-Oaxaca decomposition technique.

The chosen specifications included the linear and logarithmic specifications of the annual hours equation and for the weekly hours equation we chose the linear specification. No formal tests of the structure of the equations such as by the Box-Cox procedure were performed.

We need to state that the result of the decomposition analyses was robust to the specification model used. The results of the decomposition analyses, shown in Tables 5.11-5.15, indicate that the difference in hours worked between immigrants and Canadian-born are explained mainly by the differences in the means of the independent variables included in the estimation equations, contrary to the expectations based on the immigrant selectivity hypothesis.

In the light of the "pure" immigrant selectivity hypothesis we also expected the following results, among others, from the regression analyses:

1) That the estimated intercept of the labour supply function for immigrants would be greater than that of Canadian-born workers, as immigrants are more "willing to work" at any wage, compared with Canadian-born workers;

2) That the estimated wage coefficients and, consequently, the (uncompensated) wage elasticity of labour supply for immigrant workers would be smaller than that for Canadian-born workers.

Test results indicated that in general the difference in the estimated

intercept and wage coefficients between the labour supply functions for immigrants and that for Canadian-born became statistically insignificant after correcting for underemployment bias.

Though our main focus is the total annual hours worked we estimated weekly hours equations simply to test the robustness of the results. We find that for males the difference in the wage and intercept coefficients in the weekly hours equation was statistically significant, while in the log annual hours equations it was not. The implication might be that immigrants have "better first jobs" than Canadian-born workers and are able to work more hours at it.

5.1 Estimated Intercept Terms

A summary of the estimated intercepts and their standard errors for all the equations are shown in Table 5.1 below. In all cases, except in the case of the quadratic specification of the annual hours model for males, the estimated intercept term is greater in the equations for immigrants than for Canadian-born workers.

However, as Table 5.2 shows, these differences are generally statistically insignificant, indicating that the "unobservable" superior taste for work, if it exists, does not make any significant differential impact on the intercept values of the labour supply equations between immigrants and Canadian-born workers.

Statistical tests for equality of the intercept coefficients, (based on the null hypothesis that the intercepts are the same for immigrants as for

Canadian-born workers) showed that for the case of weekly hours supply the intercepts are significantly different between males but insignificant between females. On the other hand, in the case of the annual hours supply function, the t-statistics indicate that the difference in the intercepts is insignificant between males but significant between females when we consider only the linear annual hours equation with no correction for underemployment bias.

The t-statistic for the evaluation of the null hypothesis of equal intercepts was based on the formula:

$$t = (\beta_{oi}' - \beta_{oc}') \; / \; \sqrt{[v(\beta_{o}') + v(\beta o_c')]} \sim t_{n-k} \qquad (5.1)$$

where t is evaluated at $\alpha = 0.05$; β_o' and v(.) are the estimated coefficient and the variance, respectively, of the intercept term in the labour supply equation for immigrants i and Canadian-born workers c.

The results of the t-tests are shown in parentheses in Table 5.2, with the absolute differences in the intercept coefficients shown alongside the corresponding t-values. As may be seen in Table 5.2 all the differences in the estimated intercepts are positive, except with the underemployment bias-corrected quadratic estimates of the annual hours model, indicating that all the estimated intercept coefficients in the labour supply equations for immigrants are greater than those for Canadian-born workers.

TABLE 5.1 ESTIMATED COEFFICIENTS OF INTERCEPT TERMS

	FB Male	CB Male	FB Female	CB Female
WEEKLY HOURS				
Linear Model				
OLS uncorr.	23.547 (1.4009)	16.091 (0.5806)	21.307 (1.3220)	17.461 (0.5035)
OLS P-bias corr.	23.550 (2.8926)	16.565 (0.6928)	21.344 (2.3626)	18.453 (1.3016)
OLS U-bias corr.	23.127 (1.7504)	19.665 (0.7583)	21.966 (2.3929)	18.760 (1.2994)
ANNUAL HOURS				
Linear Model				
OLS uncorr.	1970.3 (59.587)	1862.2 (19.317)	1480.8 (62.206)	1346.6 (21.775)
OLS P-bias corr.	1972.9 (70.867)	1855.1 (29.783)	1486.1 (67.328)	1347.1 (24.313)
OLS U-bias corr.	2105.4 (72.513)	2095.3 (30.045)	1579.2 (64.740)	1478.6 (25.297)
Quadratic Model				
OLS uncorr.	1896.2 (63.700)	1761.6 (28.186)	1406.6 (67.559)	1322.3 (22.940)
OLS P-bias corr.	1899.0 (75.986)	1755.0 (35.906)	1413.2 (76.911)	1322.0 (26.430)
OLS U-bias corr.	1938.2 (93.046)	2040.0 (36.966)	1501.9 (73.429)	1470.4 (28.150)
Log Model				
OLS uncorrected	7.0914 (0.1016)	7.0511 (0.0356)	6.7619 (0.1160)	6.6525 (0.0436)
OLS P-bias corr.	7.0990 (0.1332)	7.0330 (0.0456)	6.7743 (0.1456)	6.6357 (0.0536)
OLS U-bias corr.	7.3163 (0.1141)	7.3054 (0.0441)	6.9513 (0.1376)	6.8146 (0.0540)

FB= foreign-born; CB= Canadian-born.
Standard errors in parentheses.

Generally, it is observed that with correction for participation or underemployment the degree of significance of the difference in intercepts diminishes. Without correcting for participation bias, the t-value in the linear equations for weekly and annual hours are 4.917 and 1.726, respectively, in the case of males. After correction for underemployment the t-values fall to 1.815 and 0.129 in the linear weekly and hours equations, respectively.

On the basis of annual hours, therefore, we could conclude that after correcting for participation or underemployment bias there appears to be generally no significant difference in the intercepts of the labour supply function between immigrant and Canadian-born workers. In the linear annual hours equations for males, the difference in intercepts is significantly different from zero only when selectivity bias are left uncorrected. In the case of females, the difference is significant only when underemployment bias is not corrected.

In the quadratic annual hours model, the difference in intercepts are significant for males if underemployment bias is not accounted for, while for the females the differences are insignificant with or without correction.

From these results we get one major impression, namely, that Canadian-born workers may be subject to underemployment constraints, and that when those subject to this constraint are excluded from the sample the labour supply responses of immigrants and Canadian-born population become congruent.

In appendix Tables B and C we notice that greater percentages of

Canadian-born males and females, 18.7 and 16.6, respectively, reported that they were not satisfied with their weeks of work in 1987 than were reported by immigrant males and females, 13.9 and 13.5, respectively.

Also the results of the underemployment probit estimates show that while job shortages were highly significant (with t-values of 4.030 and 4.224), for both Canadian-born males and females they were insignificant (with t-values of 0.884 and 0.737) for both immigrant males and females.

Thus the effect on the labour supply estimates of correcting forunderemployment bias was not entirely unexpected.

5.2 Estimated Wage Coefficients

The first empirical hypothesis we derived from the "pure" immigrant selectivity hypothesis is that if immigrants have more taste for work the wage coefficient in their labour supply equations would be smaller than that for Canadian-born workers because of the smaller influence of the income effect of a wage change.

Table 5.3 presents a summary of the wage coefficients and their standard errors for all the equations estimated. In all the equations, except in the case of the quadratic specification of the annual hours model with underemployment bias-correction, the estimated wage coefficients for immigrant workers are absolutely smaller than those for Canadian-born workers.

As may be observed from Table 5.4 below the difference in the wage coefficients are everywhere negative, indicating that wage effects are smaller for immigrants.

TABLE 5.2

TESTS FOR EQUALITY OF INTERCEPTS (WITH T-VALUES IN PARENTHESES)

	MALES	FEMALES
WEEKLY HOURS SUPPLY		
LINEAR MODEL		
OLS uncorrected	7.456 (4.917)*	3.846 (2.719)*
OLS P-bias corr.	6.985 (2.348)*	2.891 (1.072)
OLS U-bias corr.	3.462 (1.815)*	3.206 (1.177)
ANNUAL HOURS SUPPLY		
LINEAR MODEL		
OLS uncorrected	108.1 (1.726)*	134.2 (2.036)*
OLS P-bias corr.	117.8 (1.537)	139.0 (1.942)*
OLS U-bias corr.	10.1 (0.129)	100.6 (1.447)
QUADRATIC MODEL		
OLS uncorrected	134.6 (1.932)*	84.3 (1.181)
OLS P-bias corr.	144.0 (1.713)*	91.2 (1.121)
OLS U-bias corr.	-101.8 (1.017)	31.5 (0.401)
LOG MODEL		
OLS uncorrected	0.040 (0.374)	0.109 (0.883)
OLS P-bias corr.	0.066 (0.469)	0.139 (0.893)
OLS U-bias corr.	0.011 (0.089)	0.137 (0.925)

* indicates significant at 5%, on the one-tailed test; P=participation; U=underemployment; corr.=corrected.
Differences in coefficients are shown first.

However, like the case of the estimated intercept coefficients, these differences are generally found not to be statistically different from zero.

The test-statistic for evaluating the degree of significance of the difference in the wage coefficients between immigrants and Canadian-born workers was derived from the following formular:

$$t = (\beta w_i' - \beta w_c') \; / \; \sqrt{[v(\beta w_i') + v(\beta_{wc}')]} \sim t_{n-k} \qquad (5.2)$$

where t is evaluated at $\alpha = 0.05$; $\beta w'$ and v(.) are the estimated coefficient and the variance, respectively, of the wage terms in the labour supply equations for immigrants i and Canadian-born workers c.

Statistical tests, the results of which are shown in Table 5.4 below, indicate that on the basis of annual hours after correcting for bias due to underemployment the differences in the wage coefficients are not significantly different from zero, for both males and females. In the log annual hours model for both males and females, all the t-values were below the critical one-tailed value of 1.645. In the linear annual hours model, the degree of significance of the difference in the wage coefficients declines with participation bias-correction from a t-value of -2.415 and -2.353 for males and females, respectively, in the uncorrected estimates to -1.758 and -1.833 after correcting for participation bias.

TABLE 5.3

ESTIMATED WAGE COEFFICIENTS (WITH STANDARD ERRORS IN PARENTHESES)

	MALES		FEMALES	
	FB	CB	FB	CB
WEEKLY HOURS				
LINEAR MODEL				
OLS uncorrected	0.806 (0.038)	1.468 (0.019)	0.818 (0.054)	1.126 (0.022)
OLS P-bias corr.	0.806 (0.243)	1.461 (0.056)	0.816 (0.312)	1.110 (0.204)
OLS U-bias corr.	0.929 (0.076)	1.204 (0.058)	0.740 (0.309)	0.966 (0.198)
ANNUAL HOURS				
LINEAR MODEL				
OLS uncorrected	-2.864 (1.920)	2.463 (1.085)	-2.567 (2.979)	4.974 (1.183)
OLS P-bias corr.	-2.891 (2.762)	2.527 (1.367)	-2.737 (3.898)	4.973 (1.578)
OLS U-bias corr.	-4.001 (3.177)	-5.370 (1.326)	-3.705 (3.754)	1.000 (1.408)
QUADRATIC MODEL				
OLS uncorrected	1.721 (1.456)	7.856 (1.330)	7.416 (3.512)	8.362 (1.634)
OLS P-bias corr.	1.668 (2.132)	7.905 (2.175)	7.062 (4.743)	8.362 (0.956)
OLS U-bias corr.	3.896 (6.531)	-2.127 (1.783)	6.499 (4.792)	2.537 (0.971)
LOG MODEL				
OLS uncorrected	0.135 (0.035)	0.172 (0.012)	0.171 (0.048)	0.185 (0.017)
OLS P-bias corr.	0.133 (0.049)	0.172 (0.017)	0.166 (0.065)	0.185 (0.022)
OLS U-bias corr.	0.081 (0.044)	0.091 (0.017)	0.120 (0.062)	0.141 (0.023)

FB=immigrant; CB=Canadian-born.

On the basis of weekly hours, there appears to be little or no significant difference in the wage coefficients between females after correcting for bias due to participation or underemployment. However, with no correction for selectivity bias the difference in the wage coefficients between females is highly significant with a t-value of -5.282 in the linear weekly hours equation.

Between the males, the differences in the wage coefficients based on the weekly hours equations were highly significant, regardless of whether selectivity bias was corrected for, with t-values ranging from -2.627 to -15.581.

From Table 5.4 we may conclude that for females there appears to be little or no significant difference in the wage coefficients between immigrants after correcting for biases in the estimates due to participation or underemployment in both the weekly hours and the annual hours equations.

For males, there appear to be significant differences in the wage coefficients in the weekly hours supply equation even after correcting for selectivity bias while in the case of the annual hours' supply function the observed differences in the wage coefficients between immigrants and Canadian-born workers appear to be generally insignificantly different from zero.

It is amply clear that excluding part-time workers facing job shortages from the sample of workers leads to structural equality of the labour supply functions for immigrants and for Canadian-born workers being the same in terms of the wage and intercept coefficients.

TABLE 5.4

TESTS FOR EQUALITY OF WAGE COEFFICIENTS (WITH T-VALUES IN PARENTHESES)

	M A L E S	F E M A L E S
WEEKLY HOURS SUPPLY		
LINEAR MODEL		
OLS uncorrected	-0.662 (-15.581)*	-0.308 (-5.282)*
OLS P-bias corr.	-0.655 (-2.627)*	-0.294 (-0.789)
OLS U-bias corr.	-0.275 (-2.876)*	-0.226 (-0.616)
ANNUAL HOURS SUPPLY		
LINEAR MODEL		
OLS uncorrected	-5.327 (-2.415)*	-7.541 (-2.353)*
OLS P-bias corr.	-5.418 (-1.758)*	-7.710 (-1.833)*
OLS U-bias corr.	1.369 (0.398)	-4.705 (-1.173)
QUADRATIC MODEL		
OLS uncorrected	-6.135 (-3.111)*	-0.946 (-0.244)
OLS P-bias corr.	-6.237 (-2.051)*	-1.300 (-0.258)
OLS U-bias corr.	6.023 (0.890)	3.962 (0.811)
LOG MODEL		
OLS uncorrected	-0.037 (-0.991)	-0.014 (-0.275)
OLS P-bias corr.	-0.039 (-0.752)	-0.019 (-0.277)
OLS U-bias corr.	-0.010 (-0.212)	-0.021 (-0.318)

Differences in coefficients are shown first. * indicates difference is significant at 5% significance level.

5.3 Wage Elasticities

Wage elasticities may be measured as the proportionate change in labour supplied expressed as a ratio of the proportionate change in the wage rate. In terms of derivatives this may be expressed as:

$$E_s = (dH / dW) * (W / H)$$

where H and w are the hours worked and the wage rate, respectively, and (dH/dW) is equivalent to the estimated wage coefficient.

Coefficients of wage elasticity of labour supply were, therefore, estimated from the various equations using the following formulae:

1) For the linear hours-wage function

$$H = \beta_o + \beta_w'W + \beta_i'X_i$$

the elasticity formula used is given by:

$$E_s = \beta_w' \cdot (W/H) ;$$

where β_w' is the estimated wage coefficient and W and H are the means of wages and weekly hours respectively;

2) For the quadratic wage function,

$$H = \beta_o + \beta_1'W + \beta_2'W^2 + \ldots$$

the results of which are shown in appendices, the elasticity formula used is:

$$E_s = (\beta_1' + 2\beta_2'W) \cdot (W/H); \text{ and}$$

3) For the log linear (annual hours-hourly wage) equation

$$\log H = \beta_o + \beta_w' \log W + \ldots,$$

the wage elasticity is simply the estimated wage coefficient β_w'.

All the elasticities were evaluated at the means of wages and hours worked for the relevant sample of workers.

The results show that, generally, the estimated wage elasticities for immigrant male workers are smaller than that for Canadian-born male workers as expected, regardless of the functional specification or corrections for selectivity bias. For the log annual hours supply equations, as shown in Table 5.4 above, the wage elasticities are not significantly different between immigrants and Canadian-born workers. The wage elasticities derived from the log weekly hours model are significantly different only between the males but not between the females.

The range of values for the wage elasticities, from -0.034 to 1.374, is not inconsistent with the empirical findings in the literature on labour supply, and the negative wage elasticities seem to be consistent with that literature (Phipps, 1993).

TABLE 5.5

ESTIMATED WAGE ELASTICITIES FROM THE VARIOUS HOURS OF WORK EQUATIONS FOR MALE AND FEMALE WORKERS

	MALE		FEMALE	
	FB	CB	FB	CB
WEEKLY HOURS EQUATION				
LINEAR MODEL				
OLS uncorrected	0.285	0.452	0.241	0.322
OLS P-bias corr.	0.285	0.450	0.240	0.317
OLS U-bias corr	0.331	0.381	0.221	0.281
ANNUAL HOURS EQUATION				
LINEAR MODEL				
OLS uncorrected	-0.021	0.016	-0.016	0.032
OLS P-bias corr.	-0.021	0.017	-0.017	0.032
OLS U-bias corr.	-0.028	-0.034	-0.023	0.017
QUADRATIC MODEL				
OLS uncorrected	0.013	0.052	0.047	0.054
OLS P-bias corr.	0.012	0.052	0.044	0.054
OLS U-bias corr.	0.028	-0.014	0.040	0.016
LOG MODEL				
OLS uncorrected	0.135	0.172	0.171	0.185
OLS P-bias corr	0.133	0.172	0.166	0.185
OLS U-bias corr	0.081	0.091	0.120	0.141

In summary, the results from the tests of the significance of the difference in the intercept and wage coefficients in the labour supply equations between immigrants and Canadian-born workers indicate that on the basis of annual hours of work there appears to be little or no difference, particularly after correcting for selectivity bias. On the basis of weekly hours, however, the differences in both intercept and wage coefficients appear to be statistically significant between the male workers while between the female workers both intercept and wage coefficients are not significantly different.

5.4 General Results

The regression results, shown in Tables 5.7-5.10, generally point to many similarities in the signs and significance of the coefficients of the demographic variables included in the estimates between immigrants and Canadian-born workers.

The results of the F-tests of the significance of various groups of demographic variables in the estimation equations, shown in Table 5.6, buttresses the point that the structure of the labour supply function for immigrants and Canadian-born workers may be similar.

The coefficients of the age groups AGE1624 and AGE5564 were generally negative and significant at the 5% level, with age-group 35-44 as the reference point, while that of AGE2534 was generally positive for both male and female workers. On an annual basis, hours worked by AGE2534 and AGE4554 appeared to be insignificantly different from that of the reference group for both males and females, except in the case of Canadian-born female workers where AGE4554 had negative and significant

TABLE 5.6

TESTS FOR INCLUSION OF GROUPS OF DEMOGRAPHIC VARIABLES IN THE ESTIMATION EQUATIONS BASED ON ANNUAL HOURS (CALCULATED F-VALUES)

GROUPS OF VARIABLES	MALES FB	MALES CB	FEMALES FB	FEMALES CB
AGE: (age1624, age2534, age4554, age5564; age3544=0)	11.2*	20.2*	5.3*	29.7*
EDUCATION: (element, smpstsec, postsec, univ; hischo=0)	5.4*	73.7*	8.2*	57.3*
MARITAL STATUS: (single, other; married=0)	0.8	3.3*	0.8	4.5*
UNION[1]	8.8*	14.6*	7.4*	15.6*
INDUSTRY: (primary, manufac, govserv, trade, utility, finance; service=0)	6.7*	23.2*	1.2	17.3*
OCCUPATION: (blue; office, farming; manprof; server=0)	3.0*	11.3*	0.4	3.8*
REGION: (atlantic; quebec; prairie, bc; ontario=0)	2.9*	51.3*	3.2*	47.8*
VISIBLE MINOR.: (minor, langdif)	2.1	1.5	13.0*	0.7
N. of Observations	2412	19238	2007	18976

1. shows t-values. *indicates significance at 5% level.

coefficients in both the uncorrected and corrected regression estimates.

Thus, the results show that hours worked were smaller at younger and older ages than 25-44, for both male and female workers, which is consistent with life cycle theory of labour supply- that labour supply increases and then declines with age. As shown in Table 5.6 above age appeared to be a significant factor in the labour supply function for all the sample groups. In the F-test (Table 5.6) it is found that age is a significant factor for all the samples.

Education also appeared to be a significant factor. On the basis of weekly hours, educational attainment lower than high school, the reference group, tended to significantly increase hours worked by all groups except immigrant female workers where the sign of the coefficient of ELEMENT was still positive but insignificantly different from zero.

Higher educational attainment, for example, university education UNIV, tended to be associated with lower weekly hours but was associated with higher annual hours, particularly for Canadian-born male workers. This is a reasonable result since university graduates are more likely to be found in full-time, managerial employment on a fixed monthly salary rather than hourly rated wages and would therefore be working the standard eight-hour day. On the other hand because they have stable jobs they are more likely to achieve greater annual hours than those without university education.

For immigrant female workers university education appeared with negative and significant coefficients, while for Canadian-born female workers UNIV had positive but insignificant coefficients.

Among males marital status also appeared to be statistically

insignificant from zero in the estimated equations based on weekly hours for immigrants but strongly negative in the estimated equations for Canadian-born workers. However, on the basis of annual hours, being single appeared to be associated with significantly lower hours of work among all males.

Among female workers, being single appeared to have no significant effect on weekly hours, but on annual basis was associated with significantly higher hours worked among Canadian-born workers.

The number of children variables KIDAGEDV (children aged five and below) and KIDABFV (children aged six to twenty-four) were generally negative for both males and females and highly significant for females, particularly in the annual hours equations.

The regional variables showed varied results in two ways. First there are notable differences in the signs and significance of the coefficients between immigrants and Canadian-born. For example, on the basis of annual hours, ATLANTIC is associated with positive though insignificant coefficients for immigrant female workers but has a negative and significant coefficient for Canadian-born female workers.

Secondly, the sign of some regional coefficients changed as we moved from the weekly hours equations to the annual hours equations. For example, whilst ATLANTIC was generally associated with positive and significant coefficients in the weekly hours equations for both male and female workers, it was negative and significant in the annual hours equation for Canadian-born workers but insignificant and sometimes positive for immigrant workers.

The reason for this change in sign may be due to the fact that the average (legislated) standard hours per workweek in Atlantic Canada was 48 hours in 1986 against an average of 44 hours in Ontario, as shown in table 3.7, while annual hours depended on local employment demand conditions which were more favourable in Ontario, with an unemployment rate of 7% compared with that in Atlantic Canada of 14.0% in 1986.

With ONTARIO as the reference group, the coefficients for QUEBEC was found to be generally negative but insignificant in the weekly hours equations for both males and females. In the annual hours equation, however, QUEBEC has negative and significant coefficients in all the equations, except that it was insignificant for foreign-born females.

The coefficients of PRAIRIE were found to be positive and generally statistically significant in the weekly hours equations for Canadian-born male workers but insignificant for immigrant male workers. In the annual hours equations PRAIRIE has generally negative and significant coefficients for the Canadian-born workers, but generally insignificant for immigrants. The coefficients of BC were generally negative and significant in both the weekly hours and annual hours equations for all the samples.

Hours of work was generally positively and significantly associated with union membership, as UNION1 and UNIONM were positive and highly significant in all the equations for both male and female workers.

There were also some similarities in the results for immigrants and Canadian-born in terms of "industry effects" on hours worked. With the service industry as the reference group, the results showed that working

TABLE 5.7

REGPESSION ESTIMATES OF THE LINEAR WEEKLY HOURS EQUATION ($H = \beta_o + \beta_1 W + \beta_{2i} X_i + e$) BASED ON THE POPULATION OF MALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep. Variable	33.877	32.006	33.877	32.006	35.633	34.135
SEE	14.894	16.438	14.897	16.412	13.791	15.684
Indep. vars.						
HWAGE	0.806 (21.3)*	1.468 (75.38)*	0.806 (3.324)*	1.461 (26.23)*	0.929 (12.16)*	1.204 (20.8)*
Age						
AGE1624	-7.148 (-5.3)*	-2.133 (-4.71)*	-7.139 (-3.74)*	-2.179 (-4.33)*	-6.259 (-3.95)*	-3.222 (-5.8)*
AGE2534	1.314 (1.360)	1.337 (3.721)*	1.314 (1.107)	1.346 (3.782)*	1.854 (1.748)*	0.745 (1.98)*
AGE3544	-	-	-	-	-	-
AGE4554	1.363 (1.559)	-0.697 (-1.67)*	1.364 (1.662)*	-0.694 (-1.67)*	1.596 (1.938)*	-0.612 (-1.45)
AGE5564	1.379 (1.279)	-0.636 (-1.203)	1.380 (1.362)	-0.619 (-1.153)	1.294 (1.272)	-0.946 (-1.7)*
Educ.						
ELEMENT	1.397 (1.355)	2.703 (6.782)*	1.396 (1.317)	2.721 (6.226)*	2.149 (1.982)*	3.030 (6.22)*
HISCHO	-	-	-	-	-	-
SMPSTSEC	-2.193 (-2.0)*	-2.113 (-5.20)*	-2.194 (-2.15)*	-2.038 (-4.88)*	-2.555 (-2.45)*	-2.544 (-5.8)*
POSTSEC	-1.307 (-1.34)	-2.646 (-6.92)*	-1.304 (-1.377)	-2.624 (-7.45)*	-1.900 (-2.03)*	-2.467 (-6.6)*
UNIV	-4.179 (-4.0)*	-6.638 (-14.2)*	-4.178 (-3.59)*	-6.678 (-13.0)*	-4.691 (-4.42)*	-6.003 (-11)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	0.098 (0.088)	-0.911 (-2.47)*	0.093 (0.080)	-0.963 (-2.50)*	0.151 (0.129)	-1.612 (-3.8)*
OTHERM	0.589 (0.402)	0.293 (0.480)	0.588 (0.465)	0.335 (0.567)	0.609 (0.473)	-0.340 (-0.59)
KIDAGEDV	0.425 (0.755)	-0.090 (-0.420)	0.426 (0.713)	-0.091 (-0.441)	-0.132 (-0.240)	0.011 (0.050)
KIDSABFV	0.035 (0.126)	-0.454 (-4.19)*	0.034 (0.120)	-0.478 (-4.20)*	-0.063 (-0.214)	-0.554 (-4.4)*
Region						
ATLANTIC	2.417 (1.89)*	3.931 (10.84)*	2.420 (1.916)*	3.835 (10.35)*	3.688 (2.798)*	4.436 (11.1)*
QUEBEC	-1.524 (-1.27)	-0.315 (-0.788)	-1.526 (-1.288)	-0.322 (-0.920)	-0.150 (-0.128)	-0.441 (-1.23)
ONTARIO	-	-	-	-	-	-
PRAIRIE	-0.027 (-0.03)	1.280 (3.568)*	-0.027 (-0.033)	1.238 (3.735)*	0.822 (1.067)	1.442 (4.12)*
BC	-1.845 (-2.0)*	-0.798 (-1.620)	-1.840 (-2.11)*	-0.913 (-1.90)*	-1.058 (-1.258)	-0.569 (-1.16)
Union						
UNION1	6.265 (8.81)*	4.333 (14.62)*	6.264 (5.026)*	4.455 (12.27)*	3.771 (6.688)*	4.169 (12.3)*
Industry						
PRIMARY	3.521 (2.24)*	2.428 (4.422)*	3.517 (1.568)	2.358 (3.768)*	2.669 (1.165)	2.536 (3.74)*
MANUFAC	0.360 (0.365)	1.212 (2.932)*	0.358 (0.312)	1.211 (2.849)*	0.406 (0.387)	1.552 (3.43)*
GOVSERV	-5.346 (-4.1)*	-2.307 (-4.89)*	-5.349 (-5.02)*	-2.311 (-5.40)*	-5.323 (-5.01)*	-1.944 (-4.3)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
SERVICE	-	-	-	-	-	-
TRADE	1.973 (1.79)*	3.068 (7.434)*	1.974 (1.710)*	3.123 (7.612)*	1.603 (1.347)	3.298 (7.55)*
UTILITY	-0.674 (-0.49)	1.460 (2.951)*	-0.676 (-0.563)	1.421 (2.670)*	-0.120 (-0.096)	1.627 (2.93)*
FINANCE	4.477 (2.58)*	1.279 (1.618)	4.475 (1.838)*	1.242 (1.496)	2.291 (1.000)	1.713 (2.01)*
Occupat.						
SERVER	-	-	-	-	-	-
FARMING	-3.178 (-1.44)	2.282 (3.538)*	-3.183 (-1.130)	2.271 (2.786)*	-3.410 (-1.172)	2.970 (3.02)*
MANPROF	0.269 (0.251)	-0.153 (-0.363)	0.266 (0.174)	-0.170 (-0.403)	-0.393 (-0.352)	0.411 (0.940)
OFFICE	-4.130 (-2.6)*	-2.148 (-3.77)*	-4.133 (-2.95)*	-2.088 (-4.38)*	-3.389 (-2.36)*	-1.861 (-3.6)*
BLUE	-2.126 (-2.1)*	-0.936 (-2.44)*	-2.129 (-2.00)*	-0.928 (-2.62)*	-0.864 (-0.808)	-0.514 (-1.36)
Visible Charac.						
MINOR	0.947 (1.257)	0.150 (0.125)	0.947 (1.160)	0.150 (0.122)	0.956 (1.286)	0.730 (0.565)
LANGDIF	0.831 (1.225)	1.028 (1.689)*	0.833 (1.275)	1.078 (1.739)*	0.909 (1.401)	0.561 (0.875)
Inverse Mill's ratio						
PART	-	-	0.748 (0.093)	-2.512 (-7.03)*	-	-
UNDER	-	-	-	-	-1.336 (-0.078)	0.662 (1.522)
CONSTANT	23.547 (16.8)*	16.091 (27.71)*	23.550 (8.141)*	16.565 (23.91)*	23.127 (13.21)*	19.665 (25.9)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Adj.R^2	0.301	0.358	0.301	0.360	0.293	0.318
F(K-1,N-K)	35.658	358.10	34.494	349.56	28.745	236.36
log of like.fun	-9922	-81140	-9922	-81110	-8377	-65206
N	2412	19238	2412	19238	2076	15635
Wage Elastic.	0.285	0.452	0.285	0.450	0.331	0.381

F.B = foreign-born; C.B = Canadian-born; P-bias = participation-bias; U-bias = underemployment-bias; uncorr.= uncorrected; corr.=corrected; t-values are in parentheses; * indicates corresponding coefficient is significantly different from zero, at the 5% (one-tailed) level of significance.

TABLE 5.8

REGRESSION ESTIMATES OF THE LOG. OF ANNUAL HOURS EQUATION
($\log H = \beta_0 + \beta_1(\log AVWAGE) + \beta 2_i X_i + e$). MALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep Var. (log Annual Hrs)	7.401	7.327	7.401	7.327	7.499	7.455
SEE	0.675	0.664	0.674	0.663	0.541	0.548
Indep vars.						
AVWAGE (log)	0.135 (3.86)*	0.172 (14.05)*	0.133 (2.707)*	0.172 (10.29)*	0.081 (1.815)*	0.091 (5.45)*
Age						
AGE1624	-0.402 (-6.4)*	-0.219 (-11.9)*	-0.393 (-5.68)*	-0.218 (-11.2)*	-0.436 (-7.06)*	-0.233 (-13)*
AGE2534	0.008 (0.186)	0.024 (1.642)	0.007 (0.197)	0.023 (1.717)*	0.002 (0.077)	0.016 (1.382)
AGE3544	-	-	-	-	-	-
AGE4554	0.021 (0.527)	-0.006 (-0.373)	0.022 (0.697)	-0.006 (-0.415)	0.040 (1.608)	-0.003 (-0.26)
AGE5564	-0.145 (-3.0)*	-0.148 (-6.98)*	-0.145 (-2.94)*	-0.149 (-6.54)*	-0.132 (-3.06)*	-0.181 (-8.4)*
Educ.						
ELEMENT	-0.023 (-0.50)	-0.065 (-4.04)*	-0.024 (-0.559)	-0.067 (-3.60)*	-0.040 (-1.070)	-0.035 (-2.0)*
HISCHO	-	-	-	-	-	-
SMPSTSEC	-0.062 (-1.27)	-0.042 (-2.56)*	-0.064 (-1.253)	-0.045 (-2.70)*	-0.093 (-1.89)*	-0.064 (-3.9)*
POSTSEC	-0.001 (-0.02)	0.024 (1.530)	0.003 (0.074)	0.023 (1.681)*	0.007 (0.218)	0.007 (0.562)

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
UNIV	-0.027 (-0.57)	0.054 (2.835)*	-0.026 (-0.472)	0.057 (3 650)*	-0.011 (-0.235)	0.033 (2.26)*
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	-0.155 (-3.1)*	-0.238 (-15.8)*	-0.161 (-2.97)*	-0.236 (-15.1)*	-0.130 (-2.83)*	-0.223 (-16)*
OTHERM	-0.035 (-0.53)	-0.119 (-4.85)*	-0.037 (-0.666)	-0.121 (-4.75)*	-0.018 (-0.521)	-0.063 (-3.0)*
KIDAGEDV	-0.012 (-0.48)	-0.020 (-2.31)*	-0.012 (-0.411)	-0.020 (-2.52)*	-0.021 (-0.748)	-0.024 (-3.5)*
KIDSABFV	-0.004 (-0.31)	-0.029 (-6.69)*	-0.004 (-0.356)	-0.028 (-5.78)*	-0.003 (-0.316)	-0.034 (-7.6)*
Region						
ATLANTIC	-0.042 (-0.72)	-0.148 (-10.0)*	-0.038 (-0.697)	-0.144 (-10.0)*	0.031 (0.668)	-0.048 (-3.7)*
QUEBEC	-0.207 (-3.8)*	-0.125 (-7.76)*	-0.210 (-2.96)*	-0.125 (-8.34)*	-0.100 (-1.70)*	-0.092 (-6.6)*
ONTARIO	-	-	-	-	-	-
PRAIRIE	-0.011 (-0.31)	-0.018 (-1.218)	-0.012 (-0.340)	-0.016 (-1.199)	-0.010 (-0.338)	0.018 (1.512)
BC	-0.049 (-1.19)	-0.133 (-6.67)*	-0.044 (-1.132)	-0.129 (-6.46)*	-0.003 (-0.105)	-0.057 (-3.0)*
Union						
UNIONM	0.102 (3.31)*	0.129 (11.71)*	0.101 (3.835)*	0.125 (12.39)*	0.042 (1.813)*	0.088 (9.48)*
Industry						
PRIMARY	-0.022 (-0.31)	0.156 (6.999)*	-0.026 (-0.261)	0.160 (7.252)*	0.141 (2.449)*	0.136 (6.43)*
MANUFAC	0.066 (1.479)	0.062 (3.688)*	0.065 (1.319)	0.063 (3.633)*	0.088 (1.808)*	0.088 (5.62)*
GOVSERV	-0.009 (-0.16)	0.023 (1.217)	-0.011 (-0.228)	0.024 (1.399)	-0.020 (-0.430)	0.020 (1.221)

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
SERVICE	-	-	-	-	-	-
TRADE	0.140 (2.80)*	0.155 (9.270)*	0.142 (2.706)*	0.152 (8.703)*	0.145 (2.857)*	0.132 (7.90)*
UTILITY	0.038 (0.616)	0.106 (5.305)*	0.036 (0.611)	0.109 (5.649)*	0.092 (1.839)*	0.101 (5.76)*
FINANCE	0.150 (1.90)*	0.104 (3.266)*	0.147 (1.893)*	0.107 (3.281)*	0.049 (0.630)	0.090 (2.95)*
Occup.						
SERVER	-	-	-	-	-	-
FARMING	0.006 (0.056)	-0.137 (-5.28)*	0.0004 (0.004)	-0.138 (-4.60)*	-0.011 (-0.137)	-0.096 (-3.0)*
MANPROF	0.096 (1.95)*	0.051 (3.025)*	0.093 (1.809)*	0.053 (3.171)*	0.032 (0.732)	0.055 (3.47)*
OFFICE	0.031 (0.431)	-0.022 (-0.953)	0.028 (0.429)	-0.025 (-1.075)	-0.016 (-0.255)	-0.009 (-0.46)
BLUE	-0.007 (-0.14)	-0.007 (-0.485)	-0.009 (-0.183)	-0.008 (-0.475)	-0.024 (-0.504)	0.032 (2.09)*
Visible Charac.						
MINOR	-0.028 (-0.83)	0.038 (0.784)	-0.029 (-0.818)	0.038 (0.711)	-0.015 (-0.504)	0.030 (0.664)
LANGDIF	0.026 (0.843)	0.017 (0.069)	0.028 (0.923)	-0.001 (0.023)	0.036 (1.338)	-0.027 (-1.08)
Inverse Mill's ratio						
PART	-	-	0.774 (1.318)	0.109 (5.746)*	-	-
UNDER	-	-	-	-	-0.834 (-1.083)	0.029 (1.351)
CONSTANT	7.091 (69.8)*	7.051 (198.1)*	7.099 (53.29)*	7.033 (154.1)*	7.316 (64.12)*	7.305 (166)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Adj.R^2	0.118	0.169	0.121	0.172	0.134	0.168
F(K-1,N-K)	11.807	131.14	11.684	129.64	11.324	103.07
log of like.fun	-2458	-19398	-2455	-19363	-1655	-12780
N	2412	19238	2412	19238	2076	15635

TABLE 5.9

REGRESSION ESTIMATES OF THE LINEAR WEEKLY HOURS EQUATION ($H = \beta_0 + \beta_1 W + \beta_{2i} X_i + e$). FEMALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep Variable	27.580	26.126	27.580	26.126	28.554	27.365
SEE	14.994	15.228	14.995	15.128	14.174	14.924
Indep. vars.						
HWAGE	0.818 (15.1)*	1.126 (51.54)*	0.816 (2.619)*	1.110 (5.453)*	0.740 (2.396)*	0.966 (4.88)*
Age						
AGE1624	-5.339 (-4.1)*	-3.790 (-9.26)*	-5.358 (-3.42)*	-3.744 (-4.94)*	-6.245 (-3.66)*	-4.302 (-5.4)*
AGE2534	-0.735 (-0.73)	-0.143 (-0.404)	-0.747 (-0.757)	-0.170 (-0.389)	-0.441 (-0.428)	-0.137 (-0.30)
AGE3544	-	-	-	-	-	-
AGE4554	0.723 (0.722)	-1.081 (-2.56)*	0.713 (0.699)	-1.056 (-2.57)*	0.236 (0.250)	-1.316 (-3.1)*
AGE5564	-1.466 (-1.11)	-0.811 (-1.402)	-1.478 (-1.195)	-0.730 (-1.283)	-2.311 (-1.84)*	-1.195 (-2.1)*
Educ.						
ELEMENT	1.110 (0.953)	2.027 (3.977)*	1.105 (1.015)	1.976 (3.769)*	0.872 (0.757)	1.901 (3.33)*
HISCHO=0	-	-	-	-	-	-
SMPSTSEC	-3.822 (-3.3)*	-2.498 (-6.58)*	-3.811 (-3.34)*	-2.364 (-6.61)*	-4.316 (-3.80)*	-2.493 (-6.3)*
POSTSEC	-3.307 (-3.2)*	-2.756 (-7.93)*	-3.290 (-3.21)*	-2.672 (-7.08)*	-3.368 (-3.25)*	-2.668 (-6.6)*
UNIV	-5.450 (-4.8)*	-5.853 (-13.1)*	-5.459 (-4.76)*	-5.741 (-9.12)*	-6.495 (-5.62)*	-5.416 (-8.4)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	0.007 (0.01)	0.448 (1.317)	0.003 (0.003)	0.421 (1.305)	0.377 (0.342)	0.642 (1.84)*
OTHERM	1.384 (1.250)	1.207 (2.846)*	1.375 (1.224)	1.152 (2.768)*	2.155 (2.218)*	1.003 (2.22)*
KIDAGEDV	-2.370 (-3.4)*	-1.755 (-7.69)*	-2.337 (-3.34)*	-1.757 (-6.59)*	-1.756 (-2.35)*	-1.799 (-6.1)*
KIDSABFV	-1.073 (-3.5)*	-0.799 (-7.42)*	-1.080 (-3.44)*	-0.805 (-6.78)*	-1.034 (-3.14)*	-0.889 (-6.8)*
Region						
ATLANTIC	2.245 (1.588)	3.864 (10.8)*	2.218 (1.337)	3.696 (9.943)*	3.098 (2.217)*	4.298 (10.9)*
QUEBEC	-1.064 (-0.75)	0.130 (0.320)	-1.154 (-0.963)	0.188 (0.488)	-0.347 (-0.282)	0.026 (0.064)
ONTARIO= 0	-	-	-	-	-	-
PRAIRIE	-1.594 (-1.9)*	0.128 (0.374)	-1.595 (-1.90)*	-0.014 (-0.043)	-1.216 (-1.419)	0.381 (1.060)
BC	-2.372 (-2.4)*	-0.025 (-0.051)	-2.285 (-2.39)*	-0.238 (-0.483)	-0.949 (-0.970)	0.387 (0.706)
Union						
UNION1	6.326 (7.37)*	4.917 (15.57)*	6.326 (3.771)*	4.928 (4.769)*	6.455 (4.086)*	5.302 (5.55)*
Industry						
PRIMARY	-0.195 (-0.08)	1.561 (1.786)*	-0.203 (-0.060)	1.622 (1.473)	-0.588 (-0.167)	1.437 (1.195)
MANUFAC	2.637 (1.90)*	2.992 (5.943)*	2.634 (1.916)*	3.027 (5.760)*	3.371 (2.297)*	2.797 (4.81)*
GOVSERV	1.420 (0.959)	-0.048 (-0.104)	1.404 (0.808)	-0.036 (-0.089)	1.018 (0.819)	0.276 (0.625)
SERVICE	-	-	-	-	-	-

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
TRADE	1.051 (1.017)	0.931 (2.751)*	1.084 (1.094)	0.996 (2.957)*	2.124 (1.991)*	1.128 (3.04)*
UTILITY	3.014 (1.344)	0.179 (0.281)	3.005 (1.044)	0.177 (0.257)	2.999 (1.496)	0.225 (0.314)
FINANCE	2.599 (1.69)*	4.563 (8.746)*	2.648 (1.757)*	4.557 (6.457)*	2.274 (1.478)	4.680 (6.50)*
Occup.						
SERVER=0	-	-	-	-	-	-
FARMING	1.005 (0.327)	1.918 (1.818)*	0.982 (0.231)	1.742 (1.286)	5.203 (1.074)	1.518 (0.972)
MANPROF	0.989 (0.941)	0.818 (2.200)*	0.971 (0.763)	0.757 (1.075)	1.568 (1.205)	1.659 (2.25)*
OFFICE	0.007 (0.007)	0.748 (2.248)*	-0.023 (-0.022)	0.742 (1.873)*	-0.223 (-0.215)	1.217 (2.85)*
BLUE	0.899 (0.592)	1.951 (3.423)*	0.892 (0.600)	1.806 (3.215)*	0.300 (0.193)	2.960 (4.72)*
Visible Charac.						
MINOR	3.218 (3.89)*	-0.685 (-0.615)	3.213 (4.021)*	-0.758 (-0.741)	3.355 (3.933)*	-1.497 (-1.36)
LANGDIF	1.777 (2.37)*	0.607 (1.055)	1.768 (2.403)*	0.672 (1.241)	1.423 (1.916)*	0.739 (1.241)
Inverse Mill's ratio						
PART	-	-	3.993 (1.050)	-3.641 (-11.8)*	-	-
UNDER	-	-	-	-	6.614 (0.493)	1.140 (1.67)*
CONSTANT	21.307 (16.1)*	17.461 (34.68)*	21.344 (9.034)*	18.453 (14.18)*	21.966 (9.180)*	18.760 (14.4)*
Adj.R^2	0.232	0.262	0.232	0.272	0.238	0.250

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
F(K-1,N-K)	21.175	201.26	20.518	204.54	18.432	152.91
log of lik.func	-8266	-69985	-8266	-69874	-7026	-58103
N	2007	16900	2007	16900	1730	14100
Wage Elastic.	0.241	0.322	0.240	0.317	0.221	0.281

TABLE 5.10

REGRESSION ESTIMATES OF THE (LOG. OF) ANNUAL HOURS EQUATION
($\log H = \beta_o + \beta_1(\log AVWAGE) + \beta 2_i X_i + e$) . FEMALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep.var. (log. Annual Hours)	7.099	6.981	7.099	6.981	7.209	7.106
SEE	0.816	0.874	0.815	0.873	0.695	0.784
Indep vars.						
AVWAGE (log)	0.171 (3.57)*	0.185 (10.55)*	0.166 (2.568)*	0.185 (8.239)*	0.120 (1.922)*	0.141 (6.20)*
Age						
AGE1624	-0.240 (-3.4)*	-0.179 (-7.64)*	-0.243 (-3.94)*	-0.181 (-7.83)*	-0.252 (-4.27)*	-0.164 (-7.4)*
AGE2534	0.004 (0.077)	-0.007 (-0.371)	0.003 (0.056)	-0.007 (-0.386)	-0.031 (-0.698)	-0.008 (-0.41)
AGE3544	-	-	-	-	-	-
AGE4554	-0.050 (-0.91)	-0.058 (-2.40)*	-0.051 (-1.002)	-0.058 (-2.50)*	-0.056 (-1.317)	-0.077 (-3.4)*
AGE5564	-0.282 (-3.9)*	-0.194 (-5.86)*	-0.283 (-3.67)*	-0.196 (-5.42)*	-0.367 (-4.89)*	-0.244 (-6.9)*
Educ.						
ELEMENT	-0.016 (-0.25)	-0.078 (-2.65)*	-0.017 (-0.249)	-0.077 (-2.31)*	0.040 (0.663)	-0.034 (-1.03)
HISCHO	-	-	-	-	-	-
SMPSTSEC	-0.130 (-2.1)*	-0.044 (-2.03)*	-0.128 (-1.99)*	-0.047 (-2.16)*	-0.095 (-1.590)	-0.054 (-2.4)*
POSTSEC	-0.007 (-0.12)	0.039 (1.923)*	-0.005 (-0.081)	0.038 (1.939)*	0.014 (0.266)	0.041 (2.21)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
UNIV	-0.107 (-1.7)*	0.025 (0.951)	-0.107 (-1.72)*	0.024 (0.961)	-0.098 (-1.76)*	0.031 (1.298)
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	0.039 (0.638)	0.064 (3.256)*	0.039 (0.811)	0.064 (3.675)*	0.032 (0.742)	0.030 (1.78)*
OTHERM	0.072 (1.196)	0.113 (4.639)*	0.071 (1.131)	0.114 (4.800)*	0.181 (3.729)*	0.138 (6.20)*
KIDACEDV	-0.269 (-7.1)*	-0.245 (-18.7)*	-0.265 (-6.08)*	-0.245 (-16.1)*	-0.218 (-5.16)*	-0.237 (-15)*
KIDSABFV	-0.060 (-3.6)*	-0.074 (-12.0)*	-0.061 (-3.74)*	-0.074 (-11.6)*	-0.059 (-3.88)*	-0.075 (-12)*
Region						
ATLANTIC	0.037 (0.481)	-0.094 (-4.59)*	0.033 (0.428)	-0.092 (-4.57)*	0.077 (1.301)	-0.013 (-0.68)
QUEBEC	-0.027 (-0.34)	-0.102 (-4.37)*	-0.037 (-0.582)	-0.103 (-4.82)*	0.019 (0.335)	-0.073 (-3.5)*
ONTARIO	-	-	-	-	-	-
PRAIRIE	-0.070 (-1.53)	-0.071 (-3.59)*	-0.070 (-1.421)	-0.068 (-3.63)*	-0.081 (-1.78)*	-0.037 (-2.0)*
BC	-0.113 (-2.1)*	-0.171 (-6.12)*	-0.104 (-1.96)*	-0.167 (-5.63)*	-0.083 (-1.63)	-0.090 (-3.1)*
Union						
UNIONM	0.247 (5.48)*	0.241 (14.27)*	0.248 (5.972)*	0.241 (15.03)*	0.213 (5.378)*	0.214 (13.6)*
Industry						
PRIMARY	0.031 (0.230)	0.115 (2.302)*	0.030 (0.205)	0.114 (2.180)*	0.086 (0.620)	0.050 (0.966)
MANUFAC	0.215 (2.84)*	0.139 (4.806)*	0.214 (3.097)*	0.138 (5.048)*	0.230 (3.187)*	0.139 (5.28)*
GOVSERV	-0.110 (-1.36)	-0.030 (-1.132)	-0.111 (-1.241)	-0.030 (-1.135)	-0.083 (-0.927)	0.008 (0.331)

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
SERVICE	-	-	-	-	-	-
TRADE	0.060 (1.067)	0.079 (4.061)*	0.064 (1.090)	0.077 (3.835)*	0.129 (2.455)*	0.084 (4.21)*
UTILITY	-0.043 (-0.35)	0.081 (2.210)*	-0.043 (-0.404)	0.082 (2.491)*	-0.080 (-0.732)	0.062 (1.91)*
FINANCE	0.270 (3.22)*	0.255 (8.517)*	0.276 (3.623)*	0.256 (9.497)*	0.220 (2.910)*	0.209 (7.86)*
Occup.						
SERVER	-	-	-	-	-	-
FARMING	-0.227 (-1.36)	-0.305 (-5.05)*	-0.231 (-1.181)	-0.302 (-3.97)*	-0.189 (-1.107)	-0.251 (-3.3)*
MANPROF	0.133 (2.26)*	0.150 (6.905)*	0.132 (2.232)*	0.153 (6.964)*	0.133 (2.374)*	0.157 (7.28)*
OFFICE	0.061 (1.126)	0.141 (7.348)*	0.059 (1.095)	0.142 (7.175)*	0.019 (0.373)	0.140 (7.01)*
BLUE	0.016 (0.196)	0.002 (0.058)	0.016 (0.194)	0.005 (0.151)	-0.055 (-0.642)	0.081 (2.52)*
Visible Charac.						
MINOR	0.132 (2.92)*	0.012 (0.186)	0.131 (3.065)*	0.013 (0.193)	0.126 (3.309)*	-0.058 (-0.82)
LANGDIF	0.051 (1.261)	0.049 (1.474)	0.050 (1.217)	0.047 (1.483)	0.074 (1.946)*	0.040 (1.256)
Inverse Mill's ratio						
PART	-	-	0.453 (1.104)	0.072 (4.169)*	-	-
UNDER	-	-	-	-	2.205 (1.263)	-0.005 (-0.12)
CONSTANT	6.762 (58.3)*	6.652 (152.6)*	6.774 (46.51)*	6.636 (123.8)*	6.951 (50.53)*	6.815 (126)*
Adj.R^2	0.096	0.111	0.097	0.113	0.109	0.113

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
F(K-1,N-K)	8.076	71.640	7.945	70.276	7.834	58.698
log of like.fun	-2424	-21684	-2422	-21671	-1809	-16561
N	2007	16900	2007	16900	1730	14100

in the MANUFAC and FINANCE industries was associated with greater weekly hours for immigrant female workers as the coefficients of these variables were positive and statistically different from zero, while for Canadian-born females working in TRADE, MANUFAC and FINANCE was associated with greater weekly hours than with the SERVICE industry. Government sector work GOVSERV was also associated with positive coefficients for females but was generally insignificant.

Among Canadian-born male workers all industry variables had positive and significant coefficients in the annual hours equations and in the weekly hours equation only GOVSERV showed a negative sign while UTILITY was positive but insignificant. In the case of immigrant male workers FINANCE and TRADE were positively associated with greater hours both on the weekly and on the annual hours basis.

Generally, in the annual hours equations for female workers, all the industry variables were associated with positive coefficients except UTILITY and GOVSERV in the female immigrant workers' equation, implying that there is the tendency among females to attain greater hours elsewhere than in the SERVICE sector.

Among occupational variables, with SERVER (working in a service occupation e.g bartender, chambermaid), FARMING, BLUE and OFFICE occupations were generally associated with lower hours of work for immigrant males than working in a service occupation. MANPROF (managerial or professional) occupations were associated with greater annual hours for both male and female workers. Office occupations were generally associated

with greater hours for female workers.

While visible characteristics MINOR (minority by race or colour) and LANGDIF (first language spoken was neither English nor French) showed positive and statistically significant coefficients for immigrant female workers, these were insignificant for Canadian-born female workers. They were also insignificant among male workers.

Perhaps the most outstanding difference between the regression results for immigrants and their Canadian-born counterparts relate to the inverse Mill's ratio. The statistical significance of this variable in a regression equation indicates that the estimated coefficients would be selectively biased if the OLS estimates are uncorrected.

The inverse Mill's ratio for the probability of participation, denoted PART, and that for the probability of underemployment, UNDER, were entered into the estimation equation separately. The probit for participation was based on the entire sample of working and non-working individuals, while the underemployment probit was based on the sample of workers only. There were two underemployment probit equations, one for underemployment at the first job, measured in hours per month, and the other for underemployment during the entire year, measured in weeks.

The results for the separate corrections as shown in tables 5.7-5.10 alongside the uncorrected estimates labelled "OLS uncorr.". The estimates indicate that, for both immigrant males and females, the labour supply estimates appear not to be affected by participation or underemployment biases as the coefficients of PART and UNDER are insignificant in all the

equations. For Canadian-born workers, however, the results from the separate correction of participation and underemployment bias indicate the contrary.

The participation correction variable is highly significant in all the labour supply equations for both Canadian-born female and male workers. The underemployment correction variable is statistically significant with a t-value of 2.230 in the quadratic annual hours equation for Canadian-born males and slightly significant in the linear annual hours equation for Canadian-born female workers. The implication is that the labour supply estimates for Canadian-born population could be biased if not corrected for selectivity bias due to participation and, for females, correction for underemployment may be proper when annual hours is being used as the dependent variable.

That immigrant labour supply is not significantly affected by selectivity bias while Canadian-born appears to be affected by them may be explained by the fact that immigrants face fewer constraints on their ability to participate in the labour force because:

i) a substantial size of the immigrant population, admitted as independent class, are selected by immigration policy into "primary" occupations; and they possess characteristics relevant to the labour market, notably, education, age, and married; and

ii) unbound by social factors such as family ties which often inhibit geographical mobility, immigrants are able to select themselves into regions with favourable employment conditions.

5.5 DECOMPOSITION OF WEEKLY AND ANNUAL HOURS' DIFFERENCES

We observed from the analyses in chapter 2 that significant differences existed in the annual hours worked by immigrants and by Canadian-born workers. However, the regression results presented in Tables 5.1-5.5 indicate that on the basis of annual hours there appear to be little or no significant differences in the wage responses between the two population groups and that their estimated intercept coefficients are not significantly different.

Thus, we need to examine more closely the sources of the observed differences in hours worked between the two groups, by utilising the regression results shown in Tables 5.7-5.10.

Following Blinder (1974) and Oaxaca (1974) we can decompose the differences in the weekly hours and the annual hours differences according to the sources of the difference, utilising the estimated coefficients of the hours equations.

From the properties of ordinary least squares estimation, we can write the differential in the mean of hours worked by immigrant and Canadian-born workers as follows:

$$H_i - H_c = X_i'\beta i' - X_c'\beta_c' \qquad (5.2)$$

where X is the vector of (the means of) independent variables included in the estimation equation, and β' is the estimated coefficients of the independent variables. We can rewrite and regroup (5.2) as follows:

$$H_i - H_c = X_i'\beta_i' - X_c'\beta_i' + X_c'\beta_i' - X_c'\beta_c'$$

$$= [(X_i' - X_c')\beta_i'] + [(\beta_i' - \beta_c')\, X_c'] \qquad (5.3)$$

where the first term [.] on the right-hand side reflects the differences in the mean of hours worked due to the differences in the means of the independent variables, termed the "explained" source, and the second term reflects the differences in the coefficients and is termed the "unexplained shift in coefficient".

Since the first element in the X-vector is the constant term (which has a mean of unity in all the equations), the unexplained shift coefficients can be decomposed further to obtain:

$$H_i - H_c = [(\beta'_{oi} - \beta'_{oc}) + X_c\,(\beta'_{ij} - \beta'_{cj})] + [\beta'_{ij}\,(X_i - X_c)] \qquad (5.4)$$

where:

H is the mean of weekly (or log of annual) hours of immigrants i and Canadian-born c;

β'_o is the estimated intercept of the hours equation;

X is the mean of independent variables (wage rate and demographic characteristics) entered into the estimation equation;

β'_j (j=1,...,K) is the estimated coefficients of the independent variables;

the first term on the right-hand side expresses differences in the mean of hours due to "unexplained" factors; and

the second term on the right-hand side expresses differences in the mean of hours due to the "explained" factors.

In the light of our hypotheses that differences due to wage effects would be negative, that is, wage coefficients are lower for immigrants, and differences due to non-wage factors would be positive, we have separated the wage variable from the other independent variables and termed the latter "demographic" variables in the tables. The demographic factors are also sub-grouped into types, such as age and marital status, region and occupation.

To incorporate the selectivity correction factor λ into the analysis we modified (5.4) above as follows:

$$\begin{aligned} H_i - H_c = {} & [(\beta'_{oi} - \beta'_{oc}) + X_c (\beta'_{ij} - \beta'_{cj})] \\ & + [\beta'_{ij} (X_i - X_c)] \\ & + (\gamma'_c \lambda_c - \gamma'_i \lambda_i) \end{aligned} \qquad (5.5)$$

where γ' are the estimated coefficients of the selectivity bias term λ, and the last term in (5.5) measures the part of the difference in the mean hours worked due to the difference in the average selectivity bias between the two groups. In a sense the selectivity bias-correction term may be seen as another independent variable.

The decomposition analyses were based on the linear weekly hours and the log annual hours estimates. We chose these two, instead of the quadratic equation, because the wage variable was significant in these equations for all the samples and because the quadratic equation does not seem to be appropriate for the immigrant population.

In each case the uncorrected as well as the participation bias-corrected estimates were also used. Moreover the results of the decomposition analyses was robust to all specifications.

The underemployment bias-corrected results were not used in the decomposition analyses since already the statistical tests have shown that there is no significant differences in both the wage and intercept coefficients in the labour supply equations between the two populations.

The results of the decomposition analyses are shown in Tables 5.11, 5.12, 5.13, and 5.14.

In general the results show that differences in the means of independent variables explain the bulk of the differences in the means of hours worked between immigrant and Canadian-born workers. Contrary to the "pure" immigrant selectivity hypothesis (à la Chiswick) "unexplained" sources generally affect immigrant labour supply adversely. The implication is that if Canadian-born had the same measure of demographic characteristics, notably, region of residence and marital status, there might not be any difference in labour supply performance between immigrants and Canadian-born, all other things being equal.

Demographic variables making an overall positive contribution to the

difference in the mean of weekly hours worked included age, minority status, and union membership. For male immigrants, marital status also contributed positively to the difference, while the industry in which the individual's first job was held helped female immigrants.

On the basis of annual hours worked, the most important contributors to the hours differences between immigrants and Canadian-born male workers were region of residence, occupation, minority status, and marital status. Among females the explanatory factors for the annual hours differences were region of residence, minority status, and union membership.

Region of residence was the second most important contributor to the differences in annual hours for both male and females workers, which confirms that the differences in the hours worked may be partly explained by the fact that immigrants reside mainly in booming labour market areas, notably Ontario and British Columbia.

It was observed that while marital status made an overall positive contribution to the higher hours worked by immigrant males, it made a negative impact on female immigrants. As explained by Worswick and Beach (1990), this may be due to the fact that married immigrant females "choose" homework rather than participate actively and permanently in the paid labour market.

To the extent that the differences in the means of independent demographic variables are due to deliberate Canadian immigration policy,

TABLE 5.11

DECOMPOSITION OF DIFFERENCES IN THE MEAN OF WEEKLY HOURS BASED ON THE UNCORRECTED REGRESSION ESTIMATES

	MALE			FEMALE		
SOURCE OF DIFFERENCE	Exp.	Unexp.	Sum	Exp.	Unexp.	Sum
DEMOGRAPHIC FACTORS						
Age	0.908	-0.837	0.071	0.650	-0.419	0.231
Education	-0.425	0.268	-0.157	-0.085	-0.272	-0.357
Marital/Children	-0.014	0.990	0.975	0.002	-0.548	-0.547
Region	-0.513	-1.079	-1.592	-0.582	-1.335	-1.917
Union	0.132	0.615	0.747	0.062	0.361	0.423
Industry	-0.025	-0.766	-0.791	-0.003	0.028	0.025
Occupation	0.254	-0.961	-0.707	0.057	-0.295	-0.238
Minority Status	0.680	-0.000	0.680	1.652	0.100	1.752
A.Sub-Total due to Demographic factors	0.997	-1.770	-0.774	1.753	-2.380	-0.627
B.Due to Intercept	0.000	7.456	7.456	0.000	3.846	3.846
C.Due to Wage rate	1.710	-6.520	-4.810	0.539	-2.302	-1.763
TOTAL (A+B+C)	2.705	-0.834	1.871	2.292	-0.837	1.455
Actual Difference			1.871			1.454

Exp.= explained (i.e due to differences in means); Unexp.= unexplained (i.e due to regression); sum= sum of explained and unexplained.
Some sub-totals do not add up due to rounding.

TABLE 5.12

DECOMPOSITION OF THE DIFFERENCES IN THE LOG OF ANNUAL HOURS BASED ON THE UNCORRECTED REGRESSION ESTIMATES

	MALE			FEMALE		
SOURCE OF DIFFERENCE	Exp.	Unexp.	Sum	Exp.	Unexp.	Sum
DEMOGRAPHIC FACTORS:						
Age	0.039	-0.047	-0.008	0.012	-0.017	-0.004
Education	-0.003	-0.009	-0.011	-0.004	-0.029	-0.033
Marital/Children	0.017	0.058	0.074	0.000	-0.001	-0.001
Region	0.023	0.024	0.048	-0.016	0.051	0.035
Union	0.001	-0.010	-0.009	-0.001	0.002	0.001
Industry	0.000	-0.031	-0.030	0.009	-0.009	-0.000
Occupation	0.008	0.024	0.031	-0.001	-0.027	-0.028
Minority Status	0.007	0.000	0.007	0.057	0.001	0.059
A. Sub-Total Due to Demographic Factors	0.092	0.009	0.102	0.056	-0.028	0.029
B. Due to Intercept	0.000	0.040	0.040	0.000	0.109	0.109
C. Due to Wage rate	0.019	-0.087	-0.068	0.011	-0.030	-0.019
TOTAL (A+B+C)	0.111	-0.038	0.074	0.067	0.051	0.119
Actual Difference			0.074			0.119

Exp.= explained (i.e due to differences in means); Unexp.= unexplained (i.e due to regression); sum= sum of explained and unexplained.

TABLE 5.13

DECOMPOSITION OF WEEKLY HOURS DIFFERENCES BASED ON THE PARTICIPATION-BIAS-CORRECTED REGRESSION ESTIMATES

	MALES			FEMALES		
SOURCE OF DIFFERENCE	EXP.	UNEXP.	SUM	EXP.	UNEXP.	SUM
Demographic Factors:						
Age	0.907	-0.827	0.080	0.652	-0.442	0.210
Education	-0.425	0.260	-0.165	-0.086	-0.309	-0.396
Marital/Children	-0.014	1.028	1.014	0.000	-0.530	-0.530
Region	-0.514	-1.029	-1.542	-0.561	-1.252	-1.813
Union	0.132	0.576	0.708	0.062	0.358	0.420
Industry	-0.763	-0.025	-0.788	-0.004	0.016	0.012
Occupation	0.254	-0.966	-0.712	0.058	-0.275	-0.217
Minority Status	0.681	-0.002	0.679	1.647	0.097	1.744
A. Sub-Totals due to Demographic Factors	0.995	-1.633	-0.639	1.768	-2.337	-0.569
B. Due to Intercept	0.000	6.895	6.895	0.000	2.891	2.891
C. Due to Wage Rate	1.710	-6.454	-4.743	0.538	-2.191	-1.653
D. Sub-Total (A+B+C)	2.705	-1.633	1.513	2.306	-1.637	1.669
E. Due to Select-ivity bias			0.358			0.786
TOTAL (D+E)			1.871			1.455
Actual Difference			1.871			1.454

TABLE 5.14

DECOMPOSITION OF ANNUAL HOURS DIFFERENCES BASED ON THE PARTICIPATION BIAS-CORRECTED REGRESSION ESTIMATES

	MALES			FEMALES		
SOURCE OF DIFFERENCE	EXP.	UNEXP.	SUM	EXP.	UNEXP.	SUM
Demographic Factors:						
Age	0.038	-0.045	-0.067	0.013	-0.018	-0.005
Education	-0.002	-0.008	-0.011	-0.005	-0.028	-0.032
Marital/Children	0.017	0.054	0.071	-0.000	-0.002	-0.002
Region	0.023	0.023	0.046	-0.014	0.047	0.033
Union	0.001	-0.009	-0.008	-0.001	0.002	0.002
Industry	0.000	-0.033	-0.032	0.009	-0.008	0.001
Occupation	0.008	0.022	0.029	-0.001	-0.029	-0.030
Minority Status	0.008	0.000	0.008	0.057	0.001	0.058
A. Sub-Total due to Demographic Factors	0.093	0.005	0.098	0.059	-0.034	0.025
B. Due to Intercept	0.000	0.066	0.066	0.000	0.139	0.139
C. Due to Wage Rate	0.019	-0.092	-0.073	0.010	-0.039	-0.029
D. Sub-Total (A+B+C)	0.112	-0.012	0.091	0.070	0.065	0.135
E. Due to Select-ivity bias			-0.017			-0.016
TOTAL (D+E)			0.074			0.119
Actual Difference			0.074			0.118

we could conclude that immigration policy and self-selection into booming labour markets rather than the "pure immigrant selectivity" accounts for the apparent superior performance of immigrants, in terms of labour supply.

In view of the positive contribution of region of residence to the overall difference in the mean of annual hours worked, we decided to select one of the regions and examine again the role of the other demographic variables. For this exercise we chose Ontario because it has the largest concentration of immigrants and the lowest rate of unemployment.

We estimated only the linear annual hours model with no correction for selectivity bias, since the correction procedure was not feasible with the small immigrant samples. The regression results are shown in appendix Tables H and I. From the results on the annual hours estimates, we derived the components of the differences shown in Table 5.15 and a summary of the estimated intercept and wage coefficients, with tests of equality shown in Table 5.16.

From Table 5.15 we observe that for males in Ontario, all the difference in the means of (log) annual hours is "explained" by the differences in the means of the independent variables. Age, marital status and minority status were the only demographic factors which made a positive overall contribution to the hours difference. Unlike in the overall population, the occupation of immigrants in Ontario had an overall negative impact on the annual hours differences between the males. For females in Ontario, "explained" factors accounted for 98.8% of the difference of 107 (annual) hours between immigrants and Canadian-

TABLE 5.15

DECOMPOSITION OF THE ANNUAL HOURS DIFFERENCES BASED ON THE SAMPLE OF WORKERS IN ONTARIO

	MALES			FEMALES		
SOURCE OF DIFFERENCE	EXP.	UNEXP.	SUM	EXP.	UNEXP.	SUM
Demographic factors:						
Age	0.041	-0.014	0.026	0.016	-0.030	-0.014
Education	-0.002	-0.035	-0.037	-0.000	-0.043	-0.044
Marital/Children	0.050	0.001	0.051	0.003	-0.012	-0.008
Union	0.004	-0.008	-0.004	0.003	0.020	0.022
Industry	0.013	-0.016	-0.002	0.028	0.004	0.032
Occupation	-0.011	-0.040	-0.052	-0.007	0.038	0.031
Minority Status	0.023	0.003	0.026	0.031	0.005	0.037
A. Sub-total due to Demographic Factors	0.118	-0.110	0.009	0.075	-0.018	0.056
B. Due to Intercept	0.000	0.214	0.214	0.000	-0.073	-0.073
C. Due to Wage rate	0.013	-0.180	-0.168	0.010	0.092	0.102
TOTAL (A+B+C)	0.131	-0.076	0.055	0.084	0.001	0.085
Observed Difference			0.055			0.085

TABLE 5.16

SUMMARY OF DIFFERENCES (WITH T-VALUES IN PARENTHESES) IN INTERCEPT AND WAGE COEFFICIENTS FOR SAMPLE OF ONTARIO WORKERS BASED ON THE LOG ANNUAL HOURS EQUATION (WITH NO CORRECTION FOR SELECTIVITY BIAS)

	M A L E S		F E M A L E S	
	FB	CB	FB	CB
Intercept	7.336	7.113	6.369	6.442
Difference	0.213		-0.073	
(t-value)	(1.250)		(-0.346)	
Wage Coefficient	0.080	0.155	0.318	0.274
Difference	-0.075		0.044	
(t-value)	(-1.255)		(0.507)	

Positive difference implies coefficient for foreign-born (FB) is greater; negative implies it is smaller.

born workers. The "positive" demographic factors for female immigrants included union membership, industry, occupation and minority status, as was the case with the overall population.

From table 5.16 we find that there is no significant difference in either the wage or intercept coefficients in the annual supply of hours worked functions between immigrants and Canadian-born Ontario workers, as none of the t-values is sufficiently high. In the case of the females, we find that, contrary to the predictions of the immigrant selectivity hypothesis, the intercept coefficient in the annual hours equation for immigrant females is smaller than that of Canadian-born females, and the wage coefficient are higher for immigrants than for Canadian-born females.

The conclusion we may draw from the Ontario results, which amplifies the results obtained for the overall population, is that virtually all the difference in the mean annual hours worked between immigrant workers and Canadian-born workers could be explained in terms of differences in the means of independent variables, notably, demographic variables included in the estimation equation.

5.6 SUMMARY OF CONCLUSIONS

Immigrant selectivity hypothesis explains the differences in the economic performance between immigrants and Canadian-born populations in terms of the following factors:

1) The pure immigration process, which pre-selects individuals with superior abilities, motivation or optimism;

2) The remigration process, which ensures that only "successful" immigrants remain; and

3) Immigration policy, which enhances the ability of the immigration process to pre-select individuals who have greater chance for succeeding in Canada by reason of their education, occupation, racial background etc.

The first two factors tend to ascribe the labour market performance of immigrants to positive "unobserved" or "unexplained" attributes of immigrants which native-born do not possess. We have named this approach the "pure" immigrant selectivity hypothesis.

The third factor, immigration policy, explains the source of the difference in labour market performance of immigrants in terms of "observed" or "explained" demographic characteristics. We describe this explanation as the "enhanced" immigrant selectivity hypothesis.

We assumed that these factors, to the extent that they are real, would affect the labour supply estimates in terms of higher intercepts and lower elasticity coefficients for immigrant workers compared with Canadian-born workers.

The results of the labour supply estimates may be summarised as follows.

1) The estimated coefficients of the intercept term were greater in the labour supply functions of immigrants than those of Canadian-born workers, as expected for both males and females. However, the differences were not significantly different from zero for the female workers in both the annual hours and weekly hours equations after correction for selectivity bias. In the case of male workers, the differences were significant mainly in the case of the weekly hours equations and insignificant in the annual hours equations.

As Worswick and Beach (1990) have pointed out, the lower performance of

immigrant females compared with their male counterparts may be due to the fact that married immigrants accept to remain home and work only to supplement their husbands' income.

2) The estimated wage coefficients were generally found to be statistically similar. Tests for the significance of the differences revealed that for females, again, the differences were more apparent than real. For males, once again, the differences in the wage coefficients were mainly significant in the case on the weekly hours equations.

3) From the decomposition analyses based on the weekly hours and annual hours equations, we observed that the differences in the means of weekly hours worked between Canadian-born and immigrant workers is entirely explained by differences in the means of the independent variables included in the estimates, and that the role played by "unexplained factors" was largely adverse.

However, using the participation bias-corrected regression estimates, we observed that selectivity-bias accounts for a significant part of the difference in both weekly hours and annual hours supplied by immigrants and Canadian-born workers.

It was observed that for both male and female workers, the differences in the values of the estimated intercepts and the wage elasticities narrowed down as we corrected for underemployment bias. The conclusion that we may draw from this is that, to the extent that underemployment is explained by observable demographic characteristics of individuals, the differences in hours worked may be due not so much to "unobserved" superior characteristics of immigrants but to "observable" differences in demographic characteristics between immigrants and Canadian-born.

This conclusion is borne out by the results of the decomposition analyses which show that for males the bulk of the difference in the weekly hours and annual hours worked between immigrants and Canadian-born are explained by the differences in the means of demographic variables included in the estimation equations.

Thus, deliberate immigration policy, to the extent that it influences the demographic characteristics of immigrants, may be the larger explanatory factor for the "superior" labour supply performance of immigrants vis-a-vis Canadian-born workers.

Also the fact that correction for underemployment made some impact on the differentials in the wage and intercept coefficients in the various labour supply models estimated is indicative of the relevance of underemployment constraints in the estimation of labour supply functions and, particularly, in the comparison of two population sub-groups. Neoclassical theory of labour supply suggests that in the presence of underemployment constraints individuals are likely to be involved in multiple job-holding. In the next essay we would attempt to examine the role of underemployment in the determination of the likelihood of an individual engaging in moonlighting activity, against the alternative hypothesis that those with higher "aspirations" are the ones who moonlight.

CHAPTER 6

INTRODUCTION TO MOONLIGHTING BEHAVIOUR

In this essay on moonlighting behaviour, our aim is to examine the possible sources of differences in moonlighting behaviour between Canadian-born and immigrant workers in the light of the neo-classical proposition that moonlighting is the product of fixed hours schedules and the tendency towards underemployment.

We calculated from LMAS data moonlighting rates among both Canadian-born workers and immigrant workers, and estimated from the cross-section data both the probability of an individual engaging in moonlighting activity and the responsiveness of the supply of moonlighting hours to changes in various independent variables, notably, hours on the primary job and the moonlighting wage.

In our analyses of the sources of the differences in the supply of hours of work between immigrants and Canadian-born workers we ignored the contribution multiple job-holding could make to the individual's total supply of hours of work. One may ask, "is the greater supply of hours of work by immigrants the result of their participation in moonlighting activity, or do they simply work more hours at the same job?". Also in our estimations and analyses of the labour supply functions, we observed that the immigrant labour supply estimates were not significantly affected by selectivity bias, indicating that immigrants might be facing smaller constraints on their labour market activity than do Canadian-born. From neo-classical perspectives, therefore, we would expect more Canadian-born workers to engage in moonlighting than would immigrant workers.

On the other hand, if we assume that moonlighting is the result of higher "aspirations", that is, greater desire to work or earn more income, then we should expect more immigrants to moonlight, holding true the hypothesis that immigrants are "positively selected".

In this second part of the study, therefore, we focus on the likely

on moonlighting behaviour in the entire market and also make the appropriate comparisons between immigrants and Canadian-born workers, with the aim of finding out the sources of the differences in the moonlighting behaviour between the two groups.

We estimate a probability of moonlighting function (participation decision) and a moonlighting hours supply function (hours decision) - for moonlighters- and examine the effect of particular variables, notably, wage rates and hours at the "primary job" on both the probability of moonlighting and the supply of moonlighting hours.

6.1 Facts

Calculations based on the LMAS 1987 data indicate that while among Canadian-born male workers the individual's first job on average accounted for 75.8% of the total annual hours in 1987, 81.0% of the total annual hours supplied by immigrants was accounted for by the first job they held in 1987. It is also observed that the additional annual hours gained from secondary jobs was greater at an average of 132 hours per annum for Canadian-born male workers, than for immigrant male workers who had an average of 118 hours in 1987.

Among Canadian-born female workers the first job held in 1987 contributed 75.2% of the total annual hours (1393 hours) worked in 1987, while the first job held in 1987 contributed 77.4% of the total annual hours (1512 hours) worked by immigrants in that year. Thus, Canadian-born females gained relatively more from taking up secondary jobs than did immigrant workers.

The implication of the above observations is that immigrants tend to obtain more hours at their first jobs and rely relatively less on moonlighting to achieve their desired hours of work than do Canadian-born workers.

Further evidence from the Labour Market Activity Survey 1986-87, as shown in Table 6.2 below, indicates that immigrants participated to a

lesser extent in moonlighting activity in 1987 than did Canadian-born workers. The moonlighting rate, defined as the number of workers who simultaneously held two or more jobs, expressed as a percentage of all workers, was smaller for both immigrant males and females than for their Canadian-born counterparts.

Based on the first two jobs held in 1987, the moonlighting rate among immigrant male workers was 5.22% compared with 7.35% for Canadian-born male workers, and 5.72% for immigrant female workers compared with 8.09% for Canadian-born female workers. The percentage of workers who held their first two jobs in 1987 simultaneously for 52 weeks or more was 4.5% and 4.84% for immigrant males and females, respectively, compared with 6.6% and 6.20% for Canadian-born males and females, respectively.

The literature provides us with two main approaches to moonlighting behaviour, namely, 1) extending the basic neoclassical labour supply theory by replacing the assumption that the individual faces a flexible hours of work with the assumption that the individual faces a fixed work schedule, and 2) by examining the demographic characteristics of those who engage in moonlighting activity and generalising from the results. (Shishko and Rostker 1976).

Before examining these two approaches to moonlighting behaviour in detail, we would like to clarify the alternative empirical definitions of moonlighting or "a moonlighter" and associated concepts as used in the literature and the particular definition we would use in this text.

6.2 Definitions

"Moonlighting" is the practice of holding one or more jobs in addition to a "primary job". The primary job may be defined as the more "steady, fulltime employment" (Shishko & Rostker, 1976:298) or "as the one at which the individual worked the greatest number of hours" (Stinson Jr., 1990:3) or simply as "the first job" held (Perlman, 1966; Krishnan, 1990). There

is, however, an inherent empirical problem with the definition of a "more steady job". Furthermore, the Labour Market Activity Survey 1986-87 which is the basis for this study classifies a job as "fulltime" if individual worked at least 120 hours per month on it. Therefore, if the primary job is defined as the "fulltime" job, we are more likely to exclude the "typical moonlighter" from our sample, where the typical moonlighter holds two "fulltime" jobs (each offering at least 120 per month - an average of 8.56 hours per day for the two jobs being easily achievable) or where the typical moonlighter holds three jobs none of which offers 120 hours per month but all-together providing at least 120 hours a week.

In this study we define the first job in 1987 as the "primary job". We observed that 83.5% of male workers and 81.8% of female workers whose first job overlapped with additional jobs had the annual hours at the first job to be greater than the annual hours worked at other jobs. Therefore, our choice of the first job as the primary job does fit closely to the "hours criterion" for a primary job.

In the empirical literature the period over which the two jobs are simultaneously held vary from study to study, as determined by the type and availability of data. In terms of time, there are two main definitions of a moonlighter: the "point" definition and the "duration" definition.

The point definition looks at the worker at a particular point in time, and classifies the worker as a moonlighter if s/he held more than one job during the reference period.

In Stinson (1990), for example, a moonlighter is defined as "an employed person who, during the survey reference week, 1) had a job as a wage and salary worker with two employers or, or 2) was self-employed and also had a wage or salary job, or 3) worked as an unpaid family worker on the primary job, but also had a secondary wage or salary job". In the case of the point definition the period over which the two jobs have been held simultaneously is not relevant, and this tends to be the approach used in studies relying on census-type data where the information about

jobs pertain mostly to the survey reference week (for example, Shishko and Rostker 1976, Stinson 1990). The problem with this approach is that it considers as moonlighters individuals who might be holding "transitional jobs" and who have no intention of keeping both or all the jobs simultaneously. Thus, if we use point definition we would overestimate the number of moonlighters and the phenomenon of moonlighting in the population.

In the duration definition the worker is observed over a period of time, and if s/he held more than one job during the entire period then s/he is considered as a moonlighter.

In Krishnan (1990), for example, moonlighters were tracked over a period of nineteen weeks to ensure that both jobs were held during the entire sample period, while the self-employed and those who held unpaid family jobs were excluded.

An advantage the IMAS 1986-87 possesses over census data as presently structured is that it provides information on the periods within the year during which each of the ten recorded jobs were held. Thus, it is possible to identify which jobs were held simultaneously and at which time.

The choice that remains to be made is the length of time over which jobs must overlap for the individual to be considered as a moonlighter.

Table 6.1 (A & B) presents a matrix of moonlighting rates based on the first ten jobs recorded for the individual and a time frame of sixteen weeks. Each cell shows the moonlighting rate based on the entire population of workers.

For example, the figure 1.2 under the column Job2 and in the row Job3 indicates that 1.2% of all workers had their third recorded job overlapping with their second recorded job for sixteen weeks or more. It is seen that only the first five recorded jobs are relevant for this study on moonlighting behaviour as the other cells beyond Job5 are all empty. From the matrix in 6.1 (A & B) we defined four classes of moonlighters, namely:

1) MOON21

This label is used to describe those who held their second jobs simultaneously with the first job in 1987 for a period exceeding sixteen weeks.

2) MOONLITA

This label is used to describe those who held any of their first five jobs simultaneously for periods exceeding sixteen weeks in 1987.

3) MOONLITB

This label is used to describe those who held any of the subsequent four jobs simultaneously with the first job held in 1987.

4) MOONALYR

This label is used to describe those who held their first two jobs simultaneously for a period over fifty weeks. These may be called the permanent multiple job-holders.

Since the majority of workers held not more than two jobs (the average number of jobs held in 1987 by the entire sample of workers in the LMAS was 1.4) the difference in moonlighting rates based on MOON21, MOONLITA and MOONLITB is not very remarkable.

However, as would be expected the broader the number of jobs considered the greater the resultant moonlighting rates, which we shall show presently in Table 6.2.

Table 6.1A

MATRIX OF MALE MOONLIGHTING RATES BASED ON TEN RECORDED JOBS 1987 WHICH OVERLAPPED FOR MORE THAN SIXTEEN WEEKS (% OF WORKERS)

	JOB1	JOB2	JOB3	JOB4	JOB5	JOB6	JOB7	JOB8	JOB9
JOB2	7.1	-							
JOB3	2.3	1.2	-						
JOB4	0.8	0.5	0.2	-					
JOB5	0.2	0.2	0.1	0.0	-				
JOB6	0.0	0.0	0.0	0.0	0.0	-			
JOB7	0.0	0.0	0.0	0.0	0.0	0.0	-		
JOB8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	
JOB9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
JOB 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: Total number of male workers was 22323.

Source: Computed from IMAS 1986/87 database.

Table 6.1B

MATRIX OF FEMALE MOONLIGHTING RATES BASED ON TEN RECORDED JOBS IN 1987 WHICH OVERLAPPED FOR MORE THAN SIXTEEN WEEKS (% OF WORKERS)

	JOB1	JOB2	JOB3	JOB4	JOB5	JOB6	JOB7	JOB8	JOB9
JOB2	7.0	-							
JOB3	2.2	1.0	-						
JOB4	0.6	0.4	0.1	-					
JOB5	0.2	0.2	0.1	0.0	-				
JOB6	0.0	0.0	0.0	0.0	0.0	-			
JOB7	0.0	0.0	0.0	0.0	0.0	0.0	-		
JOB8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	
JOB9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
JOB 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: Total number of female workers was 19409.

Source: Computed from IMAS 1986/87 database.

In addition to the above we also show in Table 6.2 moonlighting rates based on three different points in time, that is, first week in 1987, twentieth week in 1987 and the fiftieth week in 1987.

Table 6.2 shows two alternative moonlighting rates under MOON21, MOONLITA and MOONLITB, namely, the rate based on a time frame of sixteen weeks or more and the rate based on a time frame of eight weeks or more. The latter rates are shown in parentheses. The result of reducing the time frame from sixteen weeks to eight weeks is obvious: moonlighting rates go up. But it is remarkable that the increase is only in terms of few percentage points. For example, MOONLITB for Canadian-born male workers goes up by 1.3% points, from 10.7% to 12.0%, when time frame goes down from sixteen weeks to eight weeks.

It is observed from Table 6.2 that moonlighting rate is higher when the period over which moonlighting activity is measured is shorter. For example, the moonlighting rate for all female workers is 6.0% when a moonlighter is defined as one who held two jobs simultaneously for over 50 weeks, compared with a rate of 19.3% when a moonlighter is said to be one who held two or more jobs in the 50th week in 1987, that is, at a point in time in 1987.

Secondly, it is observed that irrespective of the empirical definition of moonlighter used the following are true:

1) moonlighting rates are lower among foreign-born male and female workers than among Canadian-born male and female workers, respectively.

2) moonlighting rates among Canadian-born female workers are lower than among their male counterparts while moonlighting rates are higher among foreign-born female workers than among their male counterparts.

3) the differential in moonlighting rates between foreign-born male workers and their Canadian-born counterparts is greater than between the female sub-groups.

MOONLITA is the broadest empirical definition of moonlighting activity presented in Table 6.2. However, in the estimation of the probability of

moonlighting and the supply of moonlighting hours functions we used MOONLITB as the dependent and selection variable due to the extreme difficulty of writing out the matrix of cross-products with shifting reference points for the regression analyses.

TABLE 6.2 MOONLIGHTING RATES IN 1987 UNDER VARIOUS DEFINITIONS (%)

	MALES			FEMALES		
	FB	CB	POOLED	FB	CB	POOLED
MOON21 =1 if second job was held with first job, and zero otherwise	5.22 (5.96)	7.35 (8.04)	7.1 (7.8)	5.72 (6.55)	7.16 (8.09)	7.0 (7.9)
MOONLITA =1 if any two jobs overlapped and zero otherwise	8.36 (9.6)	11.3 (12.6)	11.0 (12.2)	8.85 (10.1)	10.7 (12.1)	10.5 (11.9)
MOONLITB =1 if any job overlapped with the first	8.04 (9.0)	10.7 (12.0)	10.4 (11.6)	8.26 (9.53)	10.2 (11.6)	10.0 (11.4)
MOONALYR =1 if first and second jobs were held all year	4.53	6.61	6.40	4.84	6.20	6.00
Held 2 or more jobs as at... in 1987						
1st Week	16.7	18.7	18.5	17.0	18.6	18.4
26th Week	18.0	21.3	20.9	17.4	19.8	19.6
50th Week	17.0	18.7	19.5	17.5	19.5	19.3

Note: Length of overlap is sixteen weeks (figures in parentheses assumes an overlapping period of eight weeks).
Source: Computed from LMAS 1986/87 database.

CHAPTER 7

APPROACHES TO MOONLIGHTING BEHAVIOUR

For the purposes of this thesis we would classify the approaches for explaining moonlighting behaviour into two, namely, the neoclassical approach and the demographic approach.

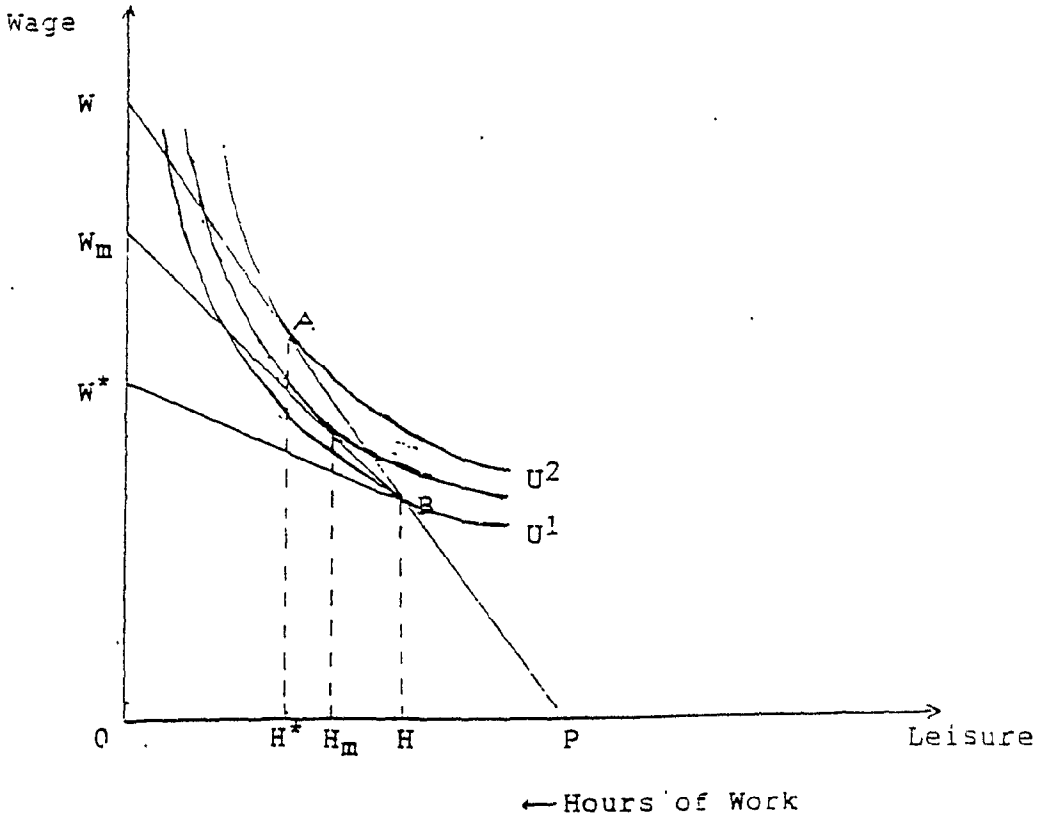
7.1 The Neoclassical Approach

The traditional neoclassical explanation of moonlighting behaviour focuses on the difference between desired hours and actual (scheduled) hours, on one hand, and primary wages and moonlighting wages, on the other. (Perlman 1966; Broffenbrenner and Mossin 1967; Shishko and Rostker 1976; Gunderson and Riddell 1988:112). Within this framework, moonlighting is largely the result of underemployment in one's "primary occupation" at the going wage rate.

Given that the moonlighting wage exceeds the moonlighting reservation wage, defined as the wage which leaves the individual on the same utility level attainable on the basis of the primary wage and the amount of hours available on the primary job, an individual with greater desired hours is more likely to participate in moonlighting activity than individuals with smaller desired hours, all other things, notably the amount of scheduled hours at the primary job, being equal.

In Figure 1, we assume a utility maximizing individual with well-behaved indifference curves U_1 and U_2 , and facing a budget constraint WP with slope equal to the wage rate W on the individual's first (or

Fig. 1 THE PROBABILITY OF MOONLIGHTING



primary) job. The individual is in equilibrium at the point A with desired hours equal to H^* . Supposing the employer for reasons of demand or technological constraints could offer only H hours, where $H<H^*$, at the going wage W. Then the equilibrium desired hours given by the point A can no longer be attained and the individual would suffer a decline in utility. At point B the individual is not in equilibrium and would be better off working additional hours at a second job offering any wage greater than W* , that is, greater than the slope W*B, which is determined by the wage at the primary job and the individual indifference curve.

For example, at the wage W_m, the individual may work PH hours at his or her primary job and offer HH_m additional hours at the second job offering that wage. Thus, from the neoclassical perspective, moonlighting activity is the result of the rigidity in the hours schedule and depends primarily on the extent of "underemployment", that is, the desired-actual hours differential, at the individual's first job and secondarily on the 'primary' wage rate, and the moonlighting wage rate. Hence, people who face underemployment constraints would be expected to moonlight most.

Following Perlman (1966), Broffenbrenner and Mossin (1967), and Shishko and Rostker (1976) the graphical exposition of the neoclassical moonlighting theory above could be expressed in mathematical terms as follows:

Let us assume a utility-maximising worker with a utility function

$$U = U(X,L) \tag{7.1}$$

and a time constraint

$$T = L + H_1 + H_m \tag{7.2}$$

where X is the composite good with price index P=1; L is leisure; H_1 is the hours worked at the individual's "primary job" (defined in this study as the individual's first job in 1987) which is assumed fixed with a wage rate W_1; and H_m is moonlighting hours worked at the "secondary job" which is assumed variable with a wage rate W_m.

For any given worker the following conditions prevail:

$L > 0$, i.e., positive leisure is desirable;

$H_1 > 0$ - every worker must have had a first job;

$H_m \geq 0$, i.e., not all workers are moonlighters;

$H_m = 0$ if $H_1 = H^*$, where H^* is desired hours

$H_m > 0$ if $H_1 < H^*$, and $W_m \geq W^{*m}$, where W^{*m} is the moonlighting reservation wage.

Maximization of the utility function subject to the budget constraint

$$W_1H_1 + W_mH_m - P.X \geq 0 \qquad (7.3)$$

$$T - (H_1 + H_m) - L \geq 0 \qquad (7.4)$$

yields the following first order conditions:

$$U_l - U_x.W_m = 0 \qquad (7.5)$$

$$W_1H_1 + W_mH_m - P.X = 0 \qquad (7.6)$$

$$T - (H_1 + H_m) - L = 0 \qquad (7.7)$$

From the first order conditions we can solve for H_m to obtain the moonlighting function as:

$$H_m = H_m (W_m, W_1, (H^*-H1)) \qquad (7.8)$$

For moonlighting to occur, the desired hours-actual hours differential must be positive and the moonlighting wage must be sufficiently high, that

is, equal to or greater than the moonlighting reservation wage, such as W*B in figure 1.

Totally differentiating (7.8) and solving we obtain the following equations:

$$dH_m/dW_m = U_x/A - H_m(A_{11}/A) \tag{7.9}$$

$$dH_m/dH_1 = -1 + (A_{11}/A)(W_m - W_1) \tag{7.10}$$

$$dH_m/dW_1 = -H_1 \cdot (A_{11}/A) \tag{7.11}$$

where A is the bordered Hessian matrix of second derivatives and is positive definite following our assumption of utility maximization; and A_{11} is

$$A_{11} = -(W_m U_{xx} - U_{xl})$$

where U_{xx}, U_{xl} is the derivative of marginal utility of consumption goods X with respect to X and leisure, respectively.

The slope of the moonlighting hours curve with respect to the moonlighting wage (7.9) is unambiguously positive if the substitution effect $U_x/A > 0$ and the income effect $A_{11}/A < 0$. Since the substitution effect of a wage change is always positive, moonlighting hours function is positive with respect to the moonlighting wage if leisure is an inferior good, that is, $A_{11} < 0$, and is positive if leisure is a superior good.

If leisure is an inferior good and $W_m < W_1$, then the effect of a change in hours at the first job on moonlighting hours (7.10) is unambiguously negative. If leisure is superior the sign of dH_m/dH_1 is indeterminate.

The effect of a change in the wage rate at the first job W_1 on moonlighting hours (7.11) is positive if leisure is an inferior good and negative if it is a normal or superior good.

From (7.8) it is obvious that the probability of moonlighting would be positively related to the "underemployment differential" ($H^* - H_1$).

Thus, if Canadian-born workers are observed to moonlight more than immigrant workers the neoclassical theory of moonlighting would indicate that there is greater tendency for underemployment among Canadian-born workers than among immigrant workers. However, neoclassical theory by itself is unable to indicate what the source of underemployment differential is, that is, whether it stems from Canadian-born workers having greater desired hours H^* or lower hours at their first job H_1, or both, and why.

Economic analyses of immigrant work behaviour vis-a-vis that of native-born, notably the immigrant selectivity hypotheses, suggest that immigrants have a tendency to work more hours and are, therefore more likely to moonlight than comparable native-born. This was echoed in a recent Economic Council of Canada report which stated that "...if [immigrants] are more ambitious, then one would expect them to put in longer hours and/or moonlight to a greater extent..." (Economic Council of Canada, Economic and Social Impacts of Immigration, 1991:87).

It is observed (in appendix tables B and C as indicated by the variable NOTSAT1) that among part-time workers a higher percentage of Canadian-born male and female workers, 26.9% and 30.3% respectively, reported dissatisfaction with the scheduled hours at their first job and indicated they would have preferred to work additional hours, compared with a percentage of 19.7 and 25.9 for immigrant male and female workers respectively.

We may now ask, "why do immigrants achieve greater annual hours at their first jobs than do Canadian-born workers? Is it due to differences in the occupational, industrial, regional, or other demographic characteristics of their respective labour force? If it is due to

differences in labour force distribution, are labour force distributional differences due to superior job search techniques employed by immigrants or to an immigration process or policy which pre-selects immigrants into "booming" or "primary" sectors of the labour market where labour demand constraints are lower and desired hours could be easily achieved?

Neoclassical theory of moonlighting does not provide explicit explanations for the above questions. We, therefore, have to seek extra information from other approaches.

7.2 Demographic and Institutional Approach

The demographic approach to moonlighting behaviour proposed by Wilensky (1963) and further advanced by many others (for example, Hayghe and Michelotti 1971; Jamal and Crawford 1981; and Krishnan 1990) suggests that moonlighting activity results from not only "aspirations" but also "deprivation" or need, and that both aspirations and deprivation are determined by the individual's demographic characteristics, for example, number of children, education, marital status (and the work status of marital partner), and one's occupational status.

"Aspirations" determine the amount of hours an individual may desire to work per unit of time. These aspirations may relate to the desire to attain a certain level of income or standard of living, promotion and career ambitions. "Deprivation" on the other hand is an adverse economic condition suffered by an individual as a result of the imposition by external factors on his or her ability to attain desired hours at a job or occupation or to attain a certain income or career goal.

Krishnan's paper, for example, demonstrated how a husband's decision to moonlight is influenced not only by his own desire to work but also by his spouse's decision to work and by the size of his family.

Stinson (1990), in his analyses of the rise of moonlighting activity among American workers, found that moonlighting activity varied according

to age and marital status. He also linked the difference in moonlighting activity among various demographic groups to differences in need. For example, he found individuals with low pay and large families engage in moonlighting more than individuals with high-paying jobs, as 35.5% of moonlighters said they held two or more jobs just "to meet regular household expenses" and 9% said they moonlight "to pay off debts".

Deprivation may also be social in character. Individuals who are denied social fulfilment or satisfaction at their primary jobs or in their residential neighbourhood may resort to moonlighting in order to fulfil this need. (Jamal and Crawford, 1981). Individuals who experience this need are likely to be "minorities" at their work place or in the community.

Thus, the demographic approach focuses on the characteristics of individuals that are likely to lead them into "deprivation". In this light, the demographic approach coincides with the institutionalist school which suggests that labour market outcomes are pre-determined by the market on the basis of individual demographic characteristics.

The institutional approach explains moonlighting activity in terms of "deprivation" resulting from the "segregation" of individuals into different sectors of the labour market on the basis of sex, race, colour, education, age, etc. People, who are denied opportunities for achieving their desired hours in the "primary labour market" where usual hours of work are high, engage in moonlighting activity either to accumulate the experience needed to secure a primary labour market job or accumulate resources to start one's own business.

Dorringer and Piore (1971), and Taubman and Wachter (1986), and many others classify the labour market in a typical capitalist economy into the "primary sector" and the "secondary sector" and argue that personal characteristics- age, sex, education, race, etc.- play a prominent role in determining whether an individual would work in the primary labour market

or in the secondary labour market.

The primary labour market is characterised by high-paying and stable jobs, where hours schedules are fixed and sufficient to meet workers' aspirations. Primary sector jobs tend to be unionised or protected under collective agreements or generally under some internal labour arrangements. Such jobs usually require high education and specific skills and on-the-job experience. On the other hand, secondary sector jobs are low-paying, unstable, requires little or no education, specific skills or job experience. They tend to be non-unionised with no regular hours schedules and desired hours are not usually achieved at the same job.

The participation of a population sub-group in the primary labour market may be determined by whether the characteristics of that sub-group match the requirements for entry into that sector. Generally, age, education, race, sex and language are the basic requirements.

In Stinson's study he found that race, colour or language spoken as well as the industry or occupation in which the individual worked were major factors in determining whether the individual would moonlight.

Table 7.1 shows the distribution of moonlighters according to certain selected demographic characteristics, namely, age, education, marital and household status, region of residence, union membership, and minority status. Shown in parentheses are the ratios of the proportion of moonlighters who belong to a given demographic group to the proportion of workers who belong to that particular demographic group. We call this ratio the relative concentration ratio, and is measured as:

$$\text{Relative concentration ratio} = \frac{\text{percentage of moonlighters in the group}}{\text{percentage of workers in the group}}$$

The relative concentration ratio (RCR) helps us to identify demographic groups which are over- or under-represented in the population of moonlighters, and thereby leads us to the determination of the demographic

determinants of moonlighting behaviour and the possible sources of differences in moonlighting behaviour between Canadian-born and immigrant workers.

It can be shown that the relative concentration ratio is equal to the ratio of the moonlighting rate within a group to the moonlighting rate in the entire population of workers.

Let the percentage of moonlighters in the group i be denoted g^i; and the percentage of workers in the group i, w^i. Then the relative concentration ratio may be expressed as:

$$\begin{aligned} RCR &= g^i / w^i \\ &= M^i / M \div W^i / W \\ &= \frac{M^i/W^i}{M / W} \\ &= m^i/m \end{aligned}$$

where M^i and W^i are the number of moonlighters and the number of workers in group i, respectively; and M and W are the total number of moonlighters and workers in the entire population, respectively; and m_i and m are the moonlighting rates in group i and the entire population, respectively.

Therefore an RCR exceeding unity indicates that the moonlighting rate in the corresponding group exceeds the overall moonlighting rate and the group can be said to be over-represented in the population of moonlighters. On the other hand an RCR below unity shows that the corresponding group is under-represented in the population of moonlighters.

From Table 7.1 we observe that immigrants and Canadian-born form 8.5% and 91.1% of male moonlighters, respectively. On the other hand, immigrants and Canadian-born form 11.0% and 88.5% of the entire population

of male workers. Therefore, in terms of representation, we observe that immigrant males, with a relative concentration ratio of 0.77, are under-represented in the population of moonlighters while Canadian-born males, with a relative concentration ratio of 1.03, are over-represented in the population of moonlighters.

Similarly, we observe that immigrant females, which form only 8.7% of female moonlighters but 10.5% of all female workers, are under-represented in the population of moonlighters while Canadian-born females are over-represented with a relative concentration ratio of 1.02.

Among Canadian-born workers demographic groups forming the largest proportion of moonlighters are those aged between 16 and 24 years AGE1624 (49.1% and 55.5% of male and female moonlighters, respectively); those with only high school education HISCHO (57.5% and 53.0% of male and female moonlighters); the single (50.1% and 47.5% of male and female moonlighters, respectively); family heads FAMHEAD (61.8% and 38.3% of male and female moonlighters, respectively); and those who live in the PRAIRIES (29.4% and 33.6% of male and female moonlighters, respectively).

The distribution of moonlighters among immigrant workers follow the same pattern as that of the Canadian-born with two exceptions, namely, distribution by marital status and by region. While among Canadian-born workers "single" workers formed the largest proportion of moonlighters, among immigrants married workers formed the largest group. About 59% of immigrant male moonlighters and 55.6% of immigrant female moonlighters were married, compared with 47% and 45% for Canadian-born males and females, respectively.

Regionally, the largest proportion of Canadian-born moonlighters were resident in the Prairies while among immigrant workers the largest proportion of moonlighters were in Ontario. The main reason for the difference is that while the largest proportion of Canadian-born workers (28.3% of males and 30.8% of females) were resident in the Prairies, the largest proportion of immigrant workers (37.5% of males and 32.2% of

females) were resident in Ontario.

A look at the relative concentration ratios (set in parentheses in Table 7.1) indicates over-representation of certain demographic groups and the under-representation of other groups in the population of moonlighters.

Groups which were over-represented, that is, groups with an RCR exceeding unity, in the population of moonlighters include those aged 16-24 years (and also immigrants aged 25-34 years); those with some post-secondary education (and also immigrant males with post-secondary education); single; among female workers, heads of household and other family members and among male workers spouses and other family members; among female workers, those resident in Ontario and British Columbia and among male workers, those resident in British Columbia and the Prairies; and Canadian-born minority workers.

TABLE 7.1
PERCENTAGE DISTRIBUTION OF MOONLIGHTERS ACCORDING TO SELECTED DEMOGRAPHIC CHARACTERISTICS (Relative concentration ratios in parentheses)

GROUP	MALE			FEMALE		
	FB	CB	POOLED	FB	CB	POOLED
Country of birth						
Canada	-	100 (1.00)	91.1 (1.03)	-	100 (1.00)	91.1 (1.02)
Foreign	100 (1.00)	-	8.5 (0.77)	100 (1.00)	-	8.7 (0.83)
AGE						
16-24	37.1 (2.81)	49.1 (1.97)	48.1 (2.04)	41.1 (2.59)	55.5 (2.10)	54.3 (2.06)
25-34	28.9 (1.42)	28.5 (0.92)	28.5 (0.95)	18.9 (0.81)	27.7 (0.88)	27.0 (0.88)
35-44	18.3 (0.64)	14.4 (0.64)	14.7 (0.63)	28.4 (0.90)	12.3 (0.54)	13.6 (0.58)
45-54	10.1 (0.45)	5.7 (0.42)	6.1 (0.42)	10.1 (0.55)	3.4 (0.27)	4.0 (0.31)
55-64	5.6 (0.40)	2.3 (0.31)	2.6 (0.32)	1.2 (0.12)	1.1 (0.20)	1.1 (0.18)
EDUCATION						
Elementary	11.2 (0.86)	11.2 (0.86)	11.3 (0.88)	3.0 (0.24)	3.8 (0.58)	3.7 (0.51)
High School	39.6 (0.96)	57.5 (1.08)	55.9 (1.08)	45.6 (1.01)	53.0 (1.00)	52.4 (1.00)
Some Postsec	21.3 (2.05)	12.8 (1.23)	13.4 (1.29)	18.9 (1.69)	18.5 (1.52)	18.5 (1.53)
Postsec	17.8 (1.25)	11.5 (0.92)	12.0 (0.94)	15.4 (1.01)	15.2 (0.89)	15.3 (0.90)
Univ	10.1 (0.48)	7.0 (0.63)	7.3 (0.59)	17.2 (1.08)	9.5 (0.86)	10.1 (0.88)

GROUP	MALE FB	MALE CB	MALE POOLED	FEMALE FB	FEMALE CB	FEMALE POOLED
TYPE OF EMPLOYMENT						
Paidwork	93.9 (0.96)	92.3 (0.96)	92.4 (0.96)	91.7 (0.94)	93.9 (0.97)	93.7 (0.97)
Family Work	0.0 (0.0)	0.5 (1.67)	0.5 (2.50)	0.6 (3.00)	0.3 (0.60)	0.4 (0.80)
Self-employed	3.5 (17.5)	5.2 (1.93)	5.1 (2.04)	5.3 (2.79)	5.0 (2.17)	5.0 (2.27)
Full-time	91.4 (0.99)	90.8 (1.00)	90.8 (1.00)	80.5 (1.08)	84.7 (1.14)	84.4 (1.13)
Part-time	8.6 (1.09)	9.2 (0.99)	9.2 (1.01)	19.5 (0.77)	15.3 (0.60)	15.6 (0.61)
OCCUPATION						
Blue collar	48.7 (1.12)	43.4 (0.96)	43.9 (0.98)	10.6 (0.80)	7.5 (0.89)	7.8 (0.88)
Server	16.7 (0.95)	22.0 (1.20)	21.5 (1.18)	34.3 (1.14)	42.1 (1.39)	41.4 (1.37)
Office	7.6 (1.58)	5.9 (1.00)	6.0 (1.03)	18.3 (0.76)	28.9 (0.94)	27.9 (0.93)
Managerial/prof.	20.8 (0.67)	13.5 (0.60)	14.1 (0.60)	33.1 (1.10)	18.4 (0.65)	19.6 (0.69)
Farming	6.1 (1.85)	15.2 (1.81)	14.4 (1.84)	3.5 (1.46)	3.2 (1.23)	3.2 (1.23)
MARITAL/HOUSEH.D						
Married	58.9 (0.77)	46.7 (0.71)	47.7 (0.71)	55.6 (0.78)	45.0 (0.70)	45.9 (0.71)
Single	39.1 (2.08)	50.1 (1.67)	49.2 (1.72)	36.7 (2.05)	47.5 (1.75)	46.6 (1.78)
Others	2.0 (0.42)	3.2 (0.78)	3.0 (0.71)	7.7 (0.68)	7.5 (0.83)	7.5 (0.81)
Head of Household	64.0 (0.77)	61.8 (0.81)	61.9 (0.80)	39.6 (1.42)	38.3 (1.39)	38.4 (1.40)
Spouse	6.6 (1.40)	2.7 (0.87)	3.0 (0.94)	38.5 (0.62)	35.2 (0.63)	35.5 (0.62)
Household member	29.4 (2.41)	35.4 (1.73)	35.0 (1.79)	21.9 (2.07)	26.4 (1.62)	26.1 (1.66)

GROUP	MALE FB	MALE CB	MALE POOLED	FEMALE FB	FEMALE CB	FEMALE POOLED
REGION						
Atlantic	4.1 (0.56)	28.3 (1.02)	26.4 (1.04)	7.7 (1.12)	20.9 (0.80)	19.8 (0.82)
Quebec	6.1 (0.78)	13.6 (0.81)	12.9 (0.82)	5.3 (0.78)	11.5 (0.76)	11.0 (0.77)
Ontario	37.0 (0.99)	18.8 (1.00)	20.4 (0.98)	39.0 (1.08)	24.0 (1.23)	25.3 (1.19)
Prairie	35.5 (1.16)	29.4 (1.04)	29.8 (1.04)	29.6 (0.92)	33.6 (1.09)	33.2 (1.07)
BC	17.3 (1.02)	9.8 (1.15)	10.5 (1.12)	18.3 (1.02)	10.0 (1.18)	10.7 (1.13)
Union member	6.1 (0.18)	3.4 (0.11)	3.6 (0.11)	4.7 (0.18)	3.0 (0.12)	3.1 (0.12)
MINORITY STATUS						
Minority by race	31.0 (1.20)	1.2 (1.20)	3.7 (1.00)	23.1 (0.91)	1.5 (1.36)	3.3 (0.89)
First language spoken not English or French	54.3 (0.95)	3.8 (0.90)	8.5 (0.81)	42.6 (0.80)	3.4 (0.74)	6.9 (0.69)
N. of obs.	197	2122	2329	169	1770	1942

The highly under-represented groups, that is, groups with RCR well below unity include those with union membership at their first job; those aged 35-64 years; male workers with elementary or university education; married workers; female spouses (living with their partners); those resident in Quebec; and immigrants.

Generally the structure of moonlighting concentration is the same for immigrants as for Canadian-born workers. For both sub-groups, the degree of concentration appears to increase and then decrease with more education, and declines with age.

Based on the overall moonlighting rates (using MOONLITB) shown in Table 6.2 and the concentration ratios shown in Table 7.1 we derived the moonlighting rates for the selected demographic groups within each sub-population, that is, Canadian-born and immigrants, and for the entire population. Thus, the moonlighting rate for a group is obtained simply as the product of the population moonlighting rate and the group's RCR.

The results are shown in table 7.2. The moonlighting rates are expressed in percentage terms as the ratio of those who held two or more jobs simultaneously with their first jobs in 1987 over a period of at least sixteen continuous weeks to the number of workers in the specified group.

From the demographic and institutional approaches outlined above, we could surmise the differences in moonlighting behaviour between immigrants and Canadian-born workers to include age, marital status, education, and minority status. Though moonlighting rates differ between immigrants and Canadian-born workers within certain specified demographic groups, the pattern of the rates are generally the same for the two sub-populations.

TABLE 7.2

MOONLIGHTING RATES ACCORDING TO SELECTED DEMOGRAPHIC CHARACTERISTICS

GROUP	MALE FB	MALE CB	MALE POOLED	FEMALE FB	FEMALE CB	FEMALE POOLED
OVERALL	8.0	10.7	10.4	8.3	10.2	10.0
AGE						
16-24	22.5	21.1	21.2	21.5	19.7	20.6
25-34	11.4	9.8	9.9	6.7	9.0	8.8
35-44	5.1	6.8	6.5	7.5	5.5	5.8
45-54	3.6	4.5	4.4	4.6	2.8	3.1
55-64	3.2	3.3	3.3	1.0	2.0	1.8
EDUCATION						
Elementary	6.9	9.2	9.1	2.0	5.9	5.1
High School	7.7	11.6	11.2	8.3	10.2	10.0
Some Postsec	16.4	13.2	13.4	14.0	15.5	15.3
Postsec	10.0	9.8	9.8	8.3	9.1	9.0
Univ	3.8	6.7	6.1	9.0	8.8	8.8
EMPLOYMENT						
Paidwork	7.7	10.3	10.0	7.8	9.9	9.7
Family work	0.0	17.8	26.0	24.9	6.1	8.0
Self-employed	17.5	20.6	21.2	23.1	22.2	22.7
Full-time	7.9	10.7	10.4	8.9	11.6	11.3
Part-time	8.7	10.6	10.5	6.4	6.1	6.1
OCCUPATION						
Blue collar	9.0	10.3	10.2	6.6	9.1	8.8
Server	7.6	12.9	12.3	9.5	14.2	13.7
Office	12.7	10.7	10.7	6.3	9.6	9.3
Managerial/prof.	5.4	6.5	6.3	9.1	6.7	6.9
Farming	14.8	19.4	19.2	12.1	12.3	12.5

GROUP	MALE FB	MALE CB	MALE POOLED	FEMALE FB	FEMALE CB	FEMALE POOLED
MARITAL/HOUSEH.D						
Married	6.2	7.6	7.4	6.5	7.1	7.1
Single	16.6	17.9	17.9	17.0	17.8	17.8
Others	3.4	8.3	7.4	5.6	8.5	8.1
Household head	6.2	8.7	8.3	11.8	14.2	14.0
Spouse	11.2	9.3	9.8	5.1	6.4	6.2
Household member	19.3	18.5	18.6	17.2	16.5	16.6
REGION						
Atlantic	4.5	10.9	10.8	9.3	8.2	8.2
Quebec	6.2	8.7	8.5	6.5	7.7	7.7
Ontario	7.9	10.7	10.2	9.0	12.5	11.9
Prairie	9.3	11.1	10.8	7.6	11.1	10.7
BC	8.2	12.3	11.6	8.5	12.0	11.3
UNION MEMBER	1.4	1.2	1.1	1.5	1.2	1.2
MINORITY STATUS						
Minority by race	9.6	12.8	10.4	7.5	13.9	8.9
First language spoken not English or French	7.6	9.6	8.4	6.6	7.5	6.9
No. of Workers	2451	19763	22323	2045	17294	19409

Moonlighting rates are expressed as percentage of the number of workers.
Source: Calculated from LMAS 1986/87 Database.

The implication is that differences in moonlighting behaviour between immigrants and Canadian-born workers could be due, at least in part, to differences in the demographic characteristics between the two populations.

Therefore, in our attempt to explain the differences in moonlighting behaviour between the two groups we need an explanation as to why differences in demographic characteristics exist between the two groups. Perhaps, again we need to rely on the immigrant selectivity hypothesis and immigration policy to understand this.

7.3 Further Explanations to Differences in Moonlighting Activity

Though the neoclassical and demographic approaches to moonlighting help us to understand why people moonlight and why participation in moonlighting activity could differ between different individuals with different personal characteristics, they do not explain explicitly why differences in the probability of underemployment or in demographic characteristics would exist between immigrants and the Canadian-born population.

The factors underlying differences in immigrant moonlighting behaviour may be further explained by the immigrant selectivity hypothesis.

First, immigration policy and the immigration process pre-select immigrants into certain occupations where the tendency to moonlight is curtailed by the fact that desired hours could be achieved at the same job.

Under Canadian immigration policy since 1967 there are three types of immigrants; the independent class, who enter on the basis of the points system and thus on the basis of the labour market demand for their services; the family class immigrants, who are sponsored by close

relatives and do not need points to enter Canada; and refugees who are admitted on humanitarian grounds.

Under the points selection system, as outlined in Table 3.1 (chapter 3) prospective applicants are awarded points on the basis of educational attainment (more points for higher education), occupational demand, age (more points for those in their prime 24-35, and less for those above 35), knowledge of English or French, arranged employment etc. For an application for a permanent visa to be considered an applicant must earn at least 50% of the maximum 15 points under occupational demand. Also to enhance the selection of skilled workers, applicants with skills required to fill national or regional occupational shortages receive an extra 10 points.

It is, therefore, obvious that those who enter on the basis of the points system must be found mostly in the primary labour market where jobs are relatively stable, and scheduled hours and wage rates are usually higher.

Secondly, the immigration process and the Canadian immigration policy as outlined in chapter 3 of this study also pre-selects individuals with certain characteristics, such as age, high education and skills, which might lead immigrants into groups or situations with smaller tendency to moonlight.

As shown in Tables 2.2 and 2.3 and in appendix Table B there are significant differences in the distribution of immigrants and Canadian-born. A greater proportion of immigrants are married, have university education, and are aged over 35 years than are Canadian-born and these are the groups with the lowest moonlighting rates.

In the estimations in the next chapter our aim is to examine the contribution of specified demographic characteristics of immigrants to the differences in moonlighting behaviour between immigrants and Canadian-born workers.

In these estimations, we also examine the influence of hours worked on the first job on the probability of moonlighting, in the light of neoclassical predictions that moonlighting activity results primarily from underemployment at the individual's primary job.

CHAPTER 8

ESTIMATION MODEL

This study has two related aims, namely, to examine the determinants of moonlighting activity in the Canadian labour market and also to examine the sources of the difference in the participation in moonlighting and the intensity of moonlighting activity between Canadian-born workers and immigrant workers.

Thus, we first examine the differential impact of demographic and personal characteristics on the probability of moonlighting and how they help explain the difference between immigrants and Canadian-born with the view of making conclusions about the role of immigration policy and process.

Following the demographic approach to moonlighting, we hypothesize that the differences in Canadian-born and immigrant workers' moonlighting behaviour (the decision to moonlight and the supply of moonlighting hours) are explained by differences in their demographic characteristics, notably education, occupation and minority status.

For the purposes of this thesis, we assume that immigration policy and process are solely responsible for any differences in the demographic characteristics between immigrants and Canadian-born workers.

The second stage is to examine the determinants of the supply of moonlighting hours and attempt to identify the sources of the difference between the moonlighting hours supplied by Canadian-born and immigrant workers.

In view of the smallness of the sample size (less than 2300) in both the male and female cases, we did not separate the sample into immigrants and Canadian-born. It may be noted that the size of the immigrant sample of moonlighters is less than 200, and such a sample size might lead to inefficient coefficient estimates (Gordon, Osberg and Phipps 1990).

To compare the influences of various demographic variables on the

probability to participate in moonlighting or on the supply of moonlighting hours, we used interaction variables. Through these interaction variables we hope to obtain indications as to which characteristics are more or less relevant in explaining the lower probability of moonlighting among immigrants.

In all the estimations self-employed persons were excluded.

8.1 The Probability of Moonlighting Model

The econometric literature gives us three alternative ways for estimating the effects of a set of independent variables on the probability of an individual being selected with index I = 1 or 0, namely, the linear probability estimation approach, the logit approach or the probit approach.

We chose to use the probit techniques in view of the fact that we can also derive the inverse Mill's ratio for correcting sample selectivity bias in the ordinary least squares estimates of the supply of moonlighting hours function.

Variables Included in the Probit Equation:

In the probit equations, the dependent variable is MOONLITB (=1 if the individual moonlighted, and 0 otherwise).

Based on the demographic, institutional and the neoclassical approaches to moonlighting activity the following variables were included as determinants of moonlighting activity:

A. Primary Variables

Following the neoclassical approach to moonlighting, the "primary" determinants of moonlighting activity are the actual hours worked and the wage rate at the first job. The greater the actual hours worked and the higher the wage rate at the first job the lower probability of moonl-

ighting, all other things being equal.

We therefore entered the variable HOURS1 (= the actual annual hours worked) and HWAGE1 (= the hourly wage rate at the first job).

B. Age

There are five age dummies, individuals aged 16-24 years (AGE1624), AGE2534, AGE3544(the reference group), AGE4554, and AGE5564. It is expected that moonlighting would be greater at younger ages than at older ages because the former are likely to have greater desired hours, according to the life cycle hypothesis of the supply of labour, and less stable jobs, because of institutional factors which tend to favour "older" workers.

C. Education

There are five education dummies, individuals with elementary or no education ELEMENT, HISCHO (the reference group), SMPSTSEC, POSTSEC, and UNIV. It is expected that moonlighting activity would diminish with higher education.

Screening and signalling hypotheses of labour supply and employment suggest that those with high education tend to have more stable jobs than those with little education.

D. Marital Status

Marital status as well as number and ages of dependent children are important determinants of desired hours of work and are, therefore expected to affect the probability to moonlight. However, their expected signs in the probability of moonlighting estimates cannot be predicted a priori.

The variables included are: MARRIED (reference group), SINGLE and OTHERS; KIDAGEDV (= number of dependent children aged 5 and below), and KIDSABFV (= number of children aged six to twenty-four).

E. Occupation

Since the hours schedule reflects technological and demand conditions and these conditions differ among occupations or industries, we expect the probability of moonlighting to differ from occupation to occupation. The following occupational variables are included: BLUE, FARMING, MANPROF, SERVER (reference group), and OFFICE.

F. Job Characteristics

Four groups of dummy variables are included to control for the effects of the characteristics of the first job on the probability of moonlighting. These groups of variables are:

1) UNION1 (=1 if individual's first job was a unionised or covered by a collective agreement, and 0 otherwise). Being a union member at the first job is likely to reduce the probability of underemployment at the job and hence the probability of moonlighting.

2) SMALFIRM(=1 if the individual worked in a small firm, and 0 otherwise); MEDFIRM(=1 if the individual worked in a medium-sized firm, and 0 otherwise); and LARGFIRM (=1 if individual worked in a large firm, and 0 otherwise).

In a smaller work environment relation between workers are less likely to be rigid and formal; therefore, the tendency for boredom may be lower thereby reducing the likelihood of taking on a second job with the aim of seeking relief from boredom and alienation at the first job. (Jamal and Crawford 1981). Also in a small-scale enterprise hours schedules are less likely to be fixed and more likely to be flexible. LARGFIRM is used as the reference group.

3) NTERRUPT (= the number of interruptions at the first job) is included to test the effect of "job instability" on the probability of moonlighting. The institutional approach suggests that unstable jobs lead to more moonlighting.

4) FIXEDHRS (=1 if the individual always worked the same number of weeks at the first job from month to month, and 0 otherwise). Following the neoclassical approach we expect fixed time schedules to increase the probability of moonlighting.

G. Minority Status

Following the demographic approach to moonlighting, we included two dummy variables MINOR (=1 if individual is a minority by race, and 0 otherwise) and LANGDIF (=1 if individual's first language spoken was neither English nor French, and 0 otherwise).

We expect that, all other things being equal, being a minority and/or having a "language deficiency" would increase the probability of moonlighting.

H. Foreign-born Interaction Variables

Interactions dummies were introduced in the pooled probit estimates to test whether the effect of "foreign-ness" is the same irrespective of personal characteristics, and also to test whether the effect of personal characteristics were the same irrespective of whether the individual is "foreign-born".

We assume that immigration policy in Canada as outlined in chapter 3 directly influences three main moonlighting factors, namely, education, occupation and minority status, and thus could explain the difference in moonlighting participation between Canadian-born and immigrant workers. We therefore include interaction terms of these variables, occupation, education and minority status, with the foreign-born dummy FORNBN.

The sign of the interaction dummy variables would indicate whether the simultaneous presence of the two characteristics will attenuate or reinforce the individual effects of these characteristics.

We also assume that the differences in the means of the education, occupation and minority status variables between Canadian-born and

immigrant workers are solely the result of immigration policy and process. Therefore, the importance of these interaction terms in the probit estimates would be an indication of the role of immigration policy in determining the differences in the moonlighting behaviour between Canadian-born and immigrant workers.

The interaction terms are:

For education: FORNELM, FORNSMP, FORNPOST, and FORNUNIV

For occupation: FORNOFF, FORNBLUE, FORNMAN, and FORNFARM; and

For minority status: FORNMINA and FORNLANG.

An intercept dummy FORNBN was also considered as an alternative hypothesis to the immigrant interaction variables.

8.2 The Supply of Moonlighting Hours Model

We estimate the supply of moonlighting hours for moonlighters using ordinary least squares. Two functional forms of the moonlighting hours supply function are estimated, namely, linear and quadratic forms.

Variables Included in the Supply of Moonlighting Hours Equations:

In the OLS estimates, the dependent variable is moonlighting hours MOONHRS, defined as the sum of the moonlighter's actual annual hours worked at all jobs other than the first job.

The independent variables included the following groups of variables:

A. Primary Variables

The "primary variables" included in the estimation model are the wage rate at the first job HWAGE1; actual annual hours worked at the first job HOURS1; and the moonlighting wage MOONWAGE.

Since some individuals worked at more than one moonlighting job, the moonlighting wage was calculated as the average wage rate at all

moonlighting jobs, weighted by the actual number of annual hours worked at each job. Following neoclassical predictions, we expect the response of moonlighting hours to the moonlighting wage to be positive.

Following equations (7.9-7.11) above, we expect the coefficients of HOURS1 and HWAGE1 to be negative, that is, if for moonlighters leisure is an inferior good.

B. Age

The age variables included are Age1624, Age2534, Age4554, and Age5564, with Age3544 as the reference group.

C. Education

The usual age dummies ELEMENT, SMPSTSEC, POSTSEC and UNIV, are included, with HISCHO as the reference variable.

D. Marital Status

We included the usual marital status variables SINGLE, and OTHERM, with MARRIED as the reference group.

E. Union Membership/Occupation

Union membership at the first job UNION1 was included, together with the usual occupation variables OFFICE, BLUE, MANPROF and FARMING, with SERVER as the occupational reference group.

F. Skill Transferability

Two variables SAMEOCC2 (=1 if individual's second job is in the same occupation as the first, and 0 otherwise) and SAMNDUS2 (=1 if individual's second job is in the same industry as the first, and 0 otherwise) are introduced into the moonlighting hours equation to control for transferability of skills. The SIC 3-digit (52-industrial grouping) code was used to construct the industry dummy and the SOC 4-digit (50-

occupational grouping) code was used for the occupational dummy in the IMAS.

We assume that the individual transfers specific skills when s/he works in the same occupation and transfers general skills when s/he works in the same industry. Thus SAMEOCC2 measures specific skill transferability while SAMNDUS2 measures general skill transferability. Since general skills are more transferable we expect moonlighting hours to be positively related to SAMNDUS2.

The relationship between SAMEOCC2 and moonlighting hours cannot be predicted a priori since it would depend on the type of specific skill involved. However, as Krishnan (1990) has shown, there is the tendency for high levels of specific skills to deter the intensity of moonlighting activity.

G. Selectivity bias Correction

We attempted to evaluate the consistency of the moonlighting supply estimates by estimating an equation incorporating a selection-bias (inverse Mill's ratio) variable.

The inverse Mill's ratio LAMBDA was derived from the relevant probit equation and included in the moonlighting hours equation to correct for possible selectivity bias due to exclusion of non-moonlighters from the OLS estimates.

The results indicate that correction for selectivity bias in the OLS estimates of the moonlighting hours supply function is not relevant as the estimated coefficient of the correction (inverse Mill's ratio) variable is statistically insignificant in all the estimated equations, for both males and females. Therefore, in chapter 9 we present the results based only on the OLS estimates without any correction for selectivity bias.

H. Foreign-born Interaction Variables

Two groups of interaction variables are examined, namely, education and

occupation. These interaction variables are included to test for the simultaneous impact on moonlighting hours of "foreign-ness" on one hand and the educational and occupational characteristics on the other.

8.3 DATASET

The dataset used is the Statistics Canada's Labour Market Activity Survey (LMAS) database which appears to be the best source for data on moonlighting activity currently available in Canada. The dataset 1986-87 has information on wage rates, hours worked and the weeks over which a job was held during those two years for each of the jobs held.

The maximum number of jobs recorded for each respondent was ten. The week during which each particular job was held is recorded which enabled us to select workers with over-lapping jobs with little or no difficulty. Other characteristics of a job such as whether flexible or fixed-schedule job; the number of job interruptions and the size of the business are available from the database.

In all there were 4371 workers whose second job or any of the subsequent jobs overlapped in terms of time with the first job held in 1986/87, and are considered as moonlighters, out of a total population of 41732 workers. Of the number of moonlighters, 2329 were males and 1942 females. Of the male moonlighters, 2122 were Canadian-born and 197 immigrants, while of the female moonlighters 1770 were Canadian-born and 169 immigrants.

Self-employed individuals were excluded from the estimation sample because there is no recorded wage rate for self-employment. The exclusion of the self-employed reduces the sample of moonlighters to 4054, comprising 2210 males (of which 2011 are Canadian-born) and 1844 female (of which 1681 are Canadian-born).

CHAPTER 9

SUMMARY OF RESULTS AND CONCLUSIONS FROM THE MOONLIGHTING ESTIMATIONS

Two main equations were estimated, one for the participation in moonlighting, which was estimated using the probit technique, and the other for the supply of moonlighting hours, which was estimated using ordinary least squares.

The aim of the estimations was first to examine the determinants of the probability and intensity of moonlighting activity and secondly, to examine the sources, on the part of immigrants, of the difference in moonlighting activity between Canadian-born workers and immigrant workers. Both male and female workers were considered, in separate functions.

The results of the probit estimates are presented in Tables 9.1 and 9.2, and the results of the hours estimates are shown in Tables 9.3 and 9.4, below. The results for males are shown in Tables 9.1 and 9.3, and those for females are shown in Tables 9.2 and 9.4.

The results shown under "Pooled Sample" represent two separate cases. First, under the heading "No interactions" we have included only one variable FORNBN to account for the effect of immigrants' "foreign-ness" on the probability to moonlight and there are no interaction variables. The second, under the heading "With Interactions" includes the three sets of immigrant interaction variables to account for the differential impact of immigrants' education, occupational distribution and minority status on the probability of moonlighting.

The same procedure is used in the estimations of the annual moonlighting hours' functions shown in Tables 9.3-9.5. All the samples excluded self-employed persons.

9.1 Probit Estimates

9.1.1 Principal Factors

Certain general patterns may be observed from the results on the probit estimates shown below in Tables 9.1 and 9.2.

First, the signs (and the degree of significance) of the probit estimates based on the Canadian-born only sample (under the heading Canadian-born) are generally the same as in the estimates based on the entire sample of workers, Canadian-born and foreign-born together, shown under the heading "pooled sample" for both females and males.

Secondly, job attributes such as whether weeks of work are fixed denoted by FIXEDHRS, number of job interruptions at the primary job NTERRUPT, and union membership at the primary job UNION1, had highly significant coefficients.

The coefficient of FIXEDHRS is positive and highly significant in all the equations. For the male sample, the coefficient of FIXEDHRS was positive in the equation for Canadian-born, for the pooled sample without interaction variables and for the pooled sample with interaction variables, with t-values of 2.694, 3.193 and 3.194, respectively. For the female sample, the t-values were 4.524, 4.933 and 4.903 for Canadian-born, the pooled sample without interaction variables and for the pooled sample with interaction variables, respectively.

This result implies that working fixed hours schedules significantly increased the likelihood of engaging in moonlighting activity, for all the samples. This confirms the neoclassical prediction that rigidities in hours schedules would result in increased moonlighting activity.

The sign of NTERRUPT was expected to be positive in line with the institutional school of thought that moonlighting is more likely to be associated with job insecurity. However, the results show that NTERRUPT is negative and highly significant in all the equations. This discrepancy may be due to three factors:

i) since we allowed a time interval of sixteen weeks for inclusion of individual multiple job-holders in the sample of moonlighters we might

have excluded individuals who suffered job interruptions within those intervals;

ii) those who experience job interruptions most might be the same as those who cannot find alternative jobs; or

iii) the fact that in the LMAS job interruptions are defined as those interruptions which result in the return to the same job and are accompanied by wage payments- thus individuals experiencing job interruptions may not be necessarily underemployed.

The coefficient of the union membership dummy UNION1 is negative in all the equations, indicating that union membership tends to reduce the likelihood of moonlighting. However, the coefficients are not significant in the estimated equations for females at 1.533, 1.333 and 1.352 for Canadian-born female workers, the pooled sample without interaction terms and the pooled sample with interaction terms, respectively. This indicates that for females union membership is less influential.

One of the most remarkable results is shown by the scale of business variables SMALFIRM and MEDFIRM. The sign of the coefficient of SMALFIRM is negative in all the samples, but insignificant for male workers, indicating that boredom or rigidities associated with large firms (the reference group) may be partly responsible for moonlighting activity among workers, and significantly so among female workers. The coefficient of MEDFIRM is also negative in all the equations but significant only for Canadian-born female sample where it has a coefficient of (0.169) with a t-value of (1.897).

Also remarkable is the sign and the degree of significance of the hours worked at the primary job HOURS1 and the primary wage rate HWAGE1. The neoclassical prediction is that the greater the hours worked the lower the probability of moonlighting since underemployment is reduced. Thus, a negative relationship between HOURS1 is predicted. Similarly, higher primary wage increases the moonlighting reservation wage; therefore, the higher the primary wage rate, the lower the probability of moonlighting.

It is observed that both HOURS1 and HWAGE1 are negative and highly significant in all the equations. Interestingly, the HOURS1 coefficient is the same at (0.001) for all the samples, namely, Canadian-born male and female workers, and pooled male and female workers with and without immigrant interaction variables. We could, therefore, conclude that all workers account for the impact of hours available at the primary job on their response to moonlighting activity the same way.

9.1.2 Immigrant Interaction Terms

The coefficient of the "foreign-born" variable FORNBN is positive but insignificantly different from zero in the pooled sample with no interaction variables for both males and females. However, in the pooled male sample with interaction variables the coefficient of FORNBN is negative and statistically significant, with a t-ratio of (2.029). This indicates that "foreign-ness" itself may not be a contributory factor to the difference in participation in moonlighting activity between Canadian-born male workers and immigrant male workers. Rather demographic characteristics such as education, occupation and minority status may be the determining factors. In the case of the female sample the FORNBN coefficient is still insignificant with interaction terms. For males, all the immigrant interaction terms were positive, except FORNUNIV (the interaction term for foreign with university education). Among the educational interaction terms FORNELM and FORNSMP were positive and significant, indicating that immigrants in these groups have higher tendency to moonlight than the respective reference group. Among the occupational interaction terms only FORNBLUE was positive with

TABLE 9.1

ESTIMATES OF THE PROBIT EQUATION FOR PARTICIPATION IN MOONLIGHTING ACTIVITY (Dependent variable : MOONLITB = (1,0)). MALES

Indep. Variables	Canadian-born	POOLED SAMPLE NO INTERACTION	POOLED SAMPLE WITH INTERACTION
HOURS1	-0.001 (-26.449)*	-0.001 (-28.286)*	-0.001 (-28.255)*
HWAGE1	-0.013 (-3.063)*	-0.013 (-3.174)*	-0.013 (-3.173)*
AGE1624	0.147 (2.524)*	0.177 (3.194)*	0.176 (3.165)*
AGE2534	0.056 (1.055)	0.089 (1.786)*	0.090 (1.803)*
AGE3544=0			
AGE4554	-0.116 (-1.581)	-0.102 (-1.513)	-0.102 (-1.501)
AGE5564	-0.385 (-3.963)*	-0.363 (-4.072)*	-0.374 (-4.173)*
ELEMENT	-0.008 (-0.145)	0.033 (0.654)	0.009 (0.165)
HISCHO=0			
SMPSTSEC	-0.040 (-0.827)	-0.003 (-0.066)	-0.044 (-0.904)
PCSTSEC	0.089 (1.726)*	0.105 (2.160)*	0.094 (1.815)*
UNIV	0.056 (0.814)	0.032 (0.496)	0.051 (0.751)
MARRIED=0			
SINGLE	-0.013 (-0.292)	-0.021 (-0.478)	-0.024 (-0.541)
OTHERM	0.059 (0.656)	0.020 (0.230)	0.015 (0.179)
KIDAGEDV	0.061 (2.088)*	0.060 (2.169)*	0.058 (2.104)*
KIDSABFV	-0.017 (-1.300)	-0.013 (-1.047)	-0.012 (-0.984)
FIXEDHRS	0.196 (2.674)*	0.224 (3.193)*	0.224 (3.194)*
NTERRUPT	-0.198 (-2.234)*	-0.249 (-2.820)*	-0.246 (-2.780)*
UNION1	-0.177 (-2.538)*	-0.164 (-2.509)*	-0.169 (-2.575)*

Indep. Variables	Canadian-born	POOLED SAMPLE NO INTERACTION	POOLED SAMPLE WITH INTERACTION
SMALFIRM	-0.045 (-0.947)	-0.027 (-0.608)	-0.026 (-0.573)
MEDFIRM	0.023 (0.266)	0.015 (0.185)	0.015 (0.180)
LARGFIRM=0			
OFFICE	0.027 (0.370)	0.051 (0.740)	0.027 (0.377)
BLUE	0.034 (0.802)	0.062 (1.556)	0.032 (0.772)
MANPROF	0.028 (0.491)	0.042 (0.773)	0.030 (0.533)
FARMING	0.096 (1.715)*	0.099 (1.825)*	0.093 (1.665)*
SERVER=0			
MINOR	0.084 (0.567)	0.095 (1.087)	0.071 (0.483)
LANGDIF	0.019 (0.237)	-0.003 (-0.047)	0.007 (0.094)
FORNBN		0.002 (0.037)	-0.288 (-2.029)*
Interaction Terms			
FORNELM			0.340 (1.922)*
FORNSMP			0.400 (2.618)*
FORNPOST			0.123 (0.772)
FORNUNIV			-0.084 (-0.425)
FORNOFF			0.261 (1.111)
FORNBLUE			0.338 (2.412)*
FORNMAN			0.145 (0.805)
FORNFARM			-0.086 (-0.329)

Indep. Variables	Canadian-born	POOLED SAMPLE NO INTERACTION	POOLED SAMPLE WITH INTERACTION
FORNMINA			0.057 (0.308)
FORNLANG			-0.054 (-0.405)
CONSTANT	-0.662 (-7.023)*	-0.745 (-8.276)*	-0.718 (-7.919)*
Likelihood ratio test	4474.92	5015.75	5034.86
R-squared Maddala Cragg-Uhler	 0.207 0.425	 0.206 0.427	 0.207 0.429
% Right Predictions	89.5	89.8	89.8
# obs.@ one Total # obs	2011 19238	2210 21757	2210 21757

TABLE 9.2

ESTIMATES OF THE PROBIT EQUATION FOR PARTICIPATION IN MOONLIGHTING ACTIVITY (Dependent variable : MOONLITB = (1,0)). FEMALES

Indep. Variables	Canadian-born	POOLED SAMPLE NO INTERACTION	POOLED SAMPLE WITH INTERACTION
HOURS1	-0.001 (-21.562)*	-0.001 (-22.905)*	-0.001 (-22.901)*
HWAGE1	-0.026 (-4.694)*	-0.027 (-5.056)*	-0.026 (-5.005)*
AGE1624	0.307 (5.166)*	0.278 (4.966)*	0.279 (4.975)*
AGE2534	0.199 (3.510)*	0.157 (2.923)*	0.156 (2.940)*
AGE3544=0			
AGE4554	-0.315 (-3.693)*	-0.281 (-3.661)*	-0.285 (-3.706)*
AGE5564	-0.458 (-3.487)*	-0.501 (-4.152)*	-0.509 (-4.177)*
ELEMENT	-0.089 (-1.101)	-0.135 (-1.759)*	-0.099 (-1.223)
HISCHO=0			
SMPSTSEC	0.098 (2.057)*	0.094 (2.079)*	0.099 (2.088)*
POSTSEC	0.102 (2.039)*	0.093 (1.964)*	0.106 (2.141)*
UNIV	0.236 (3.607)*	0.217 (3.576)*	0.238 (3.645)*
MARRIED=0			
SINGLE	0.125 (2.754)*	0.123 (2.807)*	0.124 (2.831)*
OTHERM	0.216 (3.338)*	0.194 (3.159)*	0.198 (3.218)*
KIDAGEDV	-0.126 (-3.882)*	-0.132 (-4.239)*	-0.131 (-4.195)*
KIDSABFV	-0.014 (-1.020)	-0.012 (-0.922)	-0.013 (-0.942)
FIXEDHRS	0.299 (4.524)*	0.310 (4.933)*	0.308 (4.903)*
NTERRUPT	-0.444 (-4.286)*	-0.370 (-4.134)*	-0.379 (-4.194)*

Indep. Variables	Canadian-born	POOLED SAMPLE NO INTERACTION	POOLED SAMPLE WITH INTERACTION
UNION1	-0.122 (-1.553)	-0.098 (-1.333)	-0.100 (-1.352)
SMALFIRM	-0.190 (-4.005)*	-0.172 (-3.811)*	-0.174 (-3.863)*
MEDFIRM	-0.169 (-1.897)*	-0.131 (-1.594)	-0.134 (-1.619)
LARGFIRM=0			
OFFICE	0.044 (1.063)	0.025 (0.623)	0.045 (1.083)
BLUE	0.023 (0.354)	0.033 (0.552)	0.023 (0.355)
MANPROF	-0.006 (-0.125)	0.028 (0.576)	-0.001 (-0.187)
FARMING	-0.075 (-0.791)	-0.044 (-0.492)	-0.077 (-0.815)
SERVER=0			
MINOR	0.127 (0.884)	-0.053 (-0.556)	0.134 (0.933)
LANGDIF	-0.108 (-1.208)	-0.128 (-1.868)*	-0.124 (-1.429)
FORNBN		0.101 (1.563)	0.147 (1.234)
Interaction Terms			
FORNELM			-0.395 (-1.527)
FORNSMP			-0.036 (-0.217)
FORNPOST			-0.151 (-0.876)
FORNUNIV			-0.187 (-1.035)
FORNOFF			-0.278 (-1.796)*
FORNBLUE			0.148 (0.740)
FORNMAN			0.319 (1.995)*

Indep. Variables	Canadian-born	POOLED SAMPLE NO INTERACTION	POOLED SAMPLE WITH INTERACTION
FORNFARM			0.419 (1.371)
FORNMINA			-0.311 (-1.601)
FORNLANG			0.039 (0.269)
CONSTANT	-0.983 (-11.176)*	-0.966 (-11.605)*	-0.971 (-11.595)*
Likelihood ratio test	3542.51	3915.50	3935.59
R-squared Maddala Cragg-Uhler	 0.189 0.397	 0.186 0.395	 0.187 0.397
% Right Predictions	90.0	90.3	90.3
# obs.@ one Total # obs	1681 16900	1844 18976	1844 18976

a significant t-value of 2.412, while the minority status terms FORNMINA and FORNLANG were both insignificant.

Among females, the coefficient of FORNBN was positive though insignificant in both of the pooled sample with and without immigrant interaction variables. The interaction terms for minority by race FORNMINA, office occupation FORNOFF, and all the education terms FORNELM, FORNSMP, FORNPOST and FORNUNIV showed negative signs, indicating that these factors tend to reduce the participation of immigrants in moonlighting activity relative to the respective reference groups. However, among these factors, only FORNOFF, that is, immigrants occupying office jobs, was statistically significant with a t-value of 1.796.

Contrary to expectation, working in managerial or professional occupations was not associated with lower likelihood of moonlighting but appears to increase the likelihood of moonlighting among immigrant female workers, as the coefficient of interaction term FORNMAN is positive and statistically significant with a t-value of 1.995. For Canadian-born female workers, managerial or professional occupation (MANPROF) had an insignificant though positive coefficient, with respect to the occupational reference group SERVER.

Recent surveys seem to indicate that moonlighting activity is expanding fast among highly skilled professional workers in Canada for reasons of personal finance, and opportunities for part-time work and expanded skill base (Kelman, 1993).

9.1.3 Other Results from the Probit Estimates

The likelihood of an individual worker engaging in moonlighting activity seems to increase at younger ages 16-34 as coefficients of age-group 16-24 and 25-34 are positive and significant in all the equations. On the other hand at older ages 45-64, for both females and males, the likelihood of moonlighting appears to diminish, as the coefficients of

age-group 55-64 are negative and significant.

Contrary to expectation higher education appeared to be associated with increased likelihood of moonlighting among both males and females males. However, the coefficient of UNIV university education though positive was insignificant with t-values lower than unity.

Marital status appears not to influence participation in moonlighting activity among males in both the Canadian-born sample and in the pooled sample. However, in the female samples not being married appeared to be associated with significantly higher probability of moonlighting, as the variables included SINGLE and OTHERM appear with positive and highly significant coefficients. The implication is that being a married female reduces ones likelihood of participating in moonlighting activity, perhaps, because of the second income or the higher level of home production activity.

The presence of children aged five and below tends to increase the likelihood of moonlighting among male workers, probably as the result of reduced income as female partner takes time off to care for the children, but reduces the likelihood of females engaging in moonlighting activity. On other hand, the presence of children aged six years and above appear to be an insignificant factor in determining the likelihood of moonlighting activity among both male and female workers, though it shows a negative coefficient.

Among males, working in a farming occupation increases the likelihood of participation in moonlighting activity in both the pooled sample and for Canadian-born male workers. Among female workers, occupation appears not to be a significant factor determining the likelihood of participation in moonlighting activity.

Minority status appear to be an insignificant factor in determining the likelihood of participation in moonlighting activity in general, though in

the pooled female sample the coefficient of language first spoken LANGDIF was positive and significant with a t-value of (1.368).

In summary, we observe that there is certain commonness in the responses to moonlighting activity between Canadian-born and pooled samples, given the determinants of the likelihood of moonlighting. We find that hours available at the primary job have the same impact on the likelihood of moonlighting among all the samples. Therefore, we could conclude that the observed difference in moonlighting rates between Canadian-born and immigrant workers may be due to the fact that immigrants are located away from occupations such as farming, age groups such as 16-24, and marital status (being single) which are associated with high moonlighting activity.

9.2 Estimates of the Supply Function For Moonlighting Hours

In the estimates of the supply of moonlighting hours, the results of which are shown in Tables 9.3 and 9.4 below, we sought to find out the direction and strength of the relationship between the "primary" determinants of moonlighting hours, namely, the actual hours at the first job, the wage rate at the first job, and the moonlighting wage. The second aim was to find the source of the difference in the moonlighting hours supplied by immigrants and by Canadian-born workers.

Another hypothesis that was tested is the role of transferability of specific and general skills as measured by the dummies SAMEOCC2 and SAMNDUS2, respectively.

As expected the sign of the wage rate at the first job HWAGE1 is negative and highly significant in all the equations, for both males and females. For the male samples, the values of the coefficient of the primary wage rate HWAGE1 were 25.067, 25.321, and 25.328, for Canadian-born male workers, the pooled male with no immigrant interaction

variables, and the pooled male sample with immigrant interaction variables, respectively. All had t-values exceeding 4.300.

For female workers, the value of the coefficient of HWAGE1 were higher at 50.978, 50.262 and 48.901 for the Canadian-born female workers, the pooled female sample without immigrant interaction variables, and for the pooled female sample with immigrant interaction variables. All had t-values exceeding 7.000.

The hours at the primary job HOURS1 was also negative in all the equations, but insignificant in the Canadian-born male equation and only slightly significant in the pooled male equation with a t-ratio of 1.685. In the female samples, hours at the primary job tended to reduce moonlighting hours significantly.

The moonlighting wage variable, MOONWAGE, had a positive and highly significant coefficient in all the equations, indicating that the moonlighting hours supply curve in relation to the moonlighting wage is positively-sloped. The t-values associated with the MOONWAGE coefficient exceeded 10.000 in the male samples and 7.500 in the female samples.

The elasticity of moonlighting hours with respect to the moonlighting wage for the various samples are given in Table 9.6. The results indicate that the moonlighting wage elasticities are slightly higher for the pooled sample than for the Canadian-born sample. Based on the basic linear equation without foreign-born interaction terms, the moonlighting wage elasticity for the pooled sample is 0.304 and 0.290 for males and females, respectively, compared with 0.288 and 0.265 for Canadian-born males and females, respectively.

Generally we found the coefficient of the foreign-born variable FORNBN to be positive but insignificant in all the pooled equations, indicating that "foreign-ness" is not an influential factor in determining moonlighting hours in the Canadian labour market.

We found that among the interaction terms, only FORNUNIV and FORNFARM

had negative and significant coefficients in the pooled female sample, while in the pooled male sample only FORNEIM was positive and significant.

Moonlighting hours appeared to be greater at younger ages 16-34 and lower at older ages 45-64 for male moonlighters, while among female moonlighters the age dummies were generally statistically insignificant, except for age-group 55-64 which had a negative and significant coefficient. Being single also appears to significantly reduce moonlighting hours among male moonlighters while being widowed, separated or divorced (OTHERM) tends to increase moonlighting hours significantly among female moonlighters.

As was expected SAMNDUS2 was positive and highly significant factor in determining moonlighting hours among males, with t-values exceeding 3.400 in all the male samples, while SAMEOCC2 coefficient was not significant, though positive, with t-values around 0.500.

Among the pooled female moonlighters, on the other hand, skill transferability factors SAMEOCC2 were positively significant with a t-value of 2.125 in the pooled sample without immigrant interaction variables and 2.193 in the pooled sample with immigrant interaction variables. However, both SAMNDUS2 and SAMEOCC2 were insignificant for Canadian-born female moonlighters.

Table 9.5 presents the results of the estimates of the moonlighting hours supply function with quadratic terms for the primary wage and moonlighting wage. The results indicate that the supply of moonlighting hours curve is negative in the primary wage but turns positive at some value of the primary wage.

TABLE 9.3
ORDINARY LEAST SQUARES ESTIMATES OF THE (LINEAR) ANNUAL MOONLIGHTING HOURS FUNCTION(t-values in parentheses). MALES

	Canadian-born	POOLED SAMPLE No Interaction	POOLED SAMPLE With Interaction
Mean of Dep. Variable	1249.8	1254.5	1254.5
S.E.E	819.29	809.45	809.73
Indep. Variables			
HWAGE1	-25.067 (-4.346)*	-25.321 (-4.725)*	-25.328 (-4.712)*
HOURS1	-0.100 (-1.369)	-0.111 (-1.685)*	-0.105 (-1.585)
MOONWAGE	45.362 (10.020)*	47.778 (11.261)*	47.837 (11.264)*
AGE1624	103.92 (1.483)	95.287 (1.440)	98.702 (1.491)
AGE2534	107.74 (1.747)*	102.86 (1.786)*	104.72 (1.813)*
AGE3544=0			
AGE4554	-42.862 (-0.460)	-67.480 (-0.795)	-67.169 (-0.788)
AGE5564	-138.49 (-1.027)	-154.42 (-1.274)	-167.22 (-1.375)
ELEMENT	-124.92 (-1.930)*	-98.688 (-1.626)	-122.98 (-1.954)*
HISCHO=0			
SMPSTSEC	-48.544 (-0.855)	-61.632 (-1.166)	-47.955 (-0.855)
POSTSEC	-104.79 (-1.719)*	-77.805 (-1.378)	-108.75 (-1.813)*
UNIV	117.00 (1.432)	110.81 (1.461)	109.23 (1.357)
MARRIED=0			
SINGLE	-150.73 (-3.009)*	-152.46 (-3.208)*	-149.79 (-3.146)*
OTHERM	-94.506 (-0.868)	-124.41 (-1.186)	-119.84 (-1.141)
UNION1	-69.289 (-0.609)	-31.848 (-0.305)	-34.132 (-0.326)

SAMNDUS2	190.42 (3.468)*	207.25 (3.998)*	211.21 (4.066)*
SAMEOCC2	22.655 (0.406)	27.555 (0.522)	26.442 (0.501)
OFFICE	-42.240 (-0.502)	-28.845 (-0.366)	-41.437 (-0.498)
BLUE	-63.284 (-1.258)	-64.500 (-1.357)	-66.695 (-1.350)
MANPROF	-0.172 (-0.002)	-11.584 (-0.182)	-3.263 (-0.049)
FARMING	-195.71 (-3.053)*	-194.75 (-3.162)*	-195.42 (-3.093)*
SERVER=0			
FORNBN		48.993 (0.785)	-68.630 (-0.423)
Interaction terms			
FORNELM			365.56 (1.726)*
FORNSMP			-61.734 (-0.363)
FORNPOST			287.62 (1.572)
FORNUNIV			44.645 (0.190)
FORNOFF			195.46 (0.729)
FORNBLUE			36.042 (0.207)
FORNMAN			-1.795 (-0.008)
FORNFARM			98.445 (0.300)
CONSTANT	996.87 (12.286)*	979.34 (12.776)*	979.52 (12.660)*
Adj.R-squared	0.138	0.155	0.154
F(K-1,N-K)	17.154	20.276	14.993
No.of Obs.	2011	2210	2210

S.E.E = standard error of the estimate.

TABLE 9.4

ORDINARY LEAST SQUARES ESTIMATES OF THE (LINEAR) ANNUAL MOONLIGHTING HOURS FUNCTION (t-values in parentheses). FEMALES

	Canadian-born	POOLED SAMPLE No Interaction	POOLED SAMPLE With Interaction
Mean of Dependent Variable	1082.1	1092.6	1092.6
S.E.E	728.71	733.40	730.90
Indep. Variables			
HWAGE1	-50.978 (-7.522)*	-50.262 (-7.773)*	-48.901 (-7.570)*
HOURS1	-0.204 (-2.430)*	-0.206 (-2.592)*	-0.214 (-2.710)*
MOONWAGE	47.000 (7.519)*	44.386 (7.529)*	45.994 (7.790)*
AGE1624	-10.184 (-0.153)	24.281 (0.387)	16.638 (0.265)
AGE2534	-103.81 (-1.635)	-63.508 (-1.071)	-69.634 (-1.170)
AGE3544=0			
AGE4554	-121.32 (-1.105)	-40.996 (-0.416)	-62.170 (-0.630)
AGE5564	-330.45 (-1.829)*	-315.37 (-1.831)*	-306.40 (-1.778)*
ELEMENT	-116.15 (-1.186)	-93.980 (-0.992)	-110.96 (-1.133)
HISCHO=0			
SMPSTSEC	-78.401 (-1.593)	-64.696 (-1.361)	-78.922 (-1.602)
POSTSEC	71.655 (1.327)	52.596 (1.009)	64.037 (1.189)
UNIV	211.55 (3.072)*	162.95 (2.486)*	211.87 (3.081)*
MARRIED=0			
SINGLE	11.642 (0.259)	13.136 (0.302)	14.327 (0.331)
OTHERM	261.40 (3.645)*	225.98 (3.270)*	230.59 (3.341)*
UNION1	33.240 (0.286)	54.029 (0.489)	34.604 (0.314)

SAMNDUS2	48.740 (0.980)	70.668 (1.481)	69.111 (1.452)
SAMEOCC2	87.445 (1.637)	108.40 (2.125)*	111.67 (2.193)*
OFFICE	71.924 (1.622)	61.361 (1.424)	70.508 (1.590)
BLUE	-99.210 (-1.395)	-59.746 (-0.883)	-96.927 (-1.361)
MANPROF	-59.886 (-1.048)	-29.471 (-0.541)	-61.078 (-1.073)
FARMING	-68.836 (-0.657)	-110.44 (-1.100)	-68.740 (-0.654)
SERVER=0			
FORNBN		84.918 (1.362)	96.786 (0.867)
Interaction terms			
FORNELM			500.19 (1.338)
FORNSMP			138.54 (0.786)
FORNPOST			-275.09 (-1.412)
FORNUNIV			-474.83 (-2.282)*
FORNOFF			-201.54 (-1.122)
FORNBLUE			346.19 (1.561)
FORNMAN			296.35 (1.628)
FORNFARM			-632.02 (-1.805)*
CONSTANT	885.980 (11.687)*	859.660 (11.973)*	855.98 (11.877)*
Adj.R-squared	0.177	0.170	0.176
F(K-1,N-K)	19.073	18.965	14.535
No.of Obs.	1681	1844	1844

S.E.E= standard error of the estimate.

TABLE 9.5
ORDINARY LEAST SQUARES ESTIMATES OF THE (QUADRATIC IN WAGES) ANNUAL MOONLIGHTING HOURS FUNCTION (t-values in parentheses)

	Canadian-born MALES	Canadian-born FEMALES	POOLED SAMPLE MALES	POOLED SAMPLE FEMALES
Mean of Dependent Variable	1249.8	1082.1	1254.5	1092.6
S.E.E	797.0	712.1	788.9	715.0
Indep. Variables				
HWAGE1	-54.609 (-5.906)*	-78.991 (-7.109)*	-54.353 (-6.237)*	-77.664 (-7.274)*
HWAGE1SQ	1.485 (4.156)*	2.148 (3.538)*	1.460 (4.269)*	2.126 (3.574)*
HOURS1	0.110 (1.536)	0.066 (0.757)	0.087 (1.310)	0.079 (0.951)
MOONWAGE	125.670 (13.066)*	145.570 (10.361)*	125.060 (13.665)*	151.020 (11.183)*
MWAGESQ	-3.167 (-9.606)*	-5.122 (-7.996)*	-3.049 (-9.687)*	-5.479 (-8.918)*
AGE1624	121.060 (1.774)*	-22.632 (-0.347)	112.550 (1.744)*	16.796 (0.275)
AGE2534	86.556 (1.442)	-111.300 (-1.794)*	85.469 (1.522)	-66.547 (-1.151)
AGE3544=0				
AGE4554	-34.087 (-0.376)	-139.940 (-1.305)	-63.910 (-0.772)	-58.763 (-0.611)
AGE5564	-124.520 (-0.949)	-343.880 (-1.947)*	-152.890 (-1.294)	-311.370 (-1.854)*
ELEMENT	-125.760 (-1.997)*	-107.370 (-1.122)	-95.526 (-1.614)	-89.305 (-0.966)
HISCHO=0				
SMPSTSEC	-72.375 (-1.309)	-74.920 (-1.557)	-86.507 (-1.678)*	-62.122 (-1.341)
POSTSEC	-90.682 (-1.529)	41.678 (0.789)	-62.787 (-1.141)	21.527 (0.423)
UNIV	126.340 (1.588)	178.670 (2.651)*	115.810 (1.565)	139.830 (2.186)*
MARRIED=0				
SINGLE	-123.790 (-2.536)*	23.762 (0.541)	-123.970 (-2.672)*	23.098 (0.545)
OTHERM	-84.499 (-0.797)	230.220 (3.280)*	-114.150 (-1.116)	190.480 (2.823)*

UNION1	-47.136 (-0.423)	15.716 (0.138)	-2.130 (-0.021)	13.739 (0.127)
SAMNDUS2	174.570 (3.267)*	43.568 (0.896)	191.660 (3.793)*	66.295 (1.424)
SAMEOCC2	13.356 (0.246)	72.166 (1.382)	16.441 (0.319)	93.730 (1.883)*
OFFICE	-11.287 (-0.138)	42.149 (0.968)	-1.846 (-0.024)	30.013 (0.711)
BLUE	-93.918 (-1.916)*	-109.410 (-1.574)	-94.366 (-2.033)*	-66.796 (-1.012)
MANPROF	-24.774 (-0.373)	-69.850 (-1.251)	-35.169 (-0.566)	-40.470 (-0.762)
FARMING	-189.740 (-3.041)*	-71.622 (-0.699)	-191.030 (-3.180)*	-115.900 (-1.184)
SERVER=0				
FORNBN			56.836 (0.934)	82.777 (1.361)
CONSTANT	633.180 (7.070)*	554.980 (6.347)*	628.810 (7.401)*	492.340 (5.913)*
Adj.R-squared	0.185	0.214	0.197	0.211
F(K-1,N-K)	21.693	21.812	24.603	22.425
No.of Obs.	2011	1681	2210	1844

TABLE 9.6.

THE CRITICAL (TURNING) POINT ON MOONLIGHTING HOURS CURVE WITH RESPECT TO THE MOONLIGHTING WAGE RATE (ESTIMATED FROM TABLE 9.5)

	CB MALES	CB FEMALES	POOLED MALES	POOLED FEMALES
Intercept Coefficient	633.18	554.98	628.81	492.34
Moonwage Coefficient	125.67	145.57	125.06	151.02
Moonwage squared Coefficient	-3.167	-5.122	-3.049	-5.479
Critical value of Moonwage $	19.84	14.21	20.51	13.78
Moonlighting wage Elasticity [1]	0.288	0.265	0.304	0.290

[1] Based on the linear moonlighting hours estimates.

The results also indicate that moonlighting hours increase with the moonlighting wage but the supply curve turns backwards at some point. Table 9.6 gives some detail as to the critical (turning) points on the moonlighting hours supply curve. From Table 9.5 we observe that the quadratic moonlighting wage term is negative and significant in all the equations, with t-values exceeding 7.900.

The moonlighting hours supply function with respect to the moonlighting wage may be expressed as follows:

1) For Canadian-born male moonlighters-

$$H_m = 633.18 + 125.67\ MOONWAGE - 3.167\ MOONWAGE^2$$

2) For all (pooled) male moonlighters-

$$H_m = 628.81 + 125.06\ MOONWAGE - 3.049\ MOONWAGE^2$$

3) For Canadian-born female moonlighters-

$$H_m = 554.98 + 145.57\ MOONWAGE - 5.122\ MOONWAGE^2, \text{ and}$$

4) For all (pooled) female moonlighters-

$$H_m = 492.34 + 151.02\ MOONWAGE - 5.479\ MOONWAGE^2.$$

It is observed that the "backward-bending" point in the moonlighting hours' curve with respect to moonlighting wage occurs earlier for female moonlighters (at $14.21 and $13.78 for Canadian-born and for all females, respectively) than for male moonlighters (at $19.84 and $20.51 for Canadian-born and for all males, respectively). We also observe that the structure of the moonlighting supply curve with respect to the moonlighting wage is similar between Canadian-born males and the pooled males sample, indicating that influences of the determinants of moonlighting activity may be the same for Canadian-born as for any other individual in the Canadian labour market.

It also indicates that "unobservable" influences may be irrelevant in

determining the differences in the intensity of moonlighting activity among individuals. The relevant variables may simply be the observable demographic characteristics such as whether the individual is able to find a second job in the same occupation or industry as his or her primary job, marital status, wage rate at the primary job and the offered moonlighting wage.

9.3 SUMMARY OF FINDINGS AND CONCLUSIONS

From the probit and ordinary least squares estimates, we find that "foreign-ness" per se is not a factor in determining the difference in the moonlighting activity between immigrants and Canadian-born workers.

The results also show that moonlighting activity is significantly influenced by hours worked at the primary job as well as by the wage rate at both the primary job and the secondary job, as predicted by neoclassical theory. In particular, we found that hours worked at the primary job had similar impact on all workers. Furthermore, we found that workers with fixed hours schedules are also more likely to moonlight. Thus the fact immigrants are pre-selected into booming labour markets may be the true reason why they moonlight less. Unobservable characteristics of "foreign-ness" appear to provide an insignificant explanation.

Chapter 10

GENERAL CONCLUSIONS

The immigrant selectivity hypothesis has been a major explanation for the observed differences in the labour market performance between immigrants and native-born populations since 1978. It emphasises unobservable factors- the superior motivation, drive and initiative of immigrants- as the main source of the difference. Hitherto, empirical investigation of the implications of this hypothesis has focused on earnings, without much attention to the labour supply aspects of earnings.

Our purpose was to examine this hypothesis from the perspective of labour supply by estimating and evaluating wage and intercept coefficients of the respective labour supply functions and employing Blinder and Oaxaca's decomposition technique to derive the importance of the various determinants to the labour supply differences between immigrants and Canadian-born workers.

The results indicate that on the basis of annual hours worked:

1) There is no significant difference in the structure of the labour supply function based on annual hours, with respect to the wage rate, between immigrants and Canadian-born;

2) The differences in annual hours worked between immigrants and Canadian-born workers are mainly explained by the differences in the means of the independent variables included in the estimations; "unexplained" factors appear to contribute negatively to the labour supply differences.

The results also indicated that while the Canadian-born population appears to be significantly affected by constraints on participation in the labour force, immigrants, by virtue of their observable demographic characteristics such as region of residence, marital status, and

education, do not face the same constraints. As a consequence of these constraints we found that more Canadian-born workers engaged in moonlighting activity.

Examination of participation in moonlighting activity and the supply of moonlighting hours through probit and ordinary least squares analyses revealed that hours worked at the primary job, among others, was a significant determinant of moonlighting activity. Thus, the observation that immigrants moonlight less than do Canadian-born workers may be explained by the fact that immigrants are selected into primary jobs by immigration policy and the immigration process.

Finally, to the extent that the labour supply performance of immigrants could be attributed to their observable demographic characteristics, deliberate immigration policy is a relevant explanation for the overall economic performance of immigrants vis-a-vis Canadian-born. By pre-selecting immigrants with the "required" demographic characteristics immigration policy could help meet the labour market needs of the Canadian economy.

APPENDICES

TABLE A . DESCRIPTION OF VARIABLES USED IN THE REGRESSION ANALYSES

ACRONYM	DESCRIPTION
HOURS87	Total annual hours worked at all jobs in 1987
HOURS1	Total annual hours worked at first job in 1986-87
HWAGE1	Hourly wage rate at first job held in 1986-87
AVWAG87	Average wage rate for all jobs held in 1986-87
HRSPWK	Average weekly hours at the first job in 1986-7
WKE86	Weeks worked at all jobs in 1986
STUDTIME	Time (months) spent in 1987 in school, college or university
KIDAGEDV	Number of children aged five and below
KIDSABFV	Number of children aged 6-24 years
MARRIED	Dummy variable =1 if married and 0 otherwise
SINGLE	Dummy variable =1 if single and 0 otherwise
OTHERM	Dummy variable =1 if not married or single and 0 otherwise
CANADABN	Dummy variable =1 if born in Canada and 0 otherwise
FORNBN	Dummy variable =1 if born outside Canada and 0 otherwise
MINOR	Dummy variable =1 if visible minority and 0 otherwise
LANGDIF	Dummy variable =1 if first language spoken is neither English nor French and 0 otherwise
RESPONSE	Dummy variable =1 if individual worked at least one hour in 1987 and 0 otherwise
NOTSATIF	Dummy variable =1 if not satisfied with weeks of work in 1987 and desired additional hours and 0 otherwise

ACRONYM	DESCRIPTION
AGE1624	Dummy variable =1 if aged 16-24 years, and 0 otherwise
AGE2534	Dummy variable =1 if aged 25-34 years, and 0 otherwise
AGE3544	Dummy variable =1 if aged 35-44 years, and 0 otherwise
AGE4554	Dummy variable =1 if aged 45-54 years, and 0 otherwise
AGE5564	Dummy variable =1 if aged 55-64 years, and 0 otherwise
ELEMENT	Dummy variable =1 if individual had elementary or no education, and 0 otherwise
HISCHO	Dummy variable =1 if individual had high school education, and 0 otherwise
SMPSTSEC	Dummy variable =1 if individual had some post-secondary education, and 0 otherwise
POSTSEC	Dummy variable =1 if individual had post-secondary diploma or certificate, and 0 otherwise
UNIV	Dummy variable =1 if individual had university education, and 0 otherwise
ATLANTIC	Dummy variable =1 if individual lived in the province of Newfoundland, Nova Scotia, Prince Edward Island or New Brunswick, and 0 otherwise
QUEBEC	Dummy variable =1 if individual lived in the province of Quebec, and 0 otherwise
ONTARIO	Dummy variable =1 if individual lived in the province of Ontario, and 0 otherwise
PRAIRIE	Dummy variable =1 if individual lived in the province of Manitoba, Saskatchewan or Alberta, and 0 otherwise
BC	Dummy variable =1 if individual lived in the province of British Columbia, and 0 otherwise

ACRONYM	DESCRIPTION
PRIMARY	Dummy variable =1 if individual's first job in 1986-87 was in agriculture, forestry, fishing and trapping, metal mines, mineral fuels, non-metal mines, quarries and sand pits, and services incidental to mining, and 0 otherwise
MANUFAC	Dummy variable =1 if individual's first job in 1986-87 was in food and beverage industry, tobacco products, rubber and plastics, leather, textile and knitting mills, clothing, wood, furniture and fixtures, paper and allied industries, printing-publishing and allied industries, primary metals, metal fabricating, machinery and transportation equipment, electrical products, non-metallic mineral products, petroleum and coal products, chemical and chemical products, miscellaneous manufacturing, general contractors and special trades contractors, and 0 otherwise
GOVSERV	Dummy variable =1 if individual's first job in 1986-87 was in federal, provincial or local administration and other government offices, and 0 otherwise
TRADE	Dummy variable =1 if individual's first job in 1986-87 was in wholesale or retail trade, and 0 otherwise
UTILITY	Dummy variable =1 if individual's first job in 1986-87 was in transportation, storage, communication, and electrical power, gas and water utilities, and 0 otherwise
FINANCE	Dummy variable =1 if individual's first job in 1986-87 was in finance, insurance carriers and insurance agencies and real estate industries, and 0 otherwise
SERVICE	Dummy variable =1 if individual's first job in 1986-87 was in education and related services, health and welfare services, religious organisations, amusement and recreation services, services to business management, personal services, accommodation and food services and miscellaneous services, and 0 otherwise

ACRONYM	DESCRIPTION
FARMING	Dummy variable =1 if individual's first occupation in 1986-87 was as a farmer or farm manager, or in the fields of horticulture and animal husbandry, fishing, hunting and trapping, forestry and logging, and 0 otherwise
MANPROF	Dummy variable =1 if individual's first occupation in 1986-87 was as a government official or administrator, or in the fields of management and administration related, or in physical and life sciences, mathematics, statistics and systems analysis, architecture and engineering and related, social science and related fields, religion, elementary, secondary, university and related, other teaching, health diagnosing and treating, nursing, therapy, medicine and related fields, and 0 otherwise
OFFICE	Dummy variable =1 if individual's first job in 1986-87 was in stenography and typing, bookkeeping, account-recording, office machine and EDP operation, reception, information, mail and message distribution, library, file, correspondence and other clerical and related occupations, and 0 otherwise
BLUE	Dummy variable =1 if individual's first job in 1986-87 was in mining and quarrying, food and beverage and other processing, metal shaping, forming and other machining occupations, metal products, electrical, electronics and related equipment, textiles, furs and leather goods, wood products, rubber, plastics and related products, mechanics and repairmen, excavating, grading, paving and related, electrical power, lighting and wire communications, motor transport operators, material handling, craft and equipment operators and related occupations and 0 otherwise

ACRONYM	DESCRIPTION
SERVER	Dummy variable =1 if individual's first occupation in 1986-87 was in sales (commodities, services and others), protective services, food and beverage preparation, lodging and accommodation, personal, apparel and furnishing service, and related occupations, and 0 otherwise
UNION1	Dummy variable =1 if individual's first job in 1986-87 was a unionised job or covered by collective agreement, and 0 otherwise
UNIONM	Dummy variable =1 if any of the jobs held by the individual in 1986-87 was a unionised job or covered by collective agreement, and 0 otherwise
PARTTIME	Dummy variable =1 if individual's first job in 1986-87 entailed less than 120 hours per lunar month, and 0 otherwise
TENURE	The number of weeks worked at the first job in 1986.
WELFARE	Dummy variable =1 if individual received social assistance or welfare benefits in 1987, and 0 otherwise
UIB	Dummy variable =1 if individual received unemployment benefits in 1987, and 0 otherwise
COMPENS	Dummy variable =1 if individual received worker's compensation in 1987, and 0 otherwise
PENSION	Dummy variable =1 if individual received pension benefits in 1987, and 0 otherwise
STUDENT	Dummy variable =1 if individual attended school, college or university as a fulltime student in 1987
FIXEDHRS	Dummy variable =1 if the number of weeks worked by the individual at his/her first job was always the same from month to month in 1987, and 0 otherwise
SAMNDUS2	Dummy variable =1 if individual's second job in 1987-86 was in the same industry as the first job, and 0 otherwise

ACRONYM	DESCRIPTION
SAMEOCC2	Dummy variable =1 if individual's second job in 1986-87 was in the same occupation as the first job, and 0 otherwise
PENCOVER	Dummy variable =1 if individual's first job in 1986-87 was covered by pension, and 0 otherwise
SMALFIRM	Dummy variable =1 if individual worked in a business with less than 100 employees at all locations in Canada in 1987, and 0 otherwise
MEDFIRM	Dummy variable =1 if individual worked in a business with 100-499 employees at all locations in Canada in 1987, and 0 otherwise
LARGFIRM	Dummy variable =1 if individual worked in a business with 500 plus employees at all locations in Canada in 1987, and 0 otherwise
NTERRUPT	Number of job interruptions at the individual's first job in 1987
LACKINFO	Dummy variable =1 if lack of information caused difficulty in looking for work during non-working period, and 0 otherwise
LACKSKIL	Dummy variable =1 if lack of skill caused difficulty in looking for work during non-working period, and 0 otherwise
LACKEDUC	Dummy variable =1 if lack of education caused difficulty in looking for work during non-working period, and 0 otherwise
LACKEXP	Dummy variable =1 if lack of experience caused difficulty in looking for work during non-working period, and 0 otherwise
DISABLE	Dummy variable =1 if poor health, physical or mental condition caused difficulty in looking for work during non-working period, and 0 otherwise
JOBSHORT	Dummy variable =1 if lack of jobs in the area caused difficulty in looking for work during non-working period, and 0 otherwise

ACRONYM	DESCRIPTION
RATND	Dummy variable =1 if individual desired additional hours at his/her first job but was not offered by the employer, and 0 otherwise
LAKEDUC1	Dummy variable =1 if lack of education was a reason for not getting additional desired hours at the first job in 1986-87, and 0 otherwise
LACKEXP1	Dummy variable =1 if lack of experience was a reason for not getting additional desired hours at the first job in 1986-87, and 0 otherwise
LACKSKL1	Dummy variable =1 if lack of skill was a reason for not getting additional desired hours at the first job in 1986-87, and 0 otherwise
JBSHORT1	Dummy variable =1 if job shortage was a reason for not getting additional desired hours at the first job in 1986-87, and 0 otherwise

TABLE B.

MEANS AND STANDARD DEVIATIONS (in parentheses) OF MAJOR VARIABLES USED IN THE REGRESSIONS BASED ON THE POPULATION OF MALE WORKERS AGED 16-64 YEARS, EXCLUDING SELF-EMPLOYED

VARIABLE	FORNBN	CANADABN	POOLED
HOURS87 (hours)	1890 (708)	1804 (816)	1813 (804)
HOURS1 (hours)	1524 (961)	1394 (1032)	1411 (1024)
HWAGE ($)	11.98 (9.48)	9.85 (7.76)	10.09 (8.00)
AVWAGE ($)	13.83 (8.28)	11.98 (6.28)	12.18 (6.56)
HRSPWK (hours)	33.88 (17.82)	32.01 (20.51)	32.20 (20.23)
RESPONSE %	74.5 (0.44)	77.3 (0.42)	76.89 (0.42)
STUDENT %	8.66 (0.28)	11.78 (0.32)	11.4 (0.32)
STUDTIME(mnths)	0.636 (2.23)	0.866 (2.56)	0.839 (2.52)
KIDAGEDV	0.28 (0.62)	0.30 (0.64)	0.30 (0.63)
KIDSABFV	1.13 (1.24)	1.06 (1.22)	1.07 (1.23)
MARRIED %	76.3 (0.42)	65.9 (0.47)	67.0 (0.47)
SINGLE %	19.0 (0.39)	30.0 (0.46)	28.8 (0.45)
OTHERM %	4.7 (0.21)	4.1 (0.20)	4.2 (0.20)
CANADABN %	-	1.00 (0.0)	88.4 (0.32)
FORNBN %	1.00 (0.0)	-	11.1 (0.31)
MINOR %	26.1 (0.44)	1.00 (0.1)	3.8 (0.19)
LANGDIF %	57.4 (0.49)	4.2 (0.20)	10.5 (0.31)
AGE1624 %	13.3 (0.34)	25.0 (0.43)	23.7 (0.42)
AGE2534 %	20.3 (0.40)	31.1 (0.46)	29.9 (0.46)
AGE3544 %	28.7 (0.45)	22.5 (0.42)	23.2 (0.42)
AGE4554 %	22.6 (0.42)	13.4 (0.34)	14.4 (0.35)
AGE5564 %	13.9 (0.35)	7.5 (0.26)	8.2 (0.27)
ELEMENT %	13.0 (0.34)	12.8 (0.34)	12.8 (0.33)
HISCHO %	41.4 (0.49)	53.0 (0.50)	51.7 (0.50)
SMPSTSEC %	10.4 (0.30)	10.5 (0.31)	10.4 (0.31)

POSTSEC	%	14.2 (0.35)	12.5 (0.33)	12.7 (0.33)
UNIV	%	21.0 (0.41)	11.2 (0.31)	12.3 (0.33)
ATLANTIC	%	7.2 (0.26)	27.8 (0.45)	25.6 (0.44)
QUEBEC	%	7.9 (0.27)	17.1 (0.38)	16.1 (0.37)
ONTARIO	%	37.5 (0.48)	18.9 (0.39)	20.9 (0.41)
PRAIRIE	%	30.5 (0.46)	27.7 (0.45)	28.0 (0.45)
BC	%	16.9 (0.37)	8.5 (0.28)	9.4 (0.29)
UNION1	%	33.9 (0.47)	31.8 (0.47)	32.1 (0.47)
UNIONM	%	39.4 (0.49)	38.0 (0.48)	38.2 (0.49)
PRIMARY	%	6.1 (0.24)	11.1 (0.31)	10.6 (0.31)
MANUFAC	%	36.1 (0.48)	28.0 (0.45)	29.0 (0.45)
GOVSERV	%	7.2 (0.26)	10.0 (0.30)	9.7 (0.30)
UTILITY	%	8.0 (0.27)	11.0 (0.31)	10.7 (0.31)
TRADE	%	12.7 (0.33)	17.4 (0.38)	16.9 (0.37)
FINANCE	%	3.6 (0.19)	2.6 (0.16)	2.7 (0.16)
SERVICE	%	26.1 (0.44)	19.6 (0.40)	20.3 (0.40)
BLUE	%	43.5 (0.50)	45.7 (0.50)	45.6 (0.50)
OFFICE	%	4.9 (0.22)	6.0 (0.24)	5.9 (0.24)
MANPROF	%	31.0 (0.46)	22.6 (0.42)	23.6 (0.42)
FARMING	%	2.9 (0.16)	7.2 (0.26)	6.7 (0.25)
SERVER	%	17.7 (0.38)	18.4 (0.39)	18.3 (0.39)
WELFARE	%	1.1 (0.10)	2.4 (0.15)	2.3 (0.15)
UIB	%	13.1 (0.34)	21.7 (0.41)	20.8 (0.41)
COMPENS	%	3.4 (0.18)	3.5 (0.18)	3.5 (0.18)
PENSION	%	3.3 (0.18)	2.8 (0.16)	2.9 (0.17)
PARTTIME	%	6.8 (0.25)	7.6 (0.26)	7.5 (0.26)
FULLTIME	%	93.2 (0.25)	92.4 (0.26)	92.5 (0.26)
SMALFIRM	%	27.4 (0.45)	28.3 (0.45)	28.1 (0.45)
MEDFIRM	%	10.6 (0.31)	9.6 (0.29)	9.7 (0.30)
LARGFIRM	%	34.2 (0.47)	40.0 (0.49)	40.6 (0.49)

LACKEDUC %	1.4 (0.12)	2.6 (0.16)	2.5 (0.16)
LACKSKIL %	2.3 (0.15)	3.3 (0.18)	3.2 (0.18)
LACKEXP %	2.4 (0.15)	3.2 (0.17)	3.1 (0.17)
JOBSHORT %	4.6 (0.21)	8.3 (0.28)	7.9 (0.27)
DISABLE %	0.3 (0.06)	0.3 (0.06)	0.3 (0.06)
NTERRUPT %	6.0 (0.26)	6.6 (0.28)	6.5 (0.28)
FIXEDHRS %	96.0 (0.20)	94.6 (0.22)	94.8 (0.22)
WKOU87 (weeks)	2.24 (7.04)	3.63 (8.89)	3.49 (8.71)
NOTSATIF %	13.9 (0.35)	18.7 (0.39)	18.2 (0.39)
NOTSAT1 %	1.6 (0.13)	2.3 (0.15)	2.2 (0.15)
LAKEDUC1 %	0.6 (0.08)	1.2 (0.11)	1.1 (0.10)
LACKSKL1 %	0.7 (0.08)	1.5 (0.12)	1.4 (0.12)
LACKEXP1 %	1.0 (0.10)	1.5 (0.12)	1.5 (0.12)
JBSHORT1 %	1.8 (0.13)	3.7 (0.19)	3.5 (0.18)
LACKINFO %	1.7 (0.13)	1.7 (0.13)	1.7 (0.13)
LAMBDA (PART.)	-0.001(0.047)	0.143 (0.368)	0.177 (0.395)
LAMBDA (UNDER.)	0.0005(0.019)	-0.013 (0.296)	-0.020 (0.329)
SAMNDUS %	9.2 (0.29)	9.2 (0.29)	9.2 (0.29)
SAMEOCC %	8.8 (0.28)	8.8 (0.28)	8.7 (0.28)
No. of Workers	2412	19238	21757

TABLE C.

MEANS AND STANDARD DEVIATIONS (in parentheses) OF MAJOR VARIABLES USED IN THE REGRESSIONS BASED ON THE POPULATION OF FEMALE WORKERS AGED 16-64 YEARS, EXCLUDING SELF-EMPLOYED

VARIABLE	FORNBN	CANADABN	POOLED
HOURS87 (hours)	1525 (774)	1406 (776)	1419 (777)
HOURS1 (hours)	1193 (892)	1071 (890)	1085 (890)
HWAGE $	8.12 (7.16)	7.46 (6.55)	7.54 (6.62)
AVWAGE $	9.60 (6.37)	9.05 (5.69)	9.11 (5.77)
HRSPWK (hours)	27.580(17.11)	26.126(17.73)	26.301(17.664)
RESPONSE %	57.7 (0.49)	61.8 (0.49)	61.3 (0.49)
STUDENT %	7.5 (0.26)	12.5 (0.33)	12.0 (0.32)
STUDTIME(mnths)	0.555 (2.08)	0.922 (2.61)	0.881 (2.56)
KIDAGEDV	0.236(0.548)	0.261 (0.582)	0.259 (0.578)
KIDSABFV	1.128 (1.227)	1.043 (1.198)	1.052 (1.202)
MARRIED %	71.0 (0.45)	64.2 (0.48)	64.9 (0.48)
SINGLE %	17.6 (0.38)	26.7 (0.44)	25.8 (0.44)
OTHERM %	11.4 (0.32)	9.1 (0.29)	9.3 (0.29)
CANADABN %	0.00 (0.00)	100.0 (0.00)	89.1 (0.31)
FORNBN %	100.0 (0.00)	0.000 (0.00)	10.6 (0.31)
MINOR %	25.8 (0.44)	1.1 (0.11)	3.8 (0.19)
LANGDIF %	53.0 (0.50)	4.7 (0.21)	10.1 (0.30)
AGE1624 %	15.7 (0.36)	27.2 (0.44)	25.9 (0.44)
AGE2534 %	23.4 (0.42)	31.5 (0.46)	30.6 (0.46)
AGE3544 %	31.5 (0.46)	22.8 (0.42)	23.7 (0.42)
AGE4554 %	18.3 (0.39)	12.5 (0.33)	13.1 (0.34)
AGE5564 %	9.9 (0.30)	5.7 (0.23)	6.1 (0.24)
ELEMENT %	12.8 (0.33)	6.7 (0.25)	7.3 (0.26)
HISCHO %	44.9 (0.50)	52.9 (0.50)	52.0 (0.50)
SMPSTSEC %	11.2 (0.32)	12.2 (0.33)	12.1 (0.33)

VARIABLE		FORNBN	CANADABN	POOLED
POSTSEC	%	15.3 (0.36)	17.2 (0.38)	17.0 (0.38)
UNIV	%	15.7 (0.36)	11.1 (0.31)	11.6 (0.32)
ATLANTIC	%	7.1 (0.26)	26.2 (0.44)	24.2 (0.43)
QUEBEC	%	6.8 (0.25)	15.3 (0.36)	14.4 (0.35)
ONTARIO	%	36.3 (0.48)	19.3 (0.39)	21.1 (0.41)
PRAIRIE	%	32.0 (0.47)	30.8 (0.46)	30.9 (0.46)
BC	%	17.8 (0.38)	8.4 (0.28)	9.4 (0.29)
UNION1	%	26.6 (0.44)	25.6 (0.44)	25.8 (0.44)
UNIONM	%	30.4 (0.46)	30.7 (0.46)	30.7 (0.46)
PRIMARY	%	3.5 (0.18)	3.7 (0.19)	3.7 (0.19)
MANUFAC	%	15.2 (0.36)	10.6 (0.31)	11.1 (0.31)
GOVSERV	%	6.0 (0.24)	8.2 (0.27)	8.0 (0.27)
UTILITY	%	2.4 (0.15)	3.9 (0.19)	3.8 (0.19)
TRADE	%	15.5 (0.36)	18.4 (0.39)	18.1 (0.38)
FINANCE	%	5.6 (0.23)	6.3 (0.24)	6.2 (0.24)
SERVICE	%	51.6 (0.50)	48.8 (0.50)	49.0 (0.50)
BLUE	%	13.4 (0.34)	8.5 (0.28)	9.1 (0.28)
OFFICE	%	24.4 (0.43)	31.2 (0.46)	30.5 (0.46)
MANPROF	%	30.1 (0.46)	28.6 (0.45)	28.7 (0.45)
FARMING	%	2.3 (0.15)	2.5 (0.16)	2.5 (0.15)
SERVER	%	29.7 (0.46)	29.2 (0.45)	29.2 (0.45)
WELFARE	%	1.6 (0.12)	3.2 (0.17)	3.0 (0.17)
UIB	%	15.3 (0.36)	21.5 (0.41)	20.8 (0.41)
COMPENS	%	1.5 (0.12)	1.2 (0.11)	1.3 (0.11)
PENSION	%	4.2 (0.20)	2.7 (0.16)	2.9 (0.17)
PARTTIME	%	24.5 (0.43)	24.6 (0.43)	24.6 (0.43)
FULLTIME	%	75.5 (0.43)	75.4 (0.43)	75.4 (0.43)
SMALFIRM	%	32.0(0.47)	33.5 (0.47)	33.3 (0.47)

VARIABLE	FORNBN	CANADABN	POOLED
MEDFIRM %	13.5(0.34)	10.8 (0.31)	11.0 (0.31)
LARGFIRM %	36.9(0.48)	34.7 (0.48)	35.0 (0.48)
LACKINFO %	1.1 (0.11)	1.4 (0.12)	1.4 (0.12)
LACKEDUC %	1.9 (0.14)	2.1 (0.14)	2.1 (0.14)
LACKSKIL %	2.0 (0.14)	2.8 (0.16)	2.7 (0.16)
LACKEXP %	2.0 (0.14)	2.8 (0.16)	2.7 (0.16)
JOBSHORT %	4.2 (0.20)	6.7 (0.25)	6.4 (0.24)
DISABLE %	0.3 (0.05)	0.2 (0.05)	0.2 (0.05)
NTERRUPT	0.088 (0.328)	0.077 (0.30)	0.078 (0.31)
FIXEDHRS %	91.5 (0.28)	90.7 (0.29)	90.8 (0.29)
WKOU87 (weeks)	2.267 (6.932)	3.131 (8.359)	3.040 (8.226)
NOTSATIF %	13.8 (0.34)	16.6 (0.37)	16.3 (0.37)
NOTSAT1 %	6.2 (0.24)	7.0 (0.25)	6.9 (0.25)
LAKEDUC1 %	0.9 (0.10)	1.1 (0.11)	1.1 (0.10)
LACKSKL1 %	1.2 (0.11)	1.6 (0.12)	1.5 (0.12)
LACKEXP1 %	1.3 (0.11)	1.7 (0.13)	1.7 (0.13)
JBSHORT1 %	2.3 (0.15)	3.5 (0.18)	3.4 (0.18)
LACKINF1 %	0.8 (0.09)	0.7 (0.08)	0.7 (0.08)
SAMNDUS %	10.5 (0.31)	10.7 (0.31)	10.7 (0.31)
SAMEOCC %	3.3 (0.18)	9.5 (0.29)	9.5 (0.29)
No. of Workers	2007	16900	18976

TABLE D.

PROBIT-SELECTION ESTIMATES OF THE PROBABILITY OF INCLUSION IN THE SAMPLE OF MALE WORKERS WITH POSITIVE ANNUAL HOURS, EXCLUDING SELF-EMPLOYED.

	FB	CB	POOLED
Dep. Variable= RESPONSE=1 if H>1 or 0 otherwise			
Indep. Variables			
AGE1624	0.587 (3.867)*	0.684(15.537)*	0.675(16.101)*
AGE2534	0.353 (3.874)*	0.404(12.934)*	0.408(13.907)*
AGE3544 (=0)	-	-	-
AGE4554	0.077 (1.013)	0.006 (1.861)*	0.067 (2.290)
AGE5564	-0.142(-1.789)*	-0.187(-5.517)*	-0.171(-5.532)*
ELEMENT	-0.086 (-1.084)	-0.251(-9.012)*	-0.235(-9.013)*
HISCHO (=0)	-	-	-
SMPSTSEC	0.122 (1.224)	0.118 (3.204)*	0.117 (3.414)*
POSTSEC	0.134 (1.526)	0.142 (4.029)*	0.137 (4.230)*
UNIV	-0.027 (-0.370)	0.016 (0.465)	0.014 (0.444)*
ATLANTIC	-0.080 (-0.705)	-0.139(-4.431)*	-0.125(-4.339)*
QUEBEC	-0.233(-2.312)*	-0.213(-6.165)*	-0.200(-6.299)*
ONTARIO (=0)	-	-	-
PRAIRIE	-0.048 (-0.723)	-0.218(-6.989)*	-0.177(-6.384)*
BC	-0.189(-2.483)*	-0.119(-2.799)*	-0.131(-3.564)*
MINOR	0.107 (1.569)	-0.095 (-0.954)	0.014 (0.275)
LANGDIF	-0.285(-4.798)*	-0.046 (-0.978)	-0.140(-4.544)*
STUDENT	-0.412(-3.033)*	-0.608(-15.12)*	-0.587(-15.33)*
MARRIED (=0)	-	-	-
SINGLE	-0.106 (-0.984)	-0.111(-3.357)*	-0.111(-3.547)*

	FB	CB	POOLED
OTHERM	-0.053 (-0.456)	-0.017 (-0.038)	-0.010 (-0.245)
KIDAGEDV	-0.089(-1.806)*	-0.002 (-0.122)	-0.014 (-0.756)
KIDSABFV	-0.030 (-1.258)	-0.013 (-1.460)	-0.015(-1.784)*
WELFARE	-1.230(-7.640)*	-1.227(-29.74)*	-1.226(-30.82)*
PENSION	-1.720(-19.99)*	-1.644(-49.41)*	-1.648(-53.47)*
CONSTANT	1.182(13.271)*	1.137(31.876)*	1.121(34.535)*
Likelihood ratio test	790.7	6586.7	7383.1
Maddala R-square	0.217	0.232	0.230
Cragg-Uhler R-sq.	0.319	0.353	0.347
% Right predictions	82.6	84.7	84.4
# of obs.@ 1	2412	19238	21757
Total # of obs.	3237	24908	28296

TABLE E.

PROBIT-SELECTION ESTIMATES OF THE PROBABILITY OF INCLUSION IN THE SAMPLE OF FEMALE WORKERS WITH POSITIVE ANNUAL HOURS, EXCLUDING SELF-EMPLOYED

	FB	CB	POOLED
Dep. Variable= RESPONSE=1 if H>1 or 0 otherwise			
Indep. Variables			
AGE1624	0.446 (3.952)*	0.539(15.686)*	0.536(16.456)*
AGE2534	0.423 (5.458)*	0.411(15.283)*	0.417(16.521)*
AGE3544	-	-	-
AGE4554	-0.046 (-0.652)	-0.190(-6.791)*	-0.174(-6.721)*
AGE5564	-0.661(-9.082)*	-0.631(-19.99)*	-0.636(-22.07)*
ELEMENT	-0.157(-2.340)*	-0.479(-17.83)*	-0.427(-17.25)*
HISCHO	-	-	-
SMPSTSEC	0.295 (3.242)*	0.273 (8.785)*	0.276 (9.421)*
POSTSEC	0.211 (2.840)*	0.454(16.646)*	0.425(16.682)*
UNIV	0.340 (4.392)*	0.585(16.570)*	0.544(17.098)*
ATLANTIC	-0.153 (-1.589)	-0.200(-7.429)*	-0.198(-7.937)*
QUEBEC	-0.351(-3.756)*	-0.323(-10.83)*	-0.320(-11.55)*
ONTARIO	-	-	-
PRAIRIE	0.056 (0.958)	-0.066(-2.458)*	-0.048(-1.995)*
BC	-0.026 (-0.383)	-0.157(-4.312)*	-0.131(-4.094)*
MINOR	-0.044 (-0.724)	-0.186(-2.296)*	-0.100(-2.205)*
LANGDIF	-0.118(-2.237)*	-0.053 (-1.355)	-0.062(-2.241)*
STUDENT	-0.699(-5.556)*	-0.509(-13.67)*	-0.529(-14.89)*
MARRIED	-	-	-
SINGLE	0.666 (6.246)*	0.435(13.732)*	0.450(14.935)*
OTHERM	0.498 (6.310)*	0.513(16.141)*	0.510(17.382)*
KIDAGEDV	-0.312(-6.848)*	-0.362(-22.73)*	-0.356(-23.75)*

	FB	CB	POOLED
KIDSABFV	0.005 (0.248)	-0.019(-2.311)*	-0.015(-1.987)*
WELFARE	-1.192(-8.129)*	-1.028(-26.84)*	-1.049(-28.45)*
PENSION	-1.324(-15.81)*	-1.435(-41.28)*	-1.419(-44.41)*
CONSTANT	0.456 (6.159)*	0.557(18.147)*	0.538(19.241)*
Likelihood ratio test	930.1	8304.9	9245.6
Maddala R-square	0.235	0.262	0.258
Cragg-Uhler R-sq.	0.316	0.356	0.351
% Right predictions	73.8	734.8	74.5
# of obs.@ 1	2007	16900	18.976
# of obs.	3476	27322	30940

TABLE F.

PROBIT ESTIMATES OF THE PROBABILITY OF UNDEREMPLOYMENT AMONG MALE WORKERS, EXCLUDING SELF-EMPLOYED

	FB	CB	POOLED
Dep. Variable= NOTSATIF=1 or 0			
Indep. Variables			
AGE1624	0.376 (3.070)*	0.263 (7.015)*	0.274 (7.710)*
AGE2534	0.067 (0.567)	0.036 (0.930)	0.040 (1.141)
AGE3544 (=0)	-	-	-
AGE4554	-0.093 (-0.779)	-0.066 (-1.371)	-0.066 (-1.494)
AGE5564	0.008 (0.062)	-0.191(-3.054)*	-0.150(-2.694)*
PARTTIME	0.166 (1.172)	0.524(12.598)*	0.494(12.472)*
LACKINFO	-0.340 (-1.089)	0.081 (0.857)	0.049 (0.553)
LACKSKIL	-0.016 (-0.049)	0.011 (0.110)	0.002 (0.091)
LACKEDUC	0.019 (0.055)	0.118 (1.209)	0.110 (1.187)
LACKEXP	0.194 (0.645)	0.164 (1.765)*	0.180 (2.037)*
JOBSHORT	0.169 (0.884)	0.206 (4.030)*	0.203 (4.157)*
WKOU87	0.071(11.050)*	0.050(29.836)*	0.051(31.777)*
UNIONM	-0.106 (-1.256)	-0.064(-2.286)*	-0.066(-2.496)*
ATLANTIC	-0.107 (-0.613)	-0.037 (-0.930)	-0.044 (-1.182)
QUEBEC	-0.116 (-0.722)	-0.252(-5.414)*	-0.246(-5.602)*
ONTARIO (=0)	-	-	-
PRAIRIE	0.003 (0.028)	0.116 (2.969)*	0.096 (2.693)*
BC	0.284 (2.602)*	0.224 (4.316)*	0.227 (4.879)*
WELFARE	1.106 (3.364)*	0.806(11.673)*	0.819(12.186)*
UIB	1.048(10.309)*	1.028(34.044)*	1.032(35.864)*
COMPENS	0.603 (3.452)*	0.196 (3.063)*	0.245 (4.103)*
PENSION	-0.455(-1.709)*	-0.002 (-0.029)	-0.062 (-0.798)
MINOR	-0.107 (-1.116)	-0.149 (-1.094)	-0.094 (-1.337)

	FB	CB	POOLED
LANGDIF	0.107 (1.260)	-0.060 (-0.895)	0.042 (0.958)
KIDAGEDV	-0.075 (-1.061)	-0.024 (-1.083)	-0.026 (-1.238)
CONSTANT	-1.712(-14.85)*	-1.654(-35.73)*	-1.658(-41.20)*
Likelihood ratio test	695.3	6478.7	7208.3
Maddala R-squared	0.250	0.286	0.282
Cragg-Uhler R-sq.	0.452	0.462	0.460
%Right predictions	90.3	86.9	87.3
# of obs. @ 1	336	3603	3959
Total # of obs.	2412	19238	21757

TABLE G.

PROBIT ESTIMATES OF THE PROBABILITY OF UNDEREMPLOYMENT AMONG FEMALE WORKERS, EXCLUDING SELF-EMPLOYED

	FB	CB	POOLED
Dep. Variable= NOTSATIF=1 or 0			
Indep. Variables			
AGE1624	0.121 (1.026)	0.210 (5.649)*	0.190 (5.442)*
AGE2534	-0.160 (-1.388)	0.058 (1.461)	0.010 (0.271)
AGE3544 (=0)	-	-	-
AGE4554	-0.073 (-0.603)	0.013 (0.265)	-0.020 (-0.448)
AGE5564	-0.560 (-2.96)*	-0.202 (-2.76)*	-0.307 (4.61)*
PARTTIME	0.497 (5.592)*	0.382 (12.96)*	0.404 (14.6)*
LACKINFO	-0.400 (-1.077)	0.277 (2.644)*	0.216 (2.169)*
LACKSKIL	1.075 (2.961)*	0.135 (1.288)	0.214 (2.135)*
LACKEDUC	-0.775 (-2.11)*	-0.120 (-1.132)	-0.184 (1.82)*
LACKEXP	0.122 (0.375)	0.154 (1.576)	0.143 (1.538)
JOBSHORT	0.161 (0.737)	0.246 (4.224)*	0.231 (4.134)*
WKOU87	0.053 (8.760)*	0.048 (28.6)*	0.049 (30.2)*
UNIONM	-0.179 (-1.87)*	-0.057 (-1.86)*	-0.073 (-2.53)*
ATLANTIC	0.252 (1.560)	-0.007 (-0.175)	0.029 (0.775)
QUEBEC	0.037 (0.213)	-0.184 (-3.84)*	-0.167 (-3.67)*
ONTARIO (=0)	-	-	-
PRAIRIE	0.202 (2.008)*	0.067 (1.737)*	0.084 (2.355)*
BC	0.093 (0.781)	0.210 (4.088)*	0.190 (3.996)*
WELFARE	1.218 (4.966)*	0.498 (7.977)*	0.544 (9.030)*
UIB	0.791 (7.897)*	0.686 (22.3)*	0.690 (23.6)*
COMPENS	0.082 (0.252)	-0.053 (-0.432)	-0.037 (-0.325)
PENSION	0.038 (0.169)	0.078 (0.955)	0.063 (0.823)
MINOR	0.055 (0.572)	-0.189 (-1.431)	-0.022 (-0.306)

	FB	CB	POOLED
LANGDIF	0.101 (1.156)	0.010 (0.154)	0.044 (0.957)
KIDAGEDV	0.004 (0.053)	-0.034 (-1.392)	-0.047 (-2.06)*
CONSTANT	-1.724 (-15.3)*	-1.680 (-35.3)*	-1.621 (40.5)*
Likelihood ratio test	411.9	3724.2	4116.3
Maddala R-squared	0.185	0.198	0.195
Cragg-Uhler R-sq.	0.336	0.334	0.331
%Right predictions	88.2	86.4	86.6
# of obs. @ 1	277	2800	3088
# of obs.	2007	16900	18976

TABLE H.

PROBIT ESTIMATES OF THE PROBABILITY OF UNDEREMPLOYMENT AT THE FIRST JOB AMONG MALE WORKERS, EXCLUDING SELF-EMPLOYED

	FB	CB	POOLED
Dep. Variable= NOTSAT1=1 or 0			
Indep. Variables			
AGE1624	0.246 (0.665)	0.243 (1.911)*	0.218 (1.884)*
AGE2534	0.216 (0.467)	0.211 (1.489)	0.265 (2.017)*
AGE3544 (=0)	-	-	-
AGE4554	-0.612 (-1.098)	0.225 (1.233)	0.135 (0.805)
AGE5564	0.626 (1.286)	0.062 (0.342)	0.195 (1.174)
PARTTIME	12.649 (0.025)	6.770 (3.281)*	6.653 (0.346)
LACKINF1	4.943 (0.001)	-0.393 (-1.086)	-0.319 (-0.897)
LACKSKL1	0.466 (0.001)	0.347 (1.089)	0.546 (1.802)*
LAKEDUC1	-7.491 (-0.002)	0.603 (1.657)*	0.355 (1.028)
LACKEXP1	-6.164 (-0.008)	0.094 (0.337)	-0.015 (-0.058)
JBSHORT1	6.946 (0.009)	0.512 (2.583)*	0.539 (2.798)*
NTERRUPT	0.046 (0.102)	0.171 (1.564)	0.173 (1.640)
UNION1	-0.050 (-0.120)	0.456 (4.520)*	0.412 (4.301)*
ATLANTIC	0.560 (1.063)	0.389 (3.281)*	0.391 (3.481)*
QUEBEC	0.636 (1.270)	0.224 (1.742)*	0.257 (2.094)*
ONTARIO (=0)	-	-	-
PRAIRIE	0.194 (0.547)	0.151 (1.357)	0.163 (1.569)
BC	0.912 (2.458)*	0.304 (2.106)*	0.365 (2.792)*
WELFARE	-0.022 (-0.030)	0.537 (3.073)*	0.508 (3.050)*
UIB	1.004 (2.260)*	0.710 (7.121)*	0.722 (7.594)*
COMPENS	1.476 (1.404)	0.160 (0.732)	0.233 (1.113)
PENSION	-0.816(-1.202)	-0.530(-2.596)*	-0.549 (-2.85)*
MINOR	0.315 (1.058)	0.163 (0.603)	0.160 (0.938)

	FB	CB	POOLED
LANGDIF	0.404 (1.492)	0.025 (0.128)	0.087 (0.668)
KIDAGEDV	0.271 (1.100)	-0.072 (-0.857)	-0.041 (-0.529)
CONSTANT	-14.43(-0.029)	-7.914 (-0.397)	-7.899 (-0.411)
Likelihood ratio test	259.9	2595.0	2841.7
Maddala R-squared	0.102	0.126	0.122
Cragg-Uhler R-sq.	0.670	0.648	0.644
%Right predictions	97.8	98.0	98.0
# of obs. @ 1	39	436	477
Total # of obs.	2412	19238	21757

TABLE I.

PROBIT ESTIMATES OF THE PROBABILITY OF UNDEREMPLOYMENT AT THE FIRST JOB AMONG FEMALE WORKERS, EXCLUDING SELF-EMPLOYED

	FB	CB	POOLED
Dep. Variable= NOTSAT1=1 or 0			
Indep. Variables			
AGE1624	-0.130 (-0.646)	0.159 (2.618)*	0.117 (2.043)*
AGE2534	-0.376(-1.910)*	0.164 (2.523)*	0.086 (1.433)
AGE3544 (=0)	-	-	-
AGE4554	-0.108 (-0.583)	0.020 (0.266)	-0.013 (-0.195)
AGE5564	-0.576(-2.246)*	-0.371 (-3.39)*	-0.443 (-4.61)*
PARTTIME	6.608 (0.048)	6.319 (0.226)	6.213 (0.234)
LACKINF1	0.136 (0.202)	0.115 (0.515)	0.109 (0 534)
LACKSK11	0.216 (0.303)	0.594 (2.435)*	0.483 (2.146)*
LAKEDUC1	-0.570 (-0.671)	-0.250 (-1.028)	-0.243 (-1.074)
LACKEXP1	-0.078 (-0.113)	0.185 (1.001)	0.175 (0.993)
JBSHORT1	0.346 (0.805)	0.487 (3.985)*	0.480 (4.130)*
NTERRUPT	0.394 (2.684)*	-0.070 (-1.198)	-0.003 (-0.063)
UNION1	0.120 (0.751)	0.275 (5.386)*	0.256 (5.287)*
ATLANTIC	0.589 (2.129)*	0.376 (5.463)*	0.393 (6.060)*
QUEBEC	-0.206 (-0.559)	0.177 (2.323)*	0.156 (2.148)*
ONTARIO (=0)	-	-	-
PRAIRIE	0.267 (1.605)	0.187 (2.920)*	0.187 (3.172)*
BC	0.467 (2.532)*	0.301 (3.491)*	0.335 (4.345)*
WELFARE	1.023 (2.328)*	0.511 (4.789)*	0.533 (5.193)*
UIB	0.383 (2.037)*	0.585 (10.48)*	0.561 (10.61)*
COMPENS	0.802 (1.632)	0.357 (1.844)*	0.435 (2.435)*
PENSION	-0.062 (-0.208)	0.036 (0.287)	0.013 (0.113)
MINOR	0.167 (0.999)	-0.421 (-1.98)*	-0.132 (-1.128)

	FB	CB	POOLED
LANGDIF	-0.053 (-0.380)	0.167 (1.787)*	0.133 (1.879)*
KIDAGEDV	-0.094 (-0.807)	-0.113 (-2.92)*	-0.121 (-3.40)*
CONSTANT	-7.486(-0.054)	-7.422 (-0.266)	-7.228 (-0.272)
Likelihood ratio test	427.8	4005.9	4428.6
Maddala R-squared	0.192	0.211	0.208
Cragg-Uhler R-squared	0.515	0.530	0.526
%Right predictions	94.3	93.5	93.5
# of obs. @ 1	125	1185	1317
# of obs.	2007	16900	18976

TABLE J.
ORDINARY LEAST SQUARES ESTIMATES OF THE SUPPLY OF WEEKLY HOURS FUNCTION (WITH LINEAR WAGE TERM) FOR WORKERS RESIDENT IN ONTARIO

	MALES		FEMALES	
	FB	CB	FB	CB
Mean of Dep.Variable	35.316	31.349	28.728	25.309
SEE	13.266	14.310	13.949	15.339
Independent Vars.				
HWAGE1	1.133 (16.515)*	1.395 (37.180)*	1.487 (14.004)*	0.729 (20.011)*
AGE1624	-8.910 (-4.131)*	-4.037 (-4.294)*	-5.396 (-2.454)*	-7.005 (-7.223)*
AGE2534	-0.817 (-0.563)	0.784 (1.053)	0.607 (0.370)	-1.593 (-1.884)*
AGE3544=0				
AGE4554	-0.470 (-0.563)	-1.883 (-2.237)*	-1.473 (-0.988)	-0.609 (-0.633)
AGE5564	0.205 (0.135)	-1.994 (-1.912)*	0.220 (0.107)	-0.900 (-0.680)
ELEMENT	0.637 (0.455)	3.957 (4.274)*	2.818 (1.590)	0.639 (0.471)
HISCHO=0	-		-	
SMPSTSEC	-0.184 (-0.112)	-1.251 (-1.672)*	-4.339 (-2.382)*	-1.306 (-1.558)
POSTSEC	-1.157 (-0.781)	-1.288 (-1.596)	-4.4262 (-2.596)*	-1.427 (-1.767)*
UNIV	-6.011 (-3.832)*	-5.882 (-6.652)*	-6.792 (-3.687)*	-4.213 (-4.224)*
MARRIED=0	-		-	
SINGLE	0.346 (0.206)	-1.034 (-1.339)	2.609 (1.366)	1.925 (2.393)*
OTHERM	2.106 (0.868)	1.042 (0.917)	-2.372 (-1.292)	0.073 (0.078)
KIDAGEDV	-0.324 (-0.341)	-0.504 (-1.095)	-1.169 (-0.918)	-0.766 (-1.380)

	MALES		FEMALES	
	FB	CB	FB	CB
KIDSABFV	-0.265 (-0.640)	-0.915 (-3.896)*	-0.062 (-0.125)	-1.285 (-4.989)*
UNION1	4.706 (4.553)*	3.697 (6.291)*	4.618 (3.314)*	7.731 (10.819)*
PRIMARY	-1.564 (-0.469)	1.794 (1.370)	10.351 (1.611)	1.844 (0.703)
MANUFAC	-1.564 (-1.041)	1.554 (1.959)*	4.884 (2.521)*	4.472 (4.439)*
GOVSERV	-4.023 (-1.789)*	-1.541 (-1.569)	-1.120 (-0.447)	-0.392 (-0.357)
TRADE	0.850 (0.485)	2.956 (3.634)*	3.903 (2.379)*	0.769 (0.981)
UTILITY	-2.799 (-1.353)	0.708 (0.698)	-0.990 (-0.277)	1.496 (1.017)
FINANCE	6.662 (2.599)*	1.729 (1.178)	-1.489 (-0.685)	7.517 (6.581)*
SERVICE=0	-	-	-	-
FARMING	0.567 (0.126)	2.799 (1.793)*	-11.483 (-1.564)	6.322 (2.003)*
MANPROF	-3.173 (-1.865)*	-1.734 (-2.124)*	4.0127 (2.378)*	3.609 (4.284)*
OFFICE	-5.839 (-2.523)*	-1.618 (-1.454)	1.807 (1.176)	1.665 (2.177)*
BLUE	-1.994 (-1.231)	-0.866 (-1.133)	0.669 (0.297)	2.563 (2.091)
SERVER=0				
MINOR	1.799 (1.594)	-2.254 (-0.919)	3.400 (2.606)*	-0.467 (-0.177)
LANGDIF	1.103 (1.140)	0.347 (0.319)	2.893 (2.515)*	0.691 (0.557)
CONSTANT	23.734 (11.191)*	18.432 (17.469)*	12.494 (5.988)*	19.008 (18.381)*
Adj. R-squared	0.377	0.435	0.343	0.278
F(K-1,N-K)	22.037	108.400	15.584	49.179
N	905	3631	728	3359

	MALES		FEMALES	
	FB	CB	FB	CB
Wage Elasticity	0.410 (0.068)	0.470 (0.037)	0.422 (0.106)	0.225 (0.036)

TABLE K.

ORDINARY LEAST SQUARES ESTIMATES OF THE SUPPLY OF (LOG) ANNUAL HOURS SUPPLY FUNCTION FOR WORKERS RESIDENT IN ONTARIO

	MALES		FEMALES	
	FB	CB	FB	CB
Mean of Dep. variable	7.462	7.408	7.165	7.080
SEE	0.594	0.572	0.787	0.792
Independent Vars.				
LOGAVWAGE	0.080 (1.435)	0.155 (6.513)*	0.318 (3.997)*	0.274 (7.605)*
AGE1624	-0.317 (-3.266)*	-0.304 (-8.101)*	-0.262 (-2.153)*	-0.120 (-2.379)*
AGE2534	-0.035 (-0.538)	-0.005 (-0.169)	0.057 (0.617)	-0.010 (-0.221)
AGE3544=0				
AGE4554	0.018 (0.323)	0.006 (0.179)	-0.102 (-1.215)	-0.029 (-0.581)
AGE5564	-0.163 (-2.406)*	-0.116 (-2.793)*	-0.245 (-2.110)*	-0.245 (-3.589)*
ELEMENT	-0.050 (-0.795)	0.003 (0.084)	0.012 (0.125)	-0.011 (-0.156)
HISCHO=0	-			
SMPSTSEC	-0.089 (-1.205)	0.043 (1.427)	-0.095 (-0.922)	-0.080 (-1.845)*
POSTSEC	0.016 (0.242)	0.064 (1.962)*	-0.032 (-0.343)	0.056 (1.326)
UNIV	-0.026 (-0.365)	0.041 (1.138)	-0.203 (-1.918)*	-0.019 (-0.365)
MARRIED=0	-	-	-	-
SINGLE	-0.331 (-4.373)*	-0.170 (-5.446)*	-0.016 (-0.145)	0.073 (1.748)*
OTHERM	-0.051 (-0.464)	-0.067 (-1.483)	-0.199 (-1.918)*	0.046 (0.967)

	MALES		FEMALES	
	FB	CB	FB	CB
KIDAGEDV	0.007 (0.163)	-0.029 (-1.566)	-0.221 (-3.092)*	-0.193 (-6.713)*
KIDSABFV	0.003 (0.161)	-0.038 (-4.045)*	-0.034 (-1.206)	-0.077 (-5.805)*
UNIONM	0.069 (1.574)	0.091 (4.204)	0.246 (3.358)*	0.175 (5.084)*
PRIMARY	-0.295 (-1.976)*	0.116 (2.206)*	0.018 (0.050)	0.194 (1.433)
MANUFAC	0.072 (1.075)	0.061 (1.892)	0.371 (3.394)*	0.255 (4.877)*
GOVSERV	0.059 (0.583)	0.003 (0.087)	-0.045 (-0.321)	0.023 (0.411)
TRADE	0.133 (1.700)*	0.085 (2.588)*	0.147 (1.599)	0.068 (1.690)*
UTILITY	-0.086 (-0.932)	0.056 (1.382)	0.066 (0.326)	0.159 (2.093)*
FINANCE	0.226 (1.975)*	0.059 (0.998)	0.126 (1.025)	0.303 (5.101)*
SERVICE=0	-	-	-	-
FARMING	0.271 (1.345)	-0.045 (-0.712)	-0.933 (-2.262)*	-0.178 (-1.094)
MANPROF	0.007 (0.092)	0.025 (0.766)	0.297 (3.041)*	0.153 (3.438)*
OFFICE	0.066 (0.636)	-0.016 (-0.368)	0.121 (1.386)	0.097 (2.434)*
BLUE	-0.085 (-1.167)	0.031 (1.007)	0.065 (0.515)	0.054 (0.850)
SERVER=0				
MINOR	-0.004 (-0.089)	-0.128 (-1.309)	0.003 (0.048)	-0.039 (-0.287)
LANGDIF	0.042 (0.982)	0.010 (0.229)	0.063 (0.978)	-0.030 (-0.467)
CONSTANT	7.326 (46.669)*	7.113 (106.64)*	6.369 (33.159)*	6.442 (74.694)*
Adj. R-squared	0.126	0.193	0.150	0.122

	MALES		FEMALES	
	FB	CB	FB	CB
F(K-1,N-K)	6.011	34.373	5.944	18.409
N	905	3631	728	3259

TABLE L

REGRESSION ESTIMATES OF THE WEEKLY HOURS EQUATION WITH A QUADRATIC WAGE TERM ($H = \beta_0 + \beta_1 W + \beta_2 W^2 + \beta_{3i} X_i + e$). MALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep Var.	33.877	32.006	33.877	32.006	35.633	34.135
SEE	13.932	14.933	13.935	14.910	12.069	14.409
Indep vars.						
HWAGE	1.441 (29.2)*	2.786 (102.4)*	1.441 (19.52)*	2.778 (15.54)*	2.772 (15.96)*	2.421 (14.5)*
WAGESQ	-0.006 (-18)*	-0.040 (-63.8)*	-0.006 (-7.52)*	-0.040 (-5.60)*	-0.054 (-8.95)*	-0.034 (-5.5)*
Age						
AGE1624	-4.672 (-3.6)*	-0.521 (-1.264)	-4.667 (-3.30)*	-0.565 (-1.295)	-3.074 (-2.21)*	-1.366 (-2.8)*
AGE2534	2.461 (2.72)*	1.291 (3.955)*	2.461 (2.538)*	1.299 (3.993)*	2.308 (2.477)*	0.837 (2.41)*
AGE3544	-	-	-	-	-	-
AGE4554	1.314 (1.608)	-0.942 (-2.49)*	1.315 (1.613)	-0.938 (-2.51)*	0.876 (1.208)	-0.944 (-2.4)*
AGE5564	1.482 (1.469)	-0.753 (-1.569)	1.483 (1.491)	-0.737 (-1.471)	0.596 (0.637)	-0.881 (-1.7)*
Educ.						
ELEMENT	1.791 (1.86)*	3.067 (8.469)*	1.791 (1.791)*	3.083 (7.815)*	2.797 (2.811)*	3.476 (7.75)*
HISCHO	-	-	-	-	-	-
SMPSTSEC	-2.281 (-2.3)*	-1.691 (-4.58)*	-2.282 (-2.42)*	-1.624 (-4.24)*	-2.535 (-2.86)*	-2.071 (-5.1)*
POSTSEC	-1.440 (-1.58)	-2.703 (-7.77)*	-1.438 (-1.631)	-2.683 (-8.54)*	-1.822 (-2.34)*	-2.591 (-7.8)*
UNIV	-4.955 (-5.0)*	-6.155 (-14.5)*	-4.955 (-5.02)*	-6.193 (-11.5)*	-2.591 (-2.69)*	-5.830 (-11)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	0.462 (0.448)	-0.304 (-0.906)	0.459 (0.419)	-0.352 (-1.039)	0.315 (0.305)	-0.887 (-2.4)*
OTHERM	0.645 (0.470)	0.056 (0.102)	0.644 (0.521)	0.095 (0.174)	0.320 (0.291)	-0.622 (-1.17)
KIDAGEDV	0.295 (0.560)	-0.073 (-0.377)	0.295 (0.513)	-0.075 (-0.403)	-0.621 (-1.314)	-0.007 (-0.04)
KIDSABFV	0.080 (0.310)	-0.407 (-4.13)*	0.079 (0.296)	-0.429 (-4.03)*	0.025 (0.096)	-0.493 (-4.2)*
Region						
ATLANTIC	2.869 (2.40)*	4.370 (13.27)*	2.871 (2.333)*	4.283 (13.11)*	3.707 (3.086)*	4.810 (13.4)*
QUEBEC	-0.850 (-0.76)	-0.137 (-0.378)	-0.851 (-0.768)	-0.144 (-0.474)	0.541 (0.551)	-0.326 (-1.04)
ONTARIO	-	-	-	-	-	-
PRAIRIE	0.573 (0.792)	1.058 (3.247)*	0.573 (0.787)	1.021 (3.428)*	0.402 (0.600)	1.174 (3.69)*
BC	-1.322 (-1.55)	-0.942 (-2.10)*	-1.319 (-1.71)*	-1.045 (-2.44)*	-1.288 (-1.84)*	-0.934 (-2.1)*
Union						
UNION1	3.672 (5.40)*	0.697 (2.533)*	3.671 (6.586)*	0.813 (1.622)	-0.594 (-1.103)	1.166 (2.55)*
Industry						
PRIMARY	1.679 (1.138)	1.287 (2.577)*	1.677 (0.823)	1.225 (2.266)*	2.263 (1.067)	1.271 (2.14)*
MANUFAC	-0.753 (0.81)	0.151 (0.402)	-0.754 (-0.797)	0.151 (0.410)	-0.434 (-0.491)	0.419 (1.051)
GOVSERV	-5.766 (-4.7)*	-3.029 (-7.06)*	-5.767 (-5.90)*	-3.032 (-8.23)*	-4.476 (-4.94)*	-2.794 (-7.2)*
SERVICE	-	-	-	-	-	-

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
TRADE	1.545 (1.499)	1.939 (5.167)*	1.546 (1.439)	1.991 (5.335)*	0.763 (0.763)	2.324 (5.83)*
UTILITY	-0.953 (-0.75)	0.674 (1.449)	-0.954 (-0.824)	0.640 (1.373)	-0.543 (-0.508)	0.781 (1.588)
FINANCE	3.094 (1.90)*	-0.173 (-0.241)	3.092 (1.281)	-0.203 (-0.274)	1.509 (0.677)	0.399 (0.512)
Occup.						
SERVER	-	-	-	-	-	-
FARMING	-1.660 (-0.80)	4.131 (7.044)*	-1.663 (-0.639)	4.119 (5.520)*	-0.949 (-0.372)	4.956 (5.44)*
MANPROF	-1.776 (-1.8)*	-0.705 (-1.85)*	-1.778 (-1.70)*	-0.719 (-1.88)*	-1.192 (-1.212)	-0.268 (-0.68)
OFFICE	-3.804 (-2.5)*	-2.000 (-3.86)*	-3.806 (-2.93)*	-1.946 (-4.75)*	-3.444 (-2.81)*	-1.736 (-3.9)*
BLUE	-1.721 (-1.8)*	-0.720 (-2.06)	-1.722 (-1.77)*	-0.713 (-2.26)*	-1.506 (-1.617)	-0.427 (-1.25)
Visible Charac.						
MINOR	1.603 (2.27)*	0.226 (0.207)	1.603 (2.347)*	0.227 (0.205)	0.793 (1.263)	0.804 (0.684)
LANGDIF	0.940 (1.482)	1.275 (2.306)*	0.941 (1.546)	1.320 (2.399)*	-0.066 (-0.118)	0.824 (1.618)
Inverse Mill's ratio						
PART	-	-	0.404 (0.050)	-2.269 (-7.15)*	-	-
UNDER	-	-	-	-	-2.647 (-0.163)	0.373 (1.018)
CONSTANT	18.279 (13.63)*	10.391 (19.42)*	18.280 (11.59)*	10.828 (13.97)*	14.589 (8.219)*	13.549 (15.77)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Adj.R^2	0.389	0.470	0.388	0.471	0.459	0.425
F(K-1,N-K)	50.452	551.07	48.855	537.34	55.918	361.46
log of like.fun	-9760	-79293	-9760	-79263	-8100	-63880
N	2412	19238	2412	19238	2076	15635
Wage Elastic.	0.455	0.617	0.455	0.615	0.495	0.536

TABLE M

REGRESSION ESTIMATES OF THE WEEKLY HOURS EQUATION WITH A QUADRATIC WAGE TERM ($H = \beta_o + \beta_1 W + \beta_2 W^2 + \beta_{3i} X_i + e$). FEMALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep Variable	27.580	26.126	27.580	26.126	28.554	7.365
SEE	13.988	14.699	13.991	14.613	13.126	14.442
Indep. vars.						
HWAGE	1.765 (23.64)*	1.676 (63.84)*	1.763 (13.2)*	1.653 (23.80)*	1.698 (12.0)*	1.499 (21)*
WAGESQ	-0.012 (-17.2)*	-0.006 (-35.2)*	-0.012 (-6.4)*	-0.006 (-4.41)*	-0.011 (-6.9)*	-0.006 (4.5)*
Age						
AGE1624	-3.183 (-2.61)*	-2.404 (-6.06)*	-3.195 (-2.6)*	-2.383 (-5.59)*	-3.786 (-2.9)*	-2.857 (-6.1)*
AGE2534	-0.217 (-0.233)	0.412 (1.203)	-0.224 (-0.25)	0.379 (1.102)	0.097 (0.105)	0.389 (1.047)
AGE3544	-	-	-	-	-	-
AGE4554	0.033 (0.036)	-0.894 (-2.19)*	0.029 (0.030)	-0.874 (-2.20)*	-0.317 (-0.36)	-1.134 (-2.7)*
AGE5564	-2.004 (-1.631)	-0.862 (-1.543)	-2.011 (-1.63)	-0.787 (-1.366)	-2.615 (-2.1)*	-1.215 (-2.1)*
Educ.						
ELEMENT	1.274 (1.172)	2.317 (4.710)*	1.271 (1.242)	2.266 (4.641)*	1.225 (1.135)	2.240 (4.21)*
HISCHO	-	-	-	-	-	-
SMPSTSEC	-4.150 (-3.9)*	-2.515 (-6.86)*	-4.144 (-3.8)*	-2.392 (-6.94)*	-4.514 (-4.2)*	-2.552 (-6.7)*
POSTSEC	-4.127 (-4.2)*	-3.053 (-9.10)*	-4.118 (-4.6)*	-2.972 (-9.01)*	-4.147 (-4.5)*	-3.006 (-8.5)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
UNIV	-5.841 (-5.47)*	-6.545 (-15.2)*	-5.845 (-5.5)*	-6.431 (-14.0)*	-6.826 -(6.5)*	-6.135 (-13)*
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	0.061 (0.058)	0.453 (1.379)	0.058 (0.056)	0.428 (1.383)	0.279 (0.280)	0.637 (1.90)*
OTHERM	1.418 (1.372)	1.371 (3.348)*	1.413 (1.300)	1.318 (3.284)*	1.936 (2.11)*	1.111 (2.52)*
KIDAGEDV	-2.807 (-4.29)*	-1.808 (-8.20)*	-2.790 (-4.3)*	-1.809 (-7.07)*	-2.235 (-3.3)*	-1.827 (-6.4)*
KIDSABFV	-0.860 (-3.04)*	-0.710 (-6.83)*	-0.864 (-3.0)*	-0.717 (-6.68)*	-0.796 (-2.7)*	-0.789 (-6.7)*
Region						
ATLANTIC	2.999 (2.272)*	4.085 (11.86)*	2.985 (1.93)*	3.928 (11.51)*	3.689 (2.98)*	4.491 (12.1)*
QUEBEC	-0.980 (-0.743)	0.014 (0.035)	-1.028 (-0.89)	0.069 (0.185)	-0.568 (-0.47)	-0.099 (-0.25)
ONTARIO	-	-	-	-	-	-
PRAIRIE	-1.026 (-1.309)	0.102 (0.307)	-1.027 (-1.33)	-0.028 (-0.088)	-0.643 (-0.81)	0.333 (0.954)
BC	-2.126 (-2.31)*	-0.123 (-0.262)	-2.081 (-2.3)*	-0.316 (-0.666)	-1.002 (-1.08)	0.221 (0.422)
Union						
UNION1	2.616 (3.154)*	2.669 (8.569)*	2.619 (3.24)*	2.714 (7.191)*	2.860 (3.60)*	3.221 (8.39)*
Industry						
PRIMARY	-1.064 (-0.459)	1.091 (1.293)	-1.067 (-0.33)	1.154 (1.153)	-1.605 (-0.47)	0.800 (0.733)
MANUFAC	2.535 (1.959)*	2.631 (5.414)*	2.533 (1.98)*	2.669 (5.706)*	3.158 (2.31)*	2.397 (4.63)*
GOVSERV	1.323 (0.957)	-0.094 (-0.213)	1.314 (0.771)	-0.082 (-0.212)	0.456 (0.398)	0.157 (0.371)

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
SERVICE	–	–	–	–	–	–
TRADE	0.795 (0.825)	0.702 (2.150)*	0.813 (0.885)	0.765 (2.446)*	1.630 (1.66)*	0.881 (2.54)*
UTILITY	1.266 (0.604)	-0.625 (-1.013)	1.263 (0.432)	-0.615 (-1.107)	1.047 (0.563)	-0.603 (-1.02)
FINANCE	1.384 (0.963)	3.610 (7.159)*	1.410 (1.069)	3.620 (6.545)*	1.144 (0.843)	3.770 (6.40)*
Occup.						
SERVER	–	–	–	–	–	–
FARMING	2.862 (0.998)	2.407 (2.364)*	2.849 (0.723)	2.239 (1.761)*	6.396 (1.368)	2.148 (1.457)
MANPROF	-0.786 (-0.797)	-0.429 (-1.189)	-0.793 (-0.75)	-0.466 (-1.134)	-0.415 (-0.39)	0.365 (0.805)
OFFICE	-0.784 (-0.845)	0.235 (0.730)	-0.798 (-0.83)	0.237 (0.738)	-0.949 (-1.00)	0.696 (1.94)*
BLUE	0.980 (0.691)	1.916 (3.482)*	0.976 (0.711)	1.784 (3.311)*	0.344 (0.239)	2.873 (4.77)*
Visible Charac.						
MINOR	3.571 (4.622)*	-0.676 (-0.629)	3.568 (4.88)*	-0.743 (-0.757)	3.818 (4.91)*	-1.453 (-1.37)
LANGDIF	1.991 (2.843)*	0.492 (0.885)	1.987 (2.89)*	0.553 (1.042)	1.574 (2.26)*	0.682 (1.171)
Inverse Mill's ratio						
PART	–	–	2.074 (0.549)	-3.329 (-12.3)*	–	–
UNDER	–	–	–	–	3.512 (0.290)	1.137 (1.70)*
CONSTANT	16.126 (12.70)*	14.689 (29.84)*	16.150 (11.3)*	15.639 (25.46)*	16.576 (11.3)*	15.944 (24.1)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Adj.R^2	0.331	0.313	0.331	0.321	0.347	0.298
F(K-1,N-K)	33.082	248.967	32.045	250.269	29.669	188.010
log of like.func	-8126	-69387	-8126	-69287	-6892	-57640
N	2007	16900	2007	16900	1730	14100
Wage Elastic.	0.464	0.452	0.464	0.445	0.450	0.409

TABLE N

REGRESSION ESTIMATES OF THE ANNUAL HOURS EQUATION WITH A QUADRATIC WAGE TERM ($H = \beta_0 + \beta_1 W + \beta_2 W^2 + \beta_{3i} X_i + e$). MALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep Var.	1890.4	1803.8	1890.4	1803.8	1989.6	1945.8
SEE	660.0	753.6	659.8	753.4	586.3	694.8
Indep vars.						
AVWAGE	3.054 (1.028)	14.54 (7.54)*	2.994 (0.820)	14.58 (4.611)*	19.81 (2.51)*	1.578 (0.530)
WAGESQ	-0.048 (-2.6)*	-0.279 (-7.89)*	-0.048 (-3.12)*	-0.279 (-3.86)*	-0.563 (-3.26)*	-0.148 (-2.4)*
Age						
AGE1624	-482.4 (-8.0)*	-277.9 (-13.3)*	-477.6 (-7.19)*	-277.5 (-12.4)*	-504.9 (-7.3)*	-331.7 (-14)*
AGE2534	17.61 (0.411)	-3.537 (-0.214)	17.05 (0.394)	-3.81 (-0.236)	38.70 (0.944)	-17.12 (-1.07)
AGE3544	-	-	-	-	-	-
AGE4554	21.0 (0.543)	-9.295 (-0.487)	21.96 (0.630)	-9.323 (-0.510)	51.23 (1.618)	-11.79 (-0.67)
AGE5564	-159.9 (-3.3)*	-167.5 (-6.92)*	-159.7 (-3.30)*	-167.8 (-6.54)*	-151.3 (-3.3)*	-216.4 (-8.3)*
Educ.						
ELEMENT	-65.22 (-1.43)*	-122.7 (-6.75)*	-65.73 (-1.37)	-122.9 (-6.08)*	-54.87 (-1.173)	-75.33 (-3.5)*
HISCHO	-	-	-	-	-	-
SMPSTSEC	-67.53 (-1.43)	-52.28 (-2.81)*	-68.38 (-1.45)	-53.44 (-2.80)*	-98.41 (-2.17)*	-76.04 (-3.8)*
POSTSEC	-17.74 (-0.41)	12.068 (0.685)	-15.66 (-0.376)	11.77 (0.727)	-8.826 (-0.222)	1.276 (0.079)

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
UNIV	25.47 (0.540)	82.26 (3.77)*	25.958 (0.571)	83.11 (4.13)*	38.18 (0.881)	74.51 (3.72)*
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	-170.8 (-3.4)*	-284.7 (-16)*	-173.4 (-3.37)*	-283.9 (-15)*	-149.9 (-2.96)*	-288.6 (-15)*
OTHERM	-126.4 (-1.9)*	-138.2 (-4.94)*	-127.2 (-2.10)*	-138.8 (-5.3)*	-101.3 (-1.77)*	-100.8 (-4.2)*
KIDAGEDV	5.516 (0.221)	-13.80 (-1.405)	5.86 (0.234)	-13.75 (-1.44)	1.497 (0.064)	-14.75 (-1.6)
KIDSABFV	0.507 (0.042)	-35.70 (-7.24)*	0.171 (0.014)	-35.28 (-6.79)*	0.593 (0.048)	-39.27 (-7.2)*
Union						
UNION1	73.91 (2.39)*	148.1 (11.4)*	73.60 (2.79)*	146.5 (11.6)*	-41.32 (-1.65)*	62.79 (5.01)*
Industry						
PRIMARY	72.95 (1.04)	270.4 (10.7)*	70.82 (0.848)	271.9 (10.1)*	159.0 (1.99)*	262.5 (9.21)*
MANUFAC	8.02 (0.185)	85.39 (4.49)*	6.781 (0.154)	85.51 (4.55)*	8.906 (0.208)	116.8 (6.07)*
GOVSERV	-99.44 (-1.7)*	3.391 (0.156)	-100.5 (-1.94)*	3.698 (0.191)	-117.7 (-2.41)*	28.79 (1.461)
SERVICE	-	-	-	-	-	-
TRADE	58.11 (1.193)	179.1 (9.48)*	58.98 (1.134)	178.4 (9.65)*	52.16 (1.018)	149.3 (7.70)*
UTILITY	23.61 (0.394)	194.8 (8.57)*	22.71 (0.402)	195.6 (8.44)*	39.08 (0.722)	200.6 (8.58)*
FINANCE	217.9 (2.84)*	190.0 (5.25)*	216.4 (2.25)*	190.8 (4.93)*	79.06 (0.877)	164.6 (4.14)*
Occup.						
SERVER	-	-	-	-	-	-

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
FARMING	-30.44 (-0.31)	-162.6 (-5.52)*	-32.89 (-0.288)	-162.5 (-4.48)*	-30.47 (-0.270)	-81.26 (-1.9)*
MANPROF	154.5 (3.22)*	72.66 (3.77)*	152.8 (2.92)*	73.09 (3.80)*	78.39 (1.532)	74.0 (3.76)*
OFFICE	10.98 (0.155)	-83.77 (-3.21)*	9.335 (0.139)	-84.83 (-3.57)*	-21.57 (-0.334)	-73.0 (-3.0)*
BLUE	38.54 (0.843)	-33.532 (-1.90)*	37.21 (0.759)	-33.70 (-1.91)*	12.38 (0.260)	10.92 (0.597)
Visible Charac.						
MINOR	-70.72 (-2.1)*	65.87 (1.20)	-70.94 (-2.13)*	66.06 (1.170)	-75.85 (-2.38)*	55.02 (0.941)
LANGDIF	5.92 (0.200)	67.23 (2.45)*	6.682 (0.227)	66.24 (2.46)*	6.111 (0.214)	22.03 (0.820)
Inverse Mill's ratio						
PART	-	-	410.6 (1.055)	40.72 (2.51)*	-	-
UNDER	-	-	-	-	-1133.9 (-1.021)	0.373 (1.018)
CONSTANT	1896.2 (30.0)*	1761.6 (62.50)*	1899.0 (24.99)*	1755.0 (48.9)*	1938.2 (20.8)*	2040.0 (55.2)*
Adj.R^2	0.132	0.146	0.132	0.147	0.150	0.138
F(K-1,N-K)	14.55	123.26	14.11	119.2	14.11	90.22
log of like.fun	-19068	-154732	-19067	-154728	-16163	-124481
N	2412	19238	2412	19238	2076	15635
Wage Elastic.	0.013	0.052	0.012	0.052	0.028	-0.014

TABLE O

REGRESSION ESTIMATES OF THE ANNUAL HOURS EQUATION WITH A QUADRATIC WAGE TERM ($H = \beta_0 + \beta_1 W + \beta_2 W^2 + \beta_{3i} X_i + e$). FEMALE WORKERS

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
Mean of Dep Var.	1525.2	1405.7	1525.2	1405.7	1612.6	1514.0
SEE	730.6	727.9	730.2	727.9	673.6	708.6
Indep. vars.						
AVWAGE	9.736 (1.957)*	9.007 (5.61)*	9.336 (1.445)	9.007 (4.14)*	8.826 (1.43)	2.791 (1.27)
WAGESQ	-0.121 (-3.02)*	-0.036 (-3.67)*	-0.118 (-2.8)*	-0.036 (-2.1)*	-0.118 (-3.0)*	-0.013 (-1.0)*
Age						
AGE1624	-280.6 (-4.45)*	-208.14 (-10.7)*	-283.3 (-4.7)*	-208.2 (-10.5)*	-273.0 (-4.3)*	-208.9 (-10)*
AGE2534	-2.432 (-0.050)	-39.01 (-2.30)*	-3.674 (-0.08)	-39.0 (-2.28)*	-36.50 (-0.77)	-29.38 (-1.63)
AGE3544	-	-	-	-	-	-
AGE4554	-32.97 (-0.677)	-64.56 (-3.20)*	-33.89 (-0.66)	-64.56 (-3.21)*	-65.46 (-1.41)	-78.06 (-3.7)*
AGE5564	-290.2 (-4.52)*	-182.2 (-6.59)*	-292.2 (-4.3)*	-182.2 (-6.44)*	-359.3 (-5.3)*	-225.2 (-7.7)*
Educ.						
ELEMENT	-19.71 (-0.347)	-85.75 (-3.54)*	-20.00 (-0.35)	-85.74 (-3.52)*	24.39 (0.423)	-68.07 (-2.6)*
HISCHO	-	-	-	-	-	-
SMPSTSEC	-130.5 (-2.32)*	-39.75 (-2.19)*	-128.4 (-2.4)*	-39.79 (-2.21)*	-121.9 (-2.2)*	-52.65 (-2.7)*
POSTSEC	18.32 (0.355)	67.97 (4.06)*	20.28 (0.403)	67.95 (4.12)*	25.40 (0.512)	73.19 (4.2)*

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
UNIV	-70.94 (-1.246)	94.68 (4.33)*	-71.68 (-1.26)	94.66 (4.11)*	-76.62 -(1.37)	103.9 (4.4)*
Marital/ Children						
MARRIED	-	-	-	-	-	-
SINGLE	50.48 (0.918)	64.26 (3.96)*	49.65 (0.975)	64.26 (4.13)*	28.16 (0.580)	47.22 (2.90)*
OTHERM	137.7 (2.55)*	134.4 (6.64)*	137.6 (2.22)*	134.4 (6.28)*	196.9 (3.68)*	168.7 (7.4)*
KIDAGEDV	-242.4 (-7.12)*	-201.6 (-18.5)*	-239.3 (-7.2)*	-201.6 (-16.5)*	-211.1 (-6.0)*	-205.2 (-15)*
KIDSABFV	-66.70 (-4.52)*	-82.07 (-16.0)*	-67.40 (-4.5)*	-82.07 (-15.6)*	-69.57 (-4.5)*	-83.93 (-14)*
Union						
UNION1	224.8 (5.40)*	216.28 (14.7)*	225.1 (5.91)*	216.3 (15.6)*	193.9 (5.2)*	186.6 (13.3)*
Industry						
PRIMARY	162.7 (1.346)	123.7 (2.96)*	162.5 (1.323)	123.7 (2.63)*	139.5 (1.10)	101.1 (1.93)*
MANUFAC	238.6 (3.56)*	139.2 (5.80)*	237.2 (3.73)*	139.3 (6.06)*	261.0 (3.90)*	151.8 (6.2)*
GOVSERV	9.563 (0.133)	21.78 (0.998)	7.76 (0.083)	21.78 (1.011)	-3.987 (-0.05)	57.38 (2.54)*
SERVICE	-	-	-	-	-	-
TRADE	63.23 (1.257)	63.74 (3.94)*	65.37 (1.265)	63.72 (3.95)*	118.3 (2.19)*	58.74 (3.37)*
UTILITY	-3.172 (-0.029)	117.6 (3.85)*	-2.85 (-0.02)	117.6 (4.20)*	-86.0 (-0.87)	106.2 (3.66)*
FINANCE	298.0 (3.98)*	280.6 (11.3)*	302.3 (4.18)*	280.6 (10.1)*	260.3 (3.62)*	244.7 (8.48)*
Occup.						
SERVER	-	-	-	-	-	-

	OLS uncorr.		P.bias corr.		U.bias corr.	
	FB	CB	FB	CB	FB	CB
FARMING	-298.7 (-2.0)*	-189.9 (-3.77)*	-301.0 (-2.0)*	-189.8 (3.16)*	-304.8 (-1.9)*	-165.6 (-2.3)*
MANPROF	196.9 (3.77)*	161.8 (8.97)*	195.7 (3.49)*	161.8 (8.38)*	197.3 (3.5)*	178.7 (8.60)*
OFFICE	38.19 (0.787)	118.3 (7.42)*	35.38 (0.724)	118.3 (7.23)*	19.85 (0.40)	124.9 (6.96)*
BLUE	36.75 (0.497)	-9.56 (-0.351)	35.74 (0.487)	-9.51 (-0.35)	15.28 (0.19))	55.69 (1.88)*
Visible Charac.						
MINOR	98.94 (2.46)*	13.61 (0.256)	98.31 (2.66)*	13.63 (0.273)	105.9 (2.9)*	-34.86 (-0.65)
LANGDIF	61.67 (1.71)*	47.14 (1.74)*	61.14 (1.71)*	47.12 (1.69)*	75.29 (2.14)*	36.42 (1.23)
Inverse Mill's ratio						
PART	-	-	358.8 (1.404)	1.139 (0.093)	-	-
UNDER	-	-	-	-	1812.7 (1.04)	2.927 (0.087)
CONSTANT	1406.6 (20.8)*	1322.3 (57.64)*	1413.2 (18.4)*	1322.0 (50.0)*	1501.9 (20.4)*	1470.4 (52.2)*
Adj.R^2	0.110	0.120	0.111	0.120	0.122	0.115
F(K-1,N-K)	10.15	86.39	9.907	83.30	9.607	66.21
log of like.fun	-16068	-135340	-16066	-135340	-13707	-112535
N	2007	16900	2007	16900	1730	14100
Wage Elastic.	0.047	0.054	0.044	0.054	0.040	0.016

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