

SOME ECONOMIC IMPACTS OF THE IMMIGRANT POPULATION IN CANADA

by

Syed Ather Hussain Akbari

B.Sc. Hons., University of Karachi, 1977

M.B.A., University of Karachi, 1980

M.A., Simon Fraser University, 1982

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
in the Department
of
Economics

© Syed Ather Hussain Akbari 1988

SIMON FRASER UNIVERSITY

February 1988

All rights reserved. This work may not be reproduced in whole or in part, by photocopy or other means, without permission of the author.

APPROVAL

Name: Syed Ather Hussain Akbari

Degree: Ph.D. (Economics)

Title of Thesis: Some Economic Impacts of the Immigrant Population in Canada

Examining Committee:

Chairman: John F. Chant

Don J. DeVoretz
Associate Professor
Senior Supervisor

Dennis R. Maki
Professor

Clyde G. Reed
Associate Professor

Alan G. Green
Professor
Department of Economics
Queen's University
External Examiner

Date Approved: December 4, 1987

PARTIAL COPYRIGHT LICENSE

I hereby grant to Simon Fraser University the right to lend my thesis, project or extended essay (the title of which is shown below) to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users. I further agree that permission for multiple copying of this work for scholarly purposes may be granted by me or the Dean of Graduate Studies. It is understood that copying or publication of this work for financial gain shall not be allowed without my written permission.

Title of Thesis/Project/Extended Essay

Some Economic Impacts of the Immigrant Population in Canada.

Author: _____

(signature)

Syed Ather Hussain AKBARI

(name)

April 11, 1988

(date)

ABSTRACT

Immigration policy in Canada has undergone several significant changes over the past 25 years. Domestic economic conditions provided a major impetus to these changes. The present study is an attempt to evaluate the efficacy of Canadian immigration policy over this period by assessing certain impacts on the native-born population.

The study is conducted in two steps using microdata from the 1981 Canadian Population Census. First, the life-cycle theory of consumption, savings and investment has been used to hypothesize an immigrant's impact on the native-born population through the public treasury. This theory implies a positive net impact from the immigrant population since immigrants are generally younger at the time of their arrival and spend their productive lives in Canada. Major tax contributions and consumption of public services in Canada have been estimated to obtain a balance sheet of transfers between immigrants and original residents. Second, the impact of various policy-prone characteristics such as education, labour market experience, ethnicity, gender, etc. are also analysed. For this purpose the impact on earnings is analysed via a human capital framework. Earnings models are estimated for immigrants and the native-born population using Ordinary Least Squares. The unit of analysis is the household.

Most of the implications derived from the theory of life-cycle behaviour are confirmed. When tax contributions and

the consumption of all major public services are analysed, it is found that the stock of post-1955 immigrants circa 1981 had a positive impact on the standard of living of the native-born population.

The second part of the analysis reveals that because of the selection criteria used for admission, immigrants in general were able to improve their economic performance over their lifetime in Canada. European immigrants perform better than Canadian born residents. Immigrants from Asia, Africa and Central America require ten to fifteen years to emulate the economic performance of the Canadian born stock. However, overall, their economic performance is similar to that of the native born. The marginal impact of the length of stay in Canada on earnings is higher for this latter group of immigrants.

In sum, given the present analysis, it may be concluded that immigration policy in Canada has been successful in obtaining a positive impact from immigration.

DEDICATION

To my mother,
who brought me up.

ACKNOWLEDGEMENTS

I wish to thank my senior supervisor, Dr. Don J. DeVoretz, for clarifying my understanding of important issues relating to Canadian immigration. His valuable guidance was instrumental in timely completion of this study. I am also grateful to Dr. Dennis R. Maki, another member of my supervisory committee, for his help on issues relating to labour economics and on econometric problems. Useful suggestions made at different stages by Dr. Herbert G. Grubel are also highly appreciated.

Many thanks to my wife, Zakia, for her warm companionship which was necessary during the course of my work. My daughter, Aliah, provided added inspiration.

Partial funding for this study was provided by the Department of Employment and Immigration, Government of Canada.

Miss Sydney Preston provided valuable assistance in editing several drafts of this thesis.

Finally, I express my thanks to Dr. Mahmood Hasan Khan and Dr. Syed Ali Sarwar Rizvi for encouraging me to complete my doctoral degree.

TABLE OF CONTENTS

Approval	ii
Abstract	iii
Dedication	v
Acknowledgements	vi
List of Tables	ix
List of Figures	xi
Some Definitions	xii
A. Introduction and Literature Review	1
I. Introduction	2
Trends in Canadian Immigration	4
Review of Canadian Immigration Policy	5
Organisation of This Study	16
II. Literature Review	23
Immigrant's Demand for Social Services and Their Financial Contribution	24
Earnings Profiles	26
A Critique of Earlier Studies on Earnings Profiles .	32
B. Immigrants and the Life-cycle Theory of Consumption, Savings and Investment	40
I. Theoretical Background and Methodology	42
The Methodology	46
II. Computation of Variables and Discussion of Results .	51
The Data	51
Computations and Definitions of Variables	52
Discussion of Results	61

Payment of Taxes by Immigrants and Non-Immigrant Population	69
The Net Effect of Immigrants in Canada	76
C. The Earnings Profiles of Immigrants and the Native Born .	83
I. Theoretical Background and Earnings Model	85
Introduction	85
Theoretical Background to the Analysis of Earnings Differentials	87
Specification of the Model	90
Limitations of the Model	98
II. Empirical Results	101
Data	101
Specification of Variables	102
Characteristics of Subsample	103
Results	106
A Comparison of the Impact of Foreign and Canadian Labour Market Experience	119
Immigrant Assimilation in Canada	125
III. An Expanded Earnings Model	143
Specification of an Expanded Earnings Model	144
Estimation of expanded earnings model	154
D. Summary and Conclusions	164
Appendices	173

LIST OF TABLES

Table	Page
1	Immigrant Population, Number and Percentage of Total Population, Canada, 1901-1981 4
2	Changing Composition of Immigrant Flows by Source Regions 11
3	Age at Entry of Immigrants and Age of Total Population, Canada 44
4	Average Propensities to Consume - Immigrants by Period of Entry and Non-Immigrants, Canada, 1982 60
5	Average Receipts of Government Transfer Payments - Immigrant by year of Immigration and Nonimmigrants, Canada, 1980 62
6	Percentage of total Population Receiving Government Transfer Payments - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980 63
7	Average Use of Educational Services - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980 65
8	Average Consumption of Health Care Services - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980 .. 66
9	Average Number of Children per 100 Families Living at Home - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980 67
10	Percentage Age Distribution of Husbands Wives, Lone Parents and Non-Family Persons - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980. 68
11	Average Income by Source - Immigrants by Year of Entry, and Non-Immigrant Population, Canada, 1980 72
12	Estimates of Personal Income Taxes - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980 74
13	Estimates of Average Consumption Taxes Paid - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980 .. 75
14	Estimated Balance Sheet of Transfers between Immigrants and Non-Immigrants, Canada, 1980 77
15	Net Contribution to the Public Treasury by Immigrant Entry Cohorts, 1980 81

16	Means of Variables	104
17	Regression Results of Earnings Model	107
18	Results of Chow Test	109
19	Marginal Impact of Age on Log of Earnings - Native Born, and Immigrants	111
20	Marginal Impact of Age on Log of Earnings - Europeans, and Asians, Africans & Central Americans	117
21	Regression Results with Foreign and Canadian Experience	121
22	Marginal Impact on Log of Earnings of Foreign and Canadian Experience	123
23	Averages for Period of Immigration Dummy Variables	128
24	Results of the Earnings Model for Immigrants	129
25	F-value to Test the Hypothesis that Inclusion of Period of Immigration Variables does not Improve the Fit of Earnings Model for Immigrants	131
26	Estimated Results of Earnings Model Using Pooled Data ..	136
27	Averages of Additional Variables of Expanded Earnings Model	148
28	Regression Results of Expanded Earnings Model	155
29	F-test for set of additional Regressors	157
30	Chow Test on the Expanded Model	158
31	Marginal Impact of Age on Log of Earnings in the Expanded Model	160
32	Age at Maximum Earnings	161
33	Present Value of Life-Cycle Earnings - Immigrants, Non-Immigrants, Canada, 1980	170

LIST OF FIGURES

Figure		Page
1	Life Cycle Consumption, Savings and Investment by Individuals	43
2	Earnings Differential Between Immigrants and Native Born, Canada, 1980	139
3	Earnings Differential Between Asian, African and Central American Immigrants and Native Born, Canada, 1980 .	140
4	Earnings Differential Between European Immigrants and Native Born, Canada, 1980	141

SOME DEFINITIONS

Census Family

Following the definition suggested by Statistics Canada, a census family is defined as comprising of parent(s) and never-married children who are living with parents. There are two classifications of census families: husband-wife families and lone parent families. A husband-wife family consists of the husband, wife and never-married children who are living with their parents. A lone parent family is the lone parent and never-married children who live with their parent.

Non-Family Person

A non-family person is one who is not attached with any census family.

Immigrant

Again, following census terms as used by Statistics Canada, an immigrant is defined as a person who was born outside Canada and was not a Canadian citizen by birth.

Immigrant Family

Among husband-wife families, an immigrant family is one which has at least one immigrant spouse. Similarly, among lone parent families, an immigrant family is defined as one in which the lone parent is an immigrant.

Immigrant assimilation

Immigrant assimilation refers to a process whereby immigrants acquire skills including language proficiency and knowledge about the local labour markets and other social institutions, which ultimately will enhance their socioeconomic status and their earnings in particular. % for over achieved no assimilation.

PART A
INTRODUCTION AND LITERATURE REVIEW

CHAPTER I

INTRODUCTION

The objective of this thesis is to provide some evidence on the economic impact of immigrant flows into Canada. For this purpose the primary focus will be on the impact of immigrants on the standard of living of the extant native born population. As a by-product of measuring this impact, an investigation into immigrant assimilation in Canada will also be conducted.

Several reasons can be advanced to highlight the importance of this study. First, recent demographic statistics¹ suggest an aging trend in the Canadian population with a 7 percent decline in the age group 0 to 15 years and an 18 percent increase in the age group over 65. It can be argued that this aging trend in the near future will increase the burden on the productive labour force to support and provide social services for an expanding aged dependent population. Hence, immigration is expected to assume an important role in shaping the future Canadian population pyramid and the economic growth of the country.

A second impetus to this study is measuring the impact of the series of changes in Canadian immigration policy, especially over the last two decades. As has been documented by D. DeVoretz and D. Maki (1980, 1985), L. Parai (1975), F. Hawkins (1972, 1974), and R. Jenness (1974), immigration in Canada is carefully controlled and extremely selective. Immigration policy is

¹Statistics Canada (1986), p. 40.

partially dependent upon manpower needs and partly influenced by the belief that immigrants impose a net cost on the society.² Thus, the present composition of Canada's immigrant population reflects several historical policy regimes. A rigorous analysis of immigrant performance will, therefore, shed light on the efficacy of the various policy regimes used to meet labour requirements with minimum cost.

Finally, as revealed by the 1981 Canadian population census, 16 percent of the Canadian population is foreign born. An investigation into the economic impact of the present stock of immigrants may be useful not only to evaluate the efficacy of past immigration policies, but also to assess the desirable characteristics of a future immigrant cohort.

The following section provides a brief review of the trends in Canadian immigration flows. This review is followed by a discussion of various policy regimes in Canada. This discussion gives rise to a series of questions that should be addressed in an analysis of the impact of immigrant population in Canada. It is the purpose of this thesis to address some of those questions.

²The 1975 Green Paper, Canada (1975), makes this explicit. This will be amplified in a later section.

Trends in Canadian Immigration

Statistics indicate that Canada has experienced marked changes in its immigration flows since the beginning of this century. Prior to World War II, the percentage of immigrants to total population was continuously increasing. However, since World War II, the percentage has been declining. Table 1 provides these data.

Table 1

Immigrant population, Number and Percentage of the Total Population, Canada, 1901-1981

Year ¹	<u>Immigrants</u>	
	Number '000	Percentage of total population
1901	699.5	13.0
1911	1,587.0	22.0
1921	1,955.7	22.3
1931	2,307.5	22.2
1941	2,018.8	17.5
1951 ²	2,059.9	14.7
1961	2,844.3	15.6
1971	3,295.5	15.3
1981	3,843.3	16.0

¹Figures for 1901 to 1971 include a small number of Canadian citizens by birth who were living abroad.

²Includes Newfoundland for the first time.

Source: Statistics Canada (1984).

The trends in Table 1 largely reflect the various changes in Canadian immigration policy which are outlined in detail in the following section.

Review of Canadian Immigration Policy

The following review discusses the changes undergone by Canadian immigration policy in the current century. Two major aspects of the policy will be discussed. First, immigrant selection criteria will be outlined. In addition, given these criteria, the mechanism to control immigrant volumes based upon domestic economic conditions will be discussed.

The 1910 Immigration Act is considered a landmark piece of legislation.³ This act set out the basic structure under which immigration policy was run until the first major revision in 1952 (RSC 1952, C.325). The act classified immigrants into "preferred" and "non-preferred" classes based on the country of origin. The choice of the country in this regard was based on the ability of the prospective immigrants to be assimilated into the Canadian setting. The order of preference was first, immigrants from northern and western Europe who were not different in language and mode of life; next, those from central and eastern Europe, and finally, those from southern Europe including Greece, Italy, Syria and Turkey. All others, except British subjects from the "Old Dominions," American citizens and others from the U.S., were included in the "non-preferred" class. Immigrants from the non-preferred class had to possess a

³This has also been noted by A. Green (1976). The first Immigration Act in Canada was passed in 1869. This Act gave the Canadian government a right to define an acceptable immigrant to Canada. The definition of an acceptable immigrant was intended to protect the original residents against any communicable diseases.

passport and visa issued abroad in order to gain entry. This distinction persisted until the late 1950s with little substantial change.

As noted by A. Green (1976), the desire to control the ethnic composition in the country was based upon several diverse factors, among which were the intention to fulfill the climatic, industrial, social, educational and labour requirements of Canada. In addition, a desire to maintain uniformity of customs and the need to assimilate "new" immigrants was incorporated into the act.

The post-World War II economic boom created a large demand for foreign labour within the country and called for changes in regulations affecting national origins. By the early 1950s, national origin restrictions had been considerably eased. This was due to chronic excess demand for foreign labour. A new immigration act was passed in 1953 which provided admission guidelines until late 1957. Admission was largely free for prospective immigrants from the "most-preferred" countries. The next in order of preference, as before, were immigrants from northern and western Europe and then the rest of the world. However, restrictions were still the tightest for Asian immigrants. The following quote from Prime Minister Mackenzie King outlines the government policy during this period.

The policy of the government is to foster the growth of the population of Canada by the encouragement of immigration. The government will seek by legislation, regulation and vigorous administration, to ensure the careful selection and permanent settlement of such

number of immigrants as can advantageously be absorbed in our national economy... With regard to the selection of immigrants, much has been said about discrimination. I wish to make it quite clear that Canada is perfectly within her rights in selecting the persons whom we regard as desirable future citizens. It is not a "fundamental human right" of any alien to enter Canada. It is a privilege. It is matter of domestic policy... There will, I am sure, be general agreement with the view that the people of Canada do not wish, as a result of mass immigration, to make a fundamental alteration in the character of our population. Large-scale immigration from the Orient would change the fundamental composition of the Canadian population. Any considerable Oriental immigration would, moreover, be certain to give rise to social and economic problems of a character that might lead to serious difficulties in the field of international relations.⁴

However, the 1962 Immigration Act sought to eliminate the criterion of country preference and the resulting racial discrimination. These regulations created a universal, non-discriminatory immigration policy (with the exception of one discriminatory clause relating to the sponsoring of relatives from Asia). The major emphasis was on the admission of skilled immigrants and the reunion of families. This policy arose due to the decline in the flow of immigrants from Europe due to prosperity in European countries in addition to the general relative international scarcity of highly trained manpower. Moreover, economic indicators within the country suggested that the postwar boom was over. Unemployment was high and investment was down. This information, as noted in Green (1976), became known throughout Europe thereby discouraging European workers to leave their prosperous regions.

⁴Quoted in G. Rawlyk (1962), p.289.

Furthermore, as noted by Hawkins (1974), a racially discriminatory policy simply did not accord with the role which Canada wished to play in the international community and the Commonwealth, nor with her role as trading nation, nor her future relationships with the West Indies and Asia. It also severely restricted the source of skilled immigrants at a time when the Canadian labour market had a definite need for them. The new position as stated by the then Minister of Manpower and Immigration Ellen Fairclough, is worth noting:

We shall do our best to admit as immigrants individuals and families who are personally suitable and who have the required background and training to become worthwhile citizens. The key to our immigration policy will be the consistent application of proper selection standards designed to bring the best possible settlers to Canada. I am sure that all Canadians will agree that once these standards are established they should be applied consistently to all who seek admission to this country, except where the admission of the immigrant is based on compassionate grounds or close relationships.⁵

Green (1976) dramatically notes the implications of the above:

In one statement, then, the old policy based on a national origins concept had been swept away, and in its place a policy based on the individual skills of the prospective immigrant regardless of his country of origin was adopted. The application of the universality rule was conditional, however, since it was based on the training of the applicant and the need in Canada of the particular immigrant's skill (a carry-over from the past).⁶

Another significant change occurred in 1967 when all of the discriminatory aspects (including those relating to the sponsorship of relatives from Asia) were abolished. The then

⁵Quoted in Rawlyk (1963), p. 297.

⁶Green (1976) p. 36.

Minister of Manpower and Immigration, Jean Marchand argued:

With these regulations, I believe we can abolish discrimination, pay more regard to the claims of family relationship, act with both greater efficiency and greater compassion than in the past and, through an expansionist immigration policy, serve the manpower needs of our growing Canadian economy.⁷

The regulations of 1967 set up three categories of immigrants: sponsored, nominated and independent. Sponsorship rights previously limited in the case of applicants from certain countries were to apply on equal terms to all areas of the world, and no area of the world was to be considered "off limits" for sponsorship of immigrants by their relatives in Canada. This meant that a close family relationship with a Canadian citizen or resident could make it easier for a potential immigrant to gain admission to Canada. For others, the existing standards of educational and professional skills were revised with the application of objective tests and point ratings in nine categories. Immigrants in this category, usually termed the "independent category" or "economic category," mostly without relatives in Canada, were to qualify for entry if they could compile 50 "assessment units" based on their education, skill, age, personal qualities, occupational demand, employment arrangements, knowledge of English and French, relatives, and area of destination.

Each applicant was allotted points which reflected his skills, education and intended occupation. Out of a total of 100 points, up to 40 were awarded for the immigrant's education,

⁷Quoted in J. Kage (1967), p.47.

training, skill levels and age. Another 30 points were allotted for the occupational demand in the Canadian economy and for occupational skills.⁸ Of these, a maximum of 5 were awarded if the applicant planned to move to an area of Canada experiencing a labour shortage. Up to 15 points were awarded on the strength of the demand for the applicant's skills and the remaining 10 were given if he had a definite job arranged. Another 15 of the 100 points were awarded at the discretion of the immigration officer who assigned the points on his assessment of the applicant's ability and motivation. The remaining 15 points were assigned on the criteria of knowledge of French and English, and the existence of nonsponsoring relatives who could help in the adjustment to Canadian society.

Although introduced in 1967, the point system was not fully implemented until 1972.

The policy changes discussed above are reflected in a changing composition of annual immigration flows by source areas. This is revealed in Table 2.⁹ An increased proportion of immigrant workers in this period were professional or technical workers, which rose from less than 10 percent during the 1950s to 20 to 30 percent in the 1960s and 1970s.

⁸Occupational skills were assessed according to internationally recognised standards.

⁹ The changing pattern is also reflected in the composition of the current stock of immigrant population in Canada as revealed by the 1981 census. Detailed statistics on the composition of the 1981 immigrant stock in Canada by the period of entry and region of origin are provided in Appendix 1.

Table 2

Changing Composition of Immigrant Flows
by Source Regions

Source Area	1946- 1967	1968	1969	1970	1971	1972
Britain	26.5	18.4	17.8	16.0	11.7	14.9
Other Europe	55.9	47.2	36.9	35.2	31.0	27.1
Africa	1.0	2.8	2.0	2.0	2.3	6.8
Asia	3.9	11.8	14.4	14.3	18.2	19.1
Australia	1.4	2.6	2.7	3.0	2.4	1.8
U.S.A.	6.6	9.3	11.9	14.1	17.0	18.5
Other North Cent. America	3.2	6.2	10.8	11.5	12.6	7.6
South America	1.1	1.5	3.0	3.4	4.2	3.5
Oceania & Other	0.4	0.2	0.4	0.6	0.7	0.7
Total	100	100	100	100	100	100

Source: Hawkins (1974)

Since the adoption of the 1967 Act and also the implementation of the point system, the emphasis of Canadian immigration policy is now more on the regulation of annual immigration volumes applied globally.

By the early 1970s, Canadian opinion turned against large immigration volumes. As a result, a restrictive immigration

policy was sought. As noted by W. Marr and M. Percy (1986, p.ii):

The shift of Canada to a more restrictive and less flexible immigration policy in this period is consistent with the acceptance by many in the early 1970's of the view that population growth in general and the component due to immigration in particular entailed greater costs than benefits to society.

The 1975 Immigration Bill (C-24) is regarded as the most restrictive in the history of Canadian immigration policy, explicitly laying out the belief expressed in the above quotation. The Green Paper (Canada 1975) explicitly states this view:

Through much of Canada's history, the arguments supporting rapid population expansion seemed compelling, and coloured national attitudes towards immigration. Forcible as they were in the past, and although they still have support from many, the validity of these arguments in contemporary circumstances is now being questioned. To many Canadians living in modern industrialized and increasingly urbanized society, the benefits of high rates of population growth appear dubious on many grounds.

Canada, like most advanced nations, counts the costs of more people in terms of congested areas, housing shortages, pressures on arable land, damage to the environment--in short, the familiar catalogue of problems which most prosperous and sophisticated societies are currently endeavouring to overcome.¹⁰

Following the Green Paper of 1975, a new Immigration Act was passed in 1976 which became law in 1978. The legislation adopted a restrictive posture towards increased immigration and was in sharp contrast to the expansionist approach of the sixties. For the first time Canadian immigration policy (Section 7 of the

¹⁰Quoted in Marr and Percy (1986), p. ii.

Act) explicitly required authorities to set annual quotas for immigrant admissions and linked the volume and composition of the flow to economic conditions in Canada and demographic requirements. Immigration regulations governing the admission of economic immigrants were based on narrowly defined labour market criteria. As noted by Marr and Percy (1986), the basic philosophy underlying the Act and accompanying immigration regulations appeared to be that the economic effects of immigration are small and would be negative if the magnitude of immigration and admission criteria were not closely linked to short run labour market conditions such as vacancy and unemployment rates in specific occupations. This perspective represented a major break with previous immigration policy and was certainly inconsistent with the basic philosophy of the 1966 White Paper on Immigration that ". . . immigration tends to increase the real income per person available to all Canadians."¹

By 1981, a more refined procedure was adopted to regulate the planned number of immigrants by distinct categories. The level of family class immigrants and refugees was not to be set according to the need of Canadian labour markets. However, the level of independent immigrants was to be tied even more than before to labour market conditions.

In 1982, immigrant policy became even more restrictive. This was in response to a severe recession and high unemployment

¹Quoted in Marr and Percy (1986), p. iii.

rates. An additional entry requirement was levied for the independent category of immigrants. It was made essential for them to have a job offer validated by a Canada Employment Centre before their application could be considered. Prior to these revisions, the arranged employment category was worth ten points with a validated job offer. Now, ten points were to be deducted if the migrant had no firm job offer prior to arrival.¹²

The above restrictive policies, together with the general economic downturn and high unemployment in the early 1980s, resulted in a decline in immigration flows from 143,000 in 1980 to only 88,000 in 1984.

Very recently, circa 1985-1987, demographers have expressed the view that there is a decline in the rate of growth of the Canadian population. As noted by D. Foot (1987), if the present decline in the rate of growth continues, there is a fear that by the turn of the century the population will even start to decline in absolute terms. In addition, statistics suggest an aging trend in the Canadian population. Two striking changes in the structure of Canadian population are noted over the period 1976-1981. These are a 7 percent decline in the number of children under 15 years and a 17.9 percent increase in the number of persons over 65.¹³ It is argued that this aging trend

¹² Entrepreneurs and self employed were not assessed under this category.

¹³ According to the *Canada Yearbook 1985* between 1976 and 1981, the population aged 14 and under decreased from 5.9 million persons or 25.6 percent of the total to 5.5 million (22.5 percent). The number of persons over 65 grew from about 2

will in the near future increase the burden on the productive labour force to support and provide social services such as health care and pensions to an expanding number of non-working elderly citizens.

The above facts have been of concern to recent government and demographic circles in Canada. The Canadian government has called a series of consultations with various academic and business circles. As an outcome of this consultation process, the *Annual Report to Parliament on Future Immigration Levels* was tabled on October 31, 1985 by the Minister of Immigration, Honourable Walter McLean. The report expressed the concern that annual immigration volumes have been too low in recent years. Thus, there is now a need for a moderate, controlled increase subject to the Canadian economic and labour market conditions. A significant increase in immigration levels was announced from 85,000-90,000 in 1985 to 105,000-115,000 for 1986 and 115,000-125,000 for 1987. Much of the increase announced in this report was to occur in the economic class, including assisted relatives, independent immigrants and a new category of business immigrant - the investor. Furthermore, the selection criteria for independent immigrants were revised. The 1982 restriction requiring applicants to have a validated job offer as a condition of entry was also revised.

¹³(cont'd) million or 8.7 percent of the total to about 2.4 million (9.7 percent). In other words, the proportion of the elderly is increasing and growing faster than the population in general. In 1901 only 5 percent of the total population was aged over 65. By 1981 this percentage had increased to 10.

The change in government philosophy is expressed in the following quote from the 1985 report:

The federal government does not accept the popular misconception that immigrants "take jobs away from Canadians." Immigrants contribute to economic growth and job creation by augmenting capital formation, expanding consumer demand for Canadian goods and services, and bringing needed skills and energies to Canada's labour market.¹⁴

Organisation of This Study

In order to analyse the success of immigration policy the basic question which should be asked is: Has immigration in Canada been a profitable investment for the native-born population? This poses at least three major questions:

1. Have immigrants made a net contribution to the public treasury which benefited the native-born population?
2. How has the immigrant private economic performance compared vis-à-vis the native born stock?
3. Have immigrants had an impact on employment, wages and in general income distribution?

The above list is not exhaustive.¹⁵ However, all of these questions are important sources for debate in public and private

¹⁴Canada (1985), p. 1.

¹⁵For example, immigration also benefits the host nation by adding to the stock of human capital. Realizing this, H. Grubel and A. Scott (1966), estimate the size of human capital gains accruing to the U.S. from immigration of skilled manpower. D. DeVoretz and D. Maki (1980) provide similar estimates for Canada resulting from the immigration of skilled immigrants in Canada from the Third World. F. Blau (1984) also notes immigration as investment in human capital.

circles.

This thesis will attempt to address the first two questions.¹⁶ The importance of studying the immigrant impact through the public treasury arises from the fact that transfer payments and consumption of public services by immigrants are often suggested as a negative offset to any positive effects of the immigrant.¹⁷

An answer to the second question will help explain the public treasury effects of immigrants by analysing the impact of various policy-controllable characteristics. Various characteristics of the immigrant flows, for example, their average age, education, gender and ethnic mix, have been manipulated by policy. The impact of such policy-controllable characteristics on an immigrant cohort's performance will also be analysed. A related question that emerges in this regard then is: What is the appropriate mix of these characteristics that will maximize the benefits from immigration?

An Analytical Model

The analysis will be performed in a life-cycle model first developed to explain saving and investment fluctuations by F. Modigliani (1958) and P. Samuelson (1975).

¹⁶The last question is currently under review by this author in a separate paper.

¹⁷R. Blitz (1977) and J. Simon (1982) discuss this impact.

There are two steps to the present analysis. First, one primary implication of the life-cycle theory - that there should be a transfer of resources from immigrants to the native born - is tested. As demonstrated by P. Samuelson (1975), the life-cycle theory implies that a society with relatively more young workers will experience a high level of savings. These savings can be regarded as a system of intergenerational transfers from workers to the retired elderly or to very young dependents. Immigrants are generally young at the time of their arrival. Thus one would expect a net transfer of resources from immigrants to the native born.

As a second step, the analysis will be extended to include the impact of immigrant selection characteristics such as age, education, ethnicity, etc., on the economic performance of a particular cohort. The appropriate framework for such an analysis is provided by human capital theory. The theory of human capital singles out investment in human capital as the basic factor in differential economic performance of individuals. Thus, for the same age distribution, a cohort with greater stock of human capital will have a higher economic impact.¹⁸ Hence in this step of our analysis, the success (or failure) of immigrants will be attributed to the immigrant selection criteria adopted by various policy regimes.

¹⁸In a traditional human capital analysis earnings are considered a proxy for economic performance.

The Data

The study is based on microdata obtained from the one percent public use sample drawn from the 1981 Canadian Census of Population. The units of analysis are a census family and a non-family person. In addition, some secondary data have also been used to compute values of certain variables.

To gain access to microdata from the census, Statistics Canada has produced a series of Public Use Sample Tapes (PUST). The data recorded on these tapes refer to individual respondents in the 1981 Census and are obtained from the long-form census questionnaire. These data have been organised into two separate files: individual, and household/family files. To create each of these basic files an independent stratified sample was drawn from the data collected during the 1981 Census.

The unit of analysis in this study is a census family or a non-family person. Families are included in the analysis because the consumption of social services and payment of taxes by the two population groups are in large part determined by the number of dependents. A person who immigrates to Canada generally either brings a family with him or her, or at a later stage acquires a family. More importantly, recent Canadian immigration policy has as its keystone the encouragement of family-oriented inflows of immigrants.

For the purpose of this study, the household/family file of the PUST was used as it provides information on census families

and non-family persons. The primary sample size for this file is one-in-a-hundred (i.e., one percent). The samples are self-weighting, i.e., each record is assigned a weight of 100. Each record on the household/family file consists of two parts. The "Household" part contains detailed information on the occupants of the household as well as some information on housing. The "Family" part of the record gives information on one census family or one non-family person. It provides detailed information on the husband, male lone parent, male non-family person, wife, female lone parent, and female non-family person.

In all, there are 94,795 records on the household/family file. From these, 63,203 (i.e., 66.7 percent) are census families and 31,592 (i.e., 33.3 percent) are non-family persons. Of the total census families, 16,724 (i.e. around 30 percent) can be classified as immigrant families. Among the non-family persons, there are around 6,160 (i.e. 19.5 percent) immigrants.

The analysis pertains to the calendar year 1980 since the 1981 Census collected information on earnings, consumption of government transfer payments and labour force activity for the year 1980. The immigrant cohorts that arrived in Canada in 1980, 1981 and before 1955 are excluded from the analysis. The meaning of 1980 income for the 1981 cohort is dubious.¹⁹ As for the 1980 cohort, it is not clear in which part of the year they arrived

¹⁹According to Mr. Duncan Wright of Statistics Canada, the 1980 income reported by immigrants who arrived in Canada may have been earned by them in the country where they lived prior to arriving in Canada.

in Canada. Hence their earnings and consumption may not be comparable with earlier immigrants and the native-born population. The cohort that arrived before 1955 is excluded under the assumption that members of this cohort have lived long enough in the country to be completely assimilated. One may argue that in the case of immigrant families that arrived in Canada before 1955, it is the contribution of children that is important. Since separate data on children's earnings are not available, it is impossible to consider them in this analysis.²⁰

In addition to obtaining data from the PUST, this study also made use of some secondary data. This was done because monetary values of the variables to be considered were not directly observable. Most of the secondary data that have been utilised are from various government statistical sources. These sources have been noted where used.

The study has been divided into four parts. Chapter II of the present part provides a review of the relevant literature on the impact of international immigration on population of the country of destination. Part B provides a test of the life cycle theory of consumption, investment, and savings for the immigrant population in Canada. The analysis has been conducted along the lines followed by J. Simon (1984). Part B has been divided into two chapters discussing theory, methodology, data, computation

²⁰Also excluded from the analysis are those immigrant families where only the wife is an immigrant.

of variables and discussion of results.

Part C provides evidence on the age-earnings profiles of immigrants and native-born household heads in Canada. The analysis has been conducted in a human capital framework. Earnings models, which incorporate various determinants of earnings, have been estimated separately for both immigrants and native-born individuals. Here, two subgroups of immigrants - those coming from Europe and those from Asia, Africa and Central America - have also been considered. This has been done to test if similar results hold when immigrants are disaggregated by their place of birth. Part C is divided into three chapters. The first two chapters discuss the theoretical background to an earnings model, specification of an earnings model and the estimated results. Results of an expanded earnings model are discussed in a separate chapter. The expanded model incorporates cross sectional characteristics in addition to the theoretical variables. All definitions and justifications for inclusion of variables are presented before the discussion of results.

Part D summarizes all findings of the study and draws some major conclusions.

CHAPTER II
LITERATURE REVIEW

There is a wide body of theoretical and empirical literature discussing various economic consequences of international immigration from the point of view of both sending - and - receiving countries. From the point of view of immigrant - receiving countries, the economic consequences as identified in the literature can be broadly classified into various types of effects on: employment, income distribution,¹ the terms of trade, inflation, the balance of payments, and the impact on social services. Since this study is mainly concerned with the impact of international immigration on the provision of Canadian social services, only those relevant studies will be reviewed.² The following section reviews literature on immigrants' demand for social services and their financial contribution. The literature on the age-earnings profile of immigrants is reviewed thereafter.

¹These are also discussed as welfare effects.

² For employment and income distribution effects some important studies are by A. Berry and R. Soligo (1969), M. Greenwood (1983), F. Rivera-Batiz (1981, 1983a, 1983b), J. Mutti and S. Gerking (1984), J. Bhagwatti and T. Srinivasan (1983), and J. Grossman (1984). For the terms of trade effects an important study is by A. Sapir (1983). The inflation and the balance of payments effects are discussed by M. MacMillen (1982).

Immigrant's Demand for Social Services and Their Financial Contribution

By adding to the population, immigrants tend to raise the demand for social services.³ However, they also make a financial contribution in the form of taxes. The relevant question in this regard then is whether there is a net transfer of resources from the original residents to the immigrant population.

M. Kraus and W. Baumol (1979) have demonstrated that if immigrants benefit in excess of their financial contribution then the welfare of native-born population will not be improved by government welfare programs. G. Gallais-Hamonno (1977) has suggested that in France the income tax potential of foreign wage earners was very low. In the case of Britain, K. Jones and A. Smith (1970) have concluded that New Commonwealth immigrants may have paid less income tax and contributed less to social security than their indigenous counterparts.

Transfer payments are often suggested as a negative offset to any positive impact of immigration. However, whether immigrants constitute a net burden on the public transfer system is not universally accepted. Simon (1982) suggests for the United States, that the difference between other welfare payments to immigrants and to the native-born population is small compared to the difference in social security payments.

³These include welfare programs such as unemployment insurance, etc.

Moreover, because the distribution of arriving immigrants constitutes more workers and fewer dependents than the distribution of native-born population, immigrants, on balance, contribute to the native-born population through social security and transfer payments that support education.

A comparison of taxes and consumption of public services by immigrants and the native-born population in the U.S. has been carried out by Simon (1984). Overall, taking all social security programs considered into account, Simon finds that an average immigrant family whose household entered the U.S. less than ten years ago uses a much lower level of social services than the average native-born American family. He also finds that the total level of social services used by earlier immigrant cohorts is higher and reaches equality with the native born some ten to fifteen years after arrival in the U.S. Simon also estimated the likely tax contributions of the two population groups in the U.S. and found that an average immigrant family contributes almost the same level of income tax as the native-born American family. In the end, Simon combines his results to obtain an overall balance sheet of net transfers between immigrants and native born. He then concludes that the net effect of all entry cohorts of immigrants on the native-born population is positive.

The question of the impact of immigrants on the demand for social services has also been empirically investigated by F. Blau (1984) for the U.S. Her study shows that the total transfer

payments to an immigrant family are higher on average than to a native-born family: in 1975, 52 percent higher among families with male heads, and 13 percent higher among families with female heads. However, this result was entirely due to a higher average age for family members in the immigrant group. Since the age distribution is determined by historical trends in immigration (for example adoption of restrictive immigration laws) rather than by domestic birth and death rates, immigrants tend to be older, on average, than natives. Their age therefore, tends to increase their use of social services. When the age factor is held constant, Blau found that immigrant families are less likely to rely on welfare payments than families with native-born heads. Her study also indicates that the receipts from social insurance programs are only slightly higher in the case of immigrant families when compared with their native-born counterparts.

Earnings Profiles

The age-earnings profiles, i.e., plots of average earnings by age, yield an important implication for income tax and social security payments. By incorporating the age structure, the age-earnings profile can be used to predict the future burden on various demographic groups for the provision of social services.

In the context of immigration, it is important to study earnings profiles for at least three reasons. First, the system of income and transfers in a country is designed in such a

manner that it taxes the rich in order to subsidize the poor. If immigrants earn less than non-immigrants over their life-cycle, they will tend to be more reliant on social transfers and the original residents will be subsidizing them. Thus it is important to analyse earnings differential between the native born and immigrants by controlling for their demographic differences. Second, at the time of their arrival immigrants are young as compared to the original population. However, as they age they become more reliant on the social security system. Thus by analysing their earnings while controlling for their age distribution, one may predict whether immigrants are likely to become a burden on the society in future.

Finally the earnings profiles can also be used to study the immigrant assimilation process. This point will be discussed in detail in a later chapter.

In explaining the earnings differential between individuals, human capital models are now standard in literature. Some studies in this regard include G. Becker and B. Chiswick (1966), J. Mincer (1970), Chiswick (1978), G. Snooks (1983), M. Dooley and P. Gotschalk (1984), and M. Dooley (1986). Differences in the earnings of individuals are explained by differences in skills and educational attainment while controlling for place of residence and gender composition.

For the analysis of the earnings differential between native-born and foreign-born individuals, several studies have

been conducted. B. Tandon (1977) utilised human capital theory to analyse the earnings differential between native-born and foreign-born individuals in Canada. His analysis was limited to male residents of Ontario. Using data from the 1971 Census of Population, he analysed the determinants of the earnings (expressed in natural logarithm) of foreign-born adult men in Canada. The basic post-schooling model of individual earnings variations proposed by Mincer (1970) served as the basis for the empirical specification of the earnings equations. Earnings are expressed as a function of prior human capital investments as indicated by the years of completed schooling and years of labour market experience.⁴ Statistical controls are also introduced for industry of employment, occupation, and weeks worked during the year. A measure of duration of the immigrant's residence in Canada is also included.

Tandon's findings suggest that the life-cycle earnings of immigrants in Canada are generally lower than the earnings of their native-born counterparts. However, with an increase in the length of stay, the gap in the earnings of the two groups tends to narrow. When he disaggregated the immigrant population by their country of origin, Tandon found that U.S. immigrants earn

⁴As data on the labour market experience of individuals were not available, this variable was measured by using a definition suggested by Mincer (1974). According to this definition, labour market experience is measured as the difference between age at the time of census and age at completion of school. This involves the assumption that individuals in their lifetime are either continuously employed or attending school. Several studies in the literature take issue with this assumption. These are discussed in a later section. In addition, we will argue that the assumption may not be valid in the case of immigrants.

more than the native born. U.K. immigrants, on the other hand, start from a lower level of earnings, but continue to experience increases in earnings until their earnings exceed those of the native born. Earnings of immigrants from Western Europe, Southern Europe and Asia, Latin America and the West Indies (holding constant years of schooling and potential work experience) never attain equality with the earnings of native-born Canadians.

Later in his study Tandon also splits the schooling and experience variables into their pre- and post-immigration levels. In this case Tandon's results indicate that for each group the effect of Canadian labour market experience is more significant than that of their foreign experience.⁵

⁵ Utilising the same framework and methodology, a large body of literature has developed on the estimation of earnings of immigrants and the native-born population. For example, using U.S. data B. Chiswick (1978) has analysed the determinants of earnings of foreign-born adult white men and compared them with native-born white men. His results indicate that the earnings of immigrants are initially lower, but with duration in the U.S., their earnings rise relative to the native born, though at a decreasing rate. The tendency for immigrants' earnings to be lower initially suggests that skills and other job-related knowledge (e.g., labour market information and language familiarity) are not perfectly transferrable. The rise in immigrants' earnings is consistent with the hypothesis that immigrants are progressing through a process of assimilation over the life-cycle.

In addition to Chiswick, several others, e.g., G. Carliner (1980), J. Long (1980), G. Borjas (1985) and J. Stewart and T. Hyclack (1984) have used the same methodology, focusing on various specific immigrant groups and using alternative data for the U.S. They all find support for Chiswick's conclusion that work experience prior to migration has a smaller effect on immigrant earnings than does post-migration experience. Similarly, it has been found that a year of schooling prior to immigration has a smaller effect on the immigrant earnings than if the schooling took place in the United States. However, some

In addition to Tandon (1977), several other studies on the earnings of individuals in Canada utilise the 1971 Census data. Although these studies do not directly address the issue of differences in the earnings of native born and immigrants, some inferences can be drawn from them. For example, P. Kuch and W. Haessel (1979) analysed the variations in earnings across employed persons aged 15 years or more. They present empirical estimates for earnings disaggregated by ethnic group, but pooled across nativity and birthplace. Three birthplace dummies were included in their model to distinguish the foreign born according to length of residence in Canada. One of the results of the study was that the period of immigration into Canada has no significant influence on earnings.

A. Richmond and W. Kalbach (1980) analysed the earnings of males and females aged 15 years or more using 1971 Census data. Their results indicate that although birthplace, ethnicity and language have statistically significant influences on earnings, they contribute little to the explanation of variance in income.

G. Carliner (1981) concentrated on wage differences among language groups. His results indicated that while recent immigrants were at an earnings disadvantage when compared with the native born, those who arrived in Canada more than ten years ago earned higher wages than native-born Canadians of native-born parents. These differences, however, were not always

⁵(cont'd) writers, e.g., C. Reimers (1984) and J. Stewart and T. Hyclack (1984) find no statistically significant difference in the return to pre- and post-immigration schooling.

significant. These results also indicated that native-born children of immigrants earned significantly more (2.5 percent) than the children of the native born.

N. Tomes' (1983) findings suggest that among native-born Canadians, variables indicating foreign-born parents are rarely significant in explaining income. This evidence seems to be inconsistent with other studies.

Very recently, B. Chiswick and P. Miller (1986) analysed the roles of immigrant generation, French ethnicity, and language in the determination of earnings among adult men in Canada using microdata from the 1971 and 1981 Censuses of Canada. Using 1981 data they found that the average newly-arrived immigrant has earnings about one-quarter lower than a comparable Canadian-born worker. However, immigrants' earnings are shown to rise with their length of stay. After 22 years their earnings equal those of comparable native-born workers. The schooling and pre-immigration labour market experience of immigrants were also computed and analysed. It was found that these variables have smaller partial effects on earnings than the effects of schooling and experience for the native born. Among the foreign born, the effects of schooling and pre-immigration labour market experience are larger for immigrants from English-speaking developed countries when compared with other immigrant subgroups. From the 1971 data it was shown that Canadian-born children of immigrants have earnings 13 percent higher than the children of the native born. When other variables are the same,

those of foreign parentage have a two percent earnings advantage.

A more recent study analysing the earnings profile of Canadian immigrants and the native-born population has been conducted by R. Meng (1987). Data from the 1973 Canadian Mobility Survey, which contained labour market and earnings data for the year 1972, were utilised. A major feature of this data set is that it contains direct information on labour market experience of individuals. The other Canadian studies discussed earlier used a proxy for the experience variable. The results of Meng's study indicate that foreign-born males initially earn less than the native born. However, their earnings rise more rapidly with Canadian labour market experience, and after 14 years their earnings equal those of the native-born population. Another significant finding of the study is that the experience proxy as used in previous studies gives biased results.⁶

A Critique of Earlier Studies on Earnings Profiles

To estimate the earnings models for immigrants and native-born individuals in Canada, the present study pursued the same lines as followed by the previous writers. However, several common weaknesses are found in the previous studies which may reduce their importance in the Canadian context. These weaknesses will be discussed below. The present study attempts to overcome these

⁶A more detailed discussion on this issue will be undertaken in the next section.

weaknesses and to produce more useful results.

The first general criticism of earlier studies arises from their consideration of only the working population. Hence, the results obtained can only be used to answer the question: How does an employed immigrant male perform over his life cycle as compared with the employed native-born male? Such an analysis can be shown to have several problems. First, addressing this question may not be relevant for policy making for the reason that if immigrants are in a disadvantageous position due to their lack of experience in the country or because of language problems, the analysis conducted only on employed workers will not capture all aspects of the problem. Instead of basing policy decisions on the performance of those who actually find employment in Canada, a policy maker must also take into account those who may not find employment, or choose not to work, thereby imposing costs on the public treasury. Thus the more important question for the policy purposes is: How does an immigrant perform over his life cycle when compared with a native born individual? Hence, earning profiles should be estimated for the entire population of immigrants and compared with the entire population of native born.

Second, taking into account only the working population also leads to biased results of the coefficients of the earnings equation. This has been demonstrated by R. Gronau (1975) who shows that the estimated returns to education will be biased and the distribution of earnings variable will be non-random if

non-workers are excluded from the analysis. This may be explained in the context of the present study as follows. Assume native-born individuals have a higher reservation wage vis-à-vis immigrants. In such a case there will be a high probability that wages earned by an employed native-born worker will be higher. As a consequence, their earnings profiles will show that the native born earn higher wages than the immigrants. Furthermore, if the native born demand higher wages, the probability that a native-born individual will be unemployed at a given wage offer will also be higher. Thus, if the wage equation were estimated for only the working members of the two groups, the returns to education may be biased for the two groups in one direction or the other depending upon the proportion of such people in each group. An additional bias, by considering only the working population, may be introduced if the members of one group have a tendency to retire from a job sooner than the other. In the present context, the data indicate that the proportion of unemployed individuals is higher among the native born. If the age effect were held constant and one compared the native-born worker with an immigrant worker who had similar earnings over the working life, then one is likely to find that the returns to education, as measured by the marginal earnings, are biased downwards for the native born.

A second general criticism of the above studies arises in the Canadian context. These studies weaken their policy relevance in Canada by considering the economic performance of

only males. Immigration statistics in Canada⁷ reveal a significant proportion of females in the annual immigrant arrivals in recent years. Thus, in order to have meaningful results on the analysis of the efficacy of Canadian immigration policy, one should not exclude females from the analysis.

A third general criticism is the specification of the earnings model in the above studies. These studies have utilized the basic post-schooling earnings model of Mincer (1974). The model postulates earnings as a function of the number of years of schooling, number of years of post-schooling experience in the labour market, experience squared, and the number of weeks worked during the year as a proxy for a labour supply variable.⁸ Data on the experience variables are not available in any of these studies. Mincer (1974) has suggested a crude measure of the experience variable. It is the difference between the age at the time of census and the age at completion of education. Various levels of education are assigned a specific

⁷The following Table provides a percentage distribution of annual immigration flows into Canada by gender during the period 1978-83.

Year of entry	Table	
	Males	Females
1983	46.5	53.5
1982	49.1	50.9
1981	49.1	50.9
1980	50.3	49.7
1979	48.9	51.1
1978	46.4	53.6

Source: Calculations by author based upon Canada (1978, 1979, 1980, 1981, 1982, 1983).

⁸In addition, several variables incorporating cross sectional characteristics of data are utilised

number of years.⁹ This estimation involves the assumption that at any point in time an individual is either employed or is attending school. The studies cited earlier make similar assumptions to compute the experience variable. In addition, the assumption has also been extended to split the experience variable into pre- and post-immigration labour market experience. The education variable has also been split in a similar fashion.

A. Blinder (1976) takes issue with the definition of the experience proxy suggested by Mincer (1974) for use in the earnings function. According to Blinder (1976, p.8), Mincer's definition "should do rather well for groups with continuous work histories - uninterrupted by childbearing, service in the armed forces, spells of unemployment, and the like. How one might go about identifying these people in the absence of actual work histories is a good question. Using the proxy for prime-age white males is probably appropriate, but using j for females is hazardous ..." If Mincer's definition is used in inappropriate circumstances, it can be readily seen that the regression estimates will be biased as the experience variable will be measured with error.¹⁰

⁹For example, a person with a Masters degree is assumed to have spent 18 years in school.

¹⁰The issue is more crucial in the case of females. Blinder further asserts that even if one considers unmarried women, the problem remains if females either suffer more unemployment, have lower labour force participation, or work fewer hours when employed than do males. Empirical evidence in this regard is given by B. Malkiel and J. Malkiel (1973) who show that, in the U.S., while the experience proxy may be appropriate for men it

The issues raised by Blinder (1976) merit special attention in the case of immigrants. Several reasons may be advanced in this regard. First, the assumption of continuous employment may not be valid as one would expect some employment interruptions just before and some time after immigration.¹¹ Second, conditions of employment vary across countries. Individuals in developing countries may not have similar employment opportunities as those in developed countries.¹² Third, assigning the same number of years to a particular level of education across immigrants from all parts of the world could be erroneous. This is because different countries have different schooling systems. For instance, an individual who obtained his/her Masters degree from Pakistan has only 16 years of education while one from the U.S. or Canada has more.

However, it goes without saying that the issues raised by Blinder (1976) are of a more empirical nature.¹³ Meng's (1987)

¹⁰(cont'd) is not so for women. No such study however exists using Canadian data.

¹¹Given current immigration regulations, recent immigrants will not be expected to be unemployed during their initial stay in Canada. However, in terms of efficiency, the initial years in Canada may not be regarded as similar to later years as immigrants take some time to assimilate.

¹²The 1973 Canadian Mobility Survey, cited in Meng (1987), indicates that 14.2 percent of foreign-born Canadians have had at least a year's break in their working lives. This figure for the native born was 11.5 percent.

¹³Blinder also recognises this as revealed in the following quote from his article (Blinder 1976, pp. 8-9):

"My point is a simple one: that there are alternative assumptions, different from Mincer's, that lead to different empirical formulations of the human capital

study, as noted before, provides some evidence on the issue for Canadian immigrants and native-born population. The earnings models for the two population groups were estimated using separately the actual work experience data and also Mincer's suggested experience proxy. The average gap between Mincer's proxy and the actual work experience was found to be 3.13 years for the native born and 4.11 years for the foreign born. The results showed that if Mincer's proxy was used, then in the case of immigrants the returns to the first year of experience dropped to 2.83 percent as compared with 3.71 percent when the actual work experience was used. In the case of the native born, the rate of return to the first year of experience increased to 3.3 percent with Mincer's proxy as compared with 3.18 percent with the actual experience variable. The reason for this result appears to be the large gaps between the actual work experience and its proxy. The foreign born appear to be more efficient in translating a given year of work experience into greater income than the native born. When using Mincer's proxy, however, these efficiency differences between the groups appear to be clouded. This is because the proxy did not take into account breaks in the respondent's working life. According to Meng, "The marginal return to this aggregate figure will fall for the group that received greater returns for actual experience (i.e., the

¹³(cont'd) model, and that the choice of functional form, therefore, ought to be made on an *empirical* basis rather than on a *theoretical* one."

foreign born),"¹⁴ as well as the group that has the largest gap between the actual experience and its proxy (also the foreign born). The gap between actual experience for the two groups was only 0.64 years, with the foreign born being greater. However, the gap between the measured proxy was 1.62 years, with the foreign born still being greater. On the basis of this, it may be concluded that Mincer's proxy and its coefficient in the earnings model for Canadians suffer from errors in variables problems.

¹⁴Meng (1987), p. 1118.

PART B

IMMIGRANTS AND THE LIFE-CYCLE THEORY OF CONSUMPTION, SAVINGS AND
INVESTMENT

This part of the thesis provides an investigation of the life-cycle behaviour of immigrant consumption and tax payments in order to assess their partial impact on the resident population in Canada. For this purpose their impact through the public treasury will be analysed.

CHAPTER I

THEORETICAL BACKGROUND AND METHODOLOGY

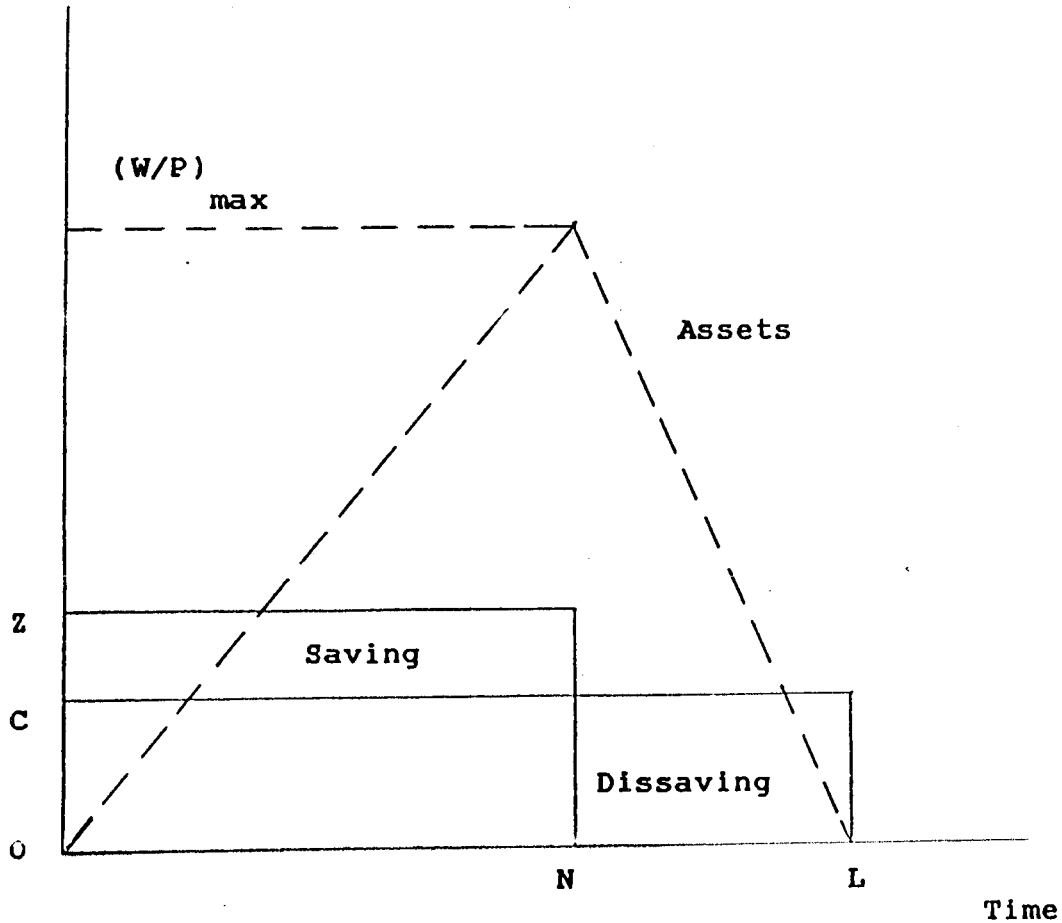
A useful theoretical background to analyse the impact of immigrants is provided by the life-cycle theory of consumption, savings and investment. This theory had its genesis in the work of Modigliani (1966) and Samuelson (1975) and was extended to immigrant analysis by Simon (1984).

The life-cycle theory suggests that individuals plan their consumption and savings behaviour over long periods by taking into consideration their expected lifetime income. Consumption plans are made so as to achieve a smooth or even level of consumption by saving during periods of high income. During the working years, the individual saves to finance consumption during retirement. The act of saving builds assets, and, as shown in Figure 1, the individual's assets increase over his working life and reach a maximum at retirement age.

One implication of the life-cycle theory, as demonstrated by Samuelson (1975), is that an increase in population growth could lead to a rise in national income. This is because a faster rate of growth of the population implies that the proportion of young workers in the population grows. These young workers save in order to consume after they retire. In an ongoing system, savings can be viewed as a system of intergenerational transfers from workers to the retired or to young dependents.

Life Cycle Consumption, Savings
and Investment by Individuals

FIGURE 1



Over the whole lifetime L , there is an even flow of consumption at the rate C , amounting in total to DL , financed out of current income in working life and out of savings (accumulated during working life) during retirement. Areas $(Z-C)N$ and $C(L-N)$ are equal, i.e., savings during working years finance dissaving during retirement.

Adapted from R. Dornbusch, S. Fischer and G. Sparks (1985, p. 230)

The life-cycle theory can also be extended to an analysis of individual income tax contributions and the receipt of government transfers. Young people are likely to contribute more in terms of taxes and rely less on transfer payments, thereby providing for the consumption by the contemporary elderly or very young.

A version of the life-cycle theory has influenced immigration policy in the receiving countries given their emphasis on young immigrants. This is evident in Canada (see Table 3) where 74 percent of total immigrants who arrived during the period 1978 to 1983 were in their prime working age (15-64 years).

Table 3
Age at Entry of Immigrants and Age of
Total Population, Canada

Age Group	Total Population 1981 (%)	Immigrant Cohort 1978-83 (%)
0-14	30	21
15-44	44	59
45-64	18	15
65 +	8	5

Source: Calculations by author based on Canada (1978, 1979, 1980, 1981, 1982, 1983) and Statistics Canada (1980b, 1981c).

In contrast, only 62 percent of the total Canadian population

was in the working age group circa 1981. Thus, it would be expected that over his/her lifetime in Canada, an immigrant will benefit the native-born population through public fund transfers. This implication of the life-cycle theory will be revealed in a present value calculation of the expected public fund transfers over the immigrant's lifetime in Canada.¹

To clarify the above point, an example will be presented from Simon (1982). Imagine a "non-immigrant" family consisting of a husband and wife, both aged thirty-five, a set of three-year-old twins, and a retired grandfather. The immigrant family consists of a husband and a wife, both aged twenty-five. Both families pay 20 percent of their \$20,000 annual income in taxes. The non-immigrant family now receives social insurance for the grandfather (and a variety of minor support for the children), whereas the immigrant family receives no such payments. On balance, the non-immigrant population now gains from the immigrants. After a few years, the balance will become slightly more even when the immigrants have two children. Forty years later, the yearly balance will become roughly equal after the two immigrants retire and collect social insurance. If, at the time of the immigrant family's admission one were to calculate their discounted "investment" value to non-immigrants, this value would be positive since the non-immigrant family was initially a net gainer. The positive value also would hold over all years since the initial years occupy a greater weight in

¹This is because earlier years in Canada will occupy a greater weight in such present value calculations.

present value calculations.

Now it can be argued that the undiscounted net flow of transfers caused by the immigrant cohort tends to balance out when the immigrants grow older. This appears so only if one looks at the immigrant per se, rather than at the whole sequence of events caused by his/her entry. As the immigrant ages, his children grow and become productive members of the work force; hence one should account for the contribution of the children after the immigrant retires.

In sum, the life-cycle theory would predict that when analyzed through the public treasury, the immigrant population should have a positive impact on the non-immigrant population. It is the purpose of this study to provide evidence to support this life-cycle prediction using Canadian data.

The Methodology

The design of a country's tax transfer system is to tax the population as a whole in order to subsidize certain groups. The income transfer system includes a welfare program or negative income tax, social services targeted to the poor, and public goods financed prior to immigration. It will be assumed in this study that the tax transfer system is invariant to the immigration policy; that is, the criteria for eligibility and the schedule of benefits do not change as the number and

characteristics of the immigrants change.²

D. Usher (1977) has suggested that the impact of immigrants on the native-born population should be analysed comparing the actual estimation with a counterfactual situation where there are no immigrants. Simon (1984) utilised this approach to analyse the impact of U.S. immigrants. A similar methodology has been adopted in this study to analyse the impact of each immigrant household on the native-born population in Canada.

As was argued earlier, immigrants are generally younger at the time of their arrival and bring fewer dependents with them. Hence their consumption of public services during their first few years after arrival is expected to be lower than their tax contributions. This study will analyse the public treasury impact of immigrants using two approaches. The first approach, attributable to Simon (1984), assumes that an average household in Canada pays a tax bill equal to the public services it consumes. This is tantamount to assuming that total government receipts equal total government payments. The second approach measures the immigrant impact without assuming a balanced budget.

²It should be noted that D. Usher (1977) has argued that if immigrants are relatively poor, then a progressive tax system may induce an adverse impact on the welfare of original residents. However, it must be noted that a proper measurement of the impact on original residents must account for the use of tax financed public services. Immigrants may be relatively poor, thus paying less taxes, but they are also likely to be less dependent on the social transfer system. This has been verified empirically by Simon (1984) and Blau (1984) for the U.S. In such cases, there will be a net transfer to the original residents.

Under Simon's balanced budget analysis any smaller than average consumption of services by an immigrant household translates into a transfer to the native-born group.³

In a similar manner, any excess or deficiency of immigrant taxes compared to the average tax bill represents the amount of funds that immigrants redistribute to the native-born population.⁴

Assume an average immigrant household pays T_i in taxes and consumes R_i in public services. The corresponding values for an average non-immigrant household are T_n and R_n . The net balance of transfers from immigrants to the native born represents the sum of the balance on public services and the balance of taxes paid as given below:

$$(R_n - R_i) + (T_i - T_n) \quad (2.1)$$

³Assume an immigrant household consumes public services worth an amount r_i , while a non-immigrant household consumes r_n . The total population is assumed to consist of N households. Then the average consumption of public services being $\bar{r} = (r_i + r_n)/N$, implies that if r_i is less than r_n , r_i will also be less than \bar{r} .

⁴Assume an immigrant household pays the amount t_i in taxes, while a non-immigrant household t_n in taxes, on average. The total population is assumed to consist of N households. Then the average payment of taxes being $\bar{t} = (t_i + t_n)/N$, implies that if t_i is less than t_n , t_i will also be less than \bar{t} . Also, by our assumption, $\bar{t} = \bar{t}$.

Usher (1977) argued that by virtue of their presence, immigrants acquire a share of publicly owned property, thereby receiving a wealth transfer. However, whether a net transfer actually occurs depends on the immigrants' impact on the cost sharing for social overhead capital. Clearly the financing of social capital frequently occurs over many years following actual construction. Thus, it is not clear whether Usher's argued transfer exists. If one does exist, it would be offset to a large extent for a pure public good since the available service does not vary appreciably with the level of immigration.⁵ Thus, it can be argued that immigrants contribute financially to the provision of public goods thereby reducing the cost to each original resident without reducing the amount of the good provided.

In light of the above discussion, the methodology presented in this section can accommodate the additional benefit to original residents from immigrants' contributions to the cost of public goods. The modified methodology presents the stream of benefits to the original residents as follows:

$$(R_n - R_i) + (T_i - T_n) + aT_n \quad (2.2)$$

where 'a' is the percentage of expenditures on a pure public good out of total public expenditures. The expression (aT_n) represents the amount by which the cost of public goods is

⁵This issue has also been discussed by M. Reder (1963) and Simon (1982, 1984).

reduced for each original resident through the migrant's tax contribution.

In the context of the present study, calculations have been performed using both equations 2.1 and 2.2.

Immigrant Impact with the Second Approach

The stream of benefits in the above approach represented transfers to the Canadian born population. The impact of immigrants can also be assessed without assuming a balanced budget. In such cases, the services consumed by immigrants may be financed in part by taxes and in part by deficit financing. The net contribution to the public treasury by an average immigrant household is then the difference between taxes paid and services consumed by that household. This difference represents a redistribution from immigrants and may be regarded as the benefit accruing to the recipient economy. As in the previous approach, total benefits can be obtained by adding to the above difference the amount by which the average cost of public goods is reduced for the native-born by virtue of the presence of immigrants.

The details for estimating tax financed public services and income taxes paid by the two population groups, and the values incorporated in 'a' are discussed in Section IV.

CHAPTER II

COMPUTATION OF VARIABLES AND DISCUSSION OF RESULTS

The variables analysed in this study can be classified into three categories; a set of variables measuring the consumption of public services, a variable measuring income taxes paid by each group in Canada, and a variable measuring the contribution of each group towards financing of public goods. The set of variables measuring the consumption of public services includes the consumption of health care and education services and government transfer payments. The following sections briefly discuss the data and the calculation of each variable. Detailed calculations of each variable (where necessary) are provided in the referenced appendixes.

The Data

As discussed in Part A, the study has utilised microdata from the Census of Canada 1981. These data are available in machine readable form. In addition, some data have also been obtained from secondary sources to compute monetary values of the variables which are not directly observable from the microdata.

Computations and Definitions of Variables

Consumption of Government Transfer Payments

Data for this variable are directly obtainable from the PUST. This variable includes all amounts received by the census family or a non-family person from federal, provincial and municipal governments during 1980. The components of this variable are Family Allowances, Unemployment Insurance Compensation Benefits (UIC), Canada/Quebec Pension Plan Benefits, Old Age Security and Guaranteed Income Supplements and other provincial grants.

Costs of Schooling

Immigrants also demand educational services. In Canada, a large proportion of expenditures at various levels of education are financed by federal, provincial and municipal governments. In this study, consumption of educational services at the elementary and secondary levels only will be considered. It is assumed that children in census families who are over 17 and attending school are at the postsecondary level and are able to finance their education out of their own income.¹

In almost every Canadian province, it is compulsory for children between ages 6 and 15 to attend school. Usually, the minimum entrance age is 6 years and the minimum leaving age is 15. The minimum age of children attending school at the

¹Since no information on the children's income is available, we cannot estimate the income tax payments by children.

elementary-secondary level is usually 6 years and the duration of study is 12 years.²

For the purpose of this study educational costs per family were computed circa 1980. This was accomplished by considering various expenditures by both the federal and provincial governments,³ and the number of children aged 6-17 in each census family. The PUST provides information on the number of children aged 6 to 17 and living at home. Information on those who are between 15 and 17 years of age and are attending school is also available.

Educational expenditures have been computed by accounting for various operating expenditures financed by federal and provincial governments. Expenditures incurred by municipal governments have been excluded.⁴ Detailed calculations are provided in Appendix 2.

Cost of Health Care Services

In Canada, a large share of national health expenditures is provided by the public sector.⁵ Thus in the cost and benefit

²This information is obtained from Statistics Canada (1985).

³This information was obtained from published sources as discussed in Appendix 2.

⁴The reason is that the only sources of financing considered in this study are personal income and consumption taxes, which are collected by federal and provincial governments.

⁵The medical insurance program in all provinces was established over the period 1961 to 1972. Over this period the share of public sector expenditure rose from 43% to 73%. In 1981 the public sector contribution to national health expenditure

analysis of international migration, it is necessary to assess the impact on the national medical bill. Since direct estimates of health care costs are not available by immigrant and non-immigrant groups, these costs will be estimated.

Existing studies on health care demand have largely focussed on the physiological needs of the society as determined by its age and gender distribution. For example, F. Denton and B. Spencer (1975) have provided estimates for Canada. G. Carrin and J. Van Dael (1984) produced estimates for Belgium. In addition, J. Sindelar (1982) has provided several reasons for differences in per capita medical costs between men and women. As international immigration is expected to affect the size and gender composition of a society, it seems appropriate to utilise the same methodology as adopted in the previously mentioned studies to estimate the health care costs for immigrants and the non-immigrant population.

The most recent Canadian estimates of per capita health care costs by age and sex are by J. Boulet and G. Grenier (1978). The estimates provided by these authors account for physician and hospital costs which constitute more than half of total government health care expenditures in Canada. These estimates have been utilised in this study to compute the health care costs associated with the immigrant and non-immigrant populations. Again, detailed computations and data sources are

⁵(cont'd) averaged around 75 percent. Reference to this information is J. Boulet and G. Grenier (1978).

provided in Appendix 3.

Estimation of Income Taxes for Immigrants and Non-Immigrants

Data on income tax contributions by various segments of the population are almost non-existent. This fact has also been noted by MacMillen (1982). As a result, indirect methods have to be employed to ascertain the likely size of such payments by one group in relation to another.

The income tax structure of a country is such that the amount of taxes paid is largely dependent on the earnings and demographic composition of the population. The demographic variables include the age composition, marital status, and the number of children and elderly dependents.⁶ In addition, the tax structure may also differ across regions within a country.

The recent literature provides two studies which compute potential income tax liabilities of the immigrant and non-immigrant population. Simon (1984) estimated an average income tax rate for U.S. residents for the year 1976. This is then applied to the earnings data of the immigrant and non-immigrant population in the U.S. to obtain the potential income tax liabilities for the two groups.

⁶In a cross section analysis, these variables also determine differences in the earnings structure of various subsections of the population in addition to the human capital variables that have been discussed at length in the literature. For inclusion of demographic variables in the earnings function see Blinder (1973). For a theoretical exposition of the human capital earnings function various studies can be cited; for example, Mincer (1974) and Chiswick (1978).

Some crude estimates of income tax payments by immigrant groups in Canada were provided by D. DeVoretz and D. Maki (1983) for the year 1973. These authors first obtained an estimate of the average income of the two population groups by considering differences in their age distribution. Then assuming certain demographic characteristics of the immigrant population, they estimated the likely tax paid by them.

The Department of National Revenue, Government of Canada, publishes annual statistics on income taxes paid by individuals in Canada during any fiscal year.⁷ However, income tax data are not reported separately for the immigrant and non-immigrant population. Hence, an estimate of the amount of the income taxes by the two groups has to be made.

While estimating the potential income tax liabilities for immigrants and the non-immigrant population in Canada, this study differs significantly from those cited in the literature in that it does not rely on any assumptions regarding the tax rates, demographic composition, and earnings of the two groups. Instead, it uses microdata from the census to obtain information on these variables and computes the income tax liability for each family and non-family person included in the one percent sample of the Canadian population. Hence, in contrast to the previously mentioned studies, the entire income distribution of each cohort of immigrants and that of the non-immigrant population has been considered along with their true demographic

⁷Canada (1982).

features when calculating income taxes. The detailed methodology and underlying assumptions made for the income tax calculations are presented in Appendix 4.

It should also be noted that the methodology adopted in the present study to calculate income tax payments should yield results that are a close approximation to the actual tax paid. Any discrepancy between the calculated and actual figure may be attributed to either sampling error or to the assumptions made in this study regarding "other deductions." All those causes that tend to understate or overstate an individual's tax liability⁸ are not expected to influence the size of the discrepancies between the observed figures of income taxes paid in Canada and those estimated in this study.⁹

Estimates of Consumption Taxes

Again, as in the case of personal income taxes, direct information on payment of consumption taxes by demographic groups in Canada are not available. A reasonable procedure for estimation of these taxes is to first compute the consumption expenditure by demographic groups.

⁸For example, tax avoidance and tax evasion, which have been shown by Feige (1979) to have distorted substantially an individual's income tax liability in the case of United States.

⁹ Discrepancies would have resulted if the income reported for Census purposes was different from that reported for income tax purposes. It does not seem likely that the income reported for the two purposes will be different. If individuals misreported information on "other deductions," these will be reflected in the published data. Again it should be noted that the objective here is to obtain an estimate of the actual amount paid and not what *should have been paid*.

The existing literature provides three Canadian studies analysing expenditure patterns by immigrant families. These include Canada (1964), Canada (1974) and very recently, W. Marr and D. McCready (1986). The last study is based on microdata collected from the 1982 Survey of Family Expenditures which was carried out by Statistics Canada.¹⁰ The survey has tabulated information on spending units' income and expenditure items. Thus, it was possible for these authors to calculate the proportion of total income spent ("Average Propensity to Consume" or APC) on a variety of consumer goods and services for the Canadian born, and foreign born by year of arrival in Canada. Their results are provided in Table 4. For the purpose of this study, it was assumed that the tastes of households did not change between 1980 and 1982 (the year for which the APC was calculated by Marr and McCready). It was also assumed that the survey coverage was such that the 1981 Census sample is well represented.

The APC estimates were used in this study to estimate consumption expenditure by various entry cohorts of immigrants and the non-immigrant population.¹¹

¹⁰The actual data are located in the 1982 Survey of Family Expenditures Public Use Microdata File. The tape contains 10,938 household or spending units. From these, 1986 (18.16 percent) are households with foreign-born heads.

¹¹Expenditures on food, health care, reading, education and security were excluded. This is because in most of the Canadian provinces these items are exempt from consumption tax.

To estimate the consumption tax attributable to the two groups, an average tax rate was computed. This was obtained for the whole economy as a ratio of aggregate consumption taxes collected in 1980 and aggregate personal expenditure on consumer goods and services in that year.¹² The ratio is computed to be 0.1197 and was applied to the estimated consumption levels.

Consumption of Public Goods

Public expenditures on the provision of most public goods are not expected to vary appreciably with the level of immigration. In the case of pure public goods consumption one sector's consumption is not expected to influence consumption by the other. Thus, immigrants actually contribute to the cost of public goods, to the extent that these are financed by personal income taxes, thereby reducing the cost to the original residents without reducing the amount of the public good provided.

From the Canadian Government Expenditure Accounts,¹³ the most likely candidate for pure public goods is the "Protection to public and property." Considering expenditures incurred by both the federal and provincial governments, this item accounted for eight percent of total government expenditures in the year 1980. Hence, to the extent that public goods are financed

¹²The aggregate personal expenditure on consumer goods and services has been obtained from Statistics Canada (1981b). Data on aggregate consumption taxes are available from Statistics Canada (1980c, 1981d). The respective figures for the year 1980 are \$168,395 million and \$20,154 million.

¹³Statistics Canada (1980e, 1981e).

Table 4

Average Propensities to Consume - Immigrants by Period of Entry and Non-Immigrants, Canada, 1982

Category	Non-Immigrants	<u>Immigrants</u>		
		1946-1965	1966-1975	1976-1982
Food	0.173	0.170	0.173	0.195
Shelter	0.201	0.194	0.220	0.241
Household	0.048	0.043	0.050	0.060
Clothing	0.061	0.056	0.063	0.070
Transportation	0.117	0.113	0.120	0.135
Health Care	0.020	0.023	0.020	0.021
Personal Care	0.020	0.018	0.020	0.023
Recreation	0.044	0.039	0.041	0.042
Reading	0.007	0.006	0.005	0.007
Education	0.007	0.008	0.013	0.014
Tobacco	0.018	0.012	0.009	0.011
Alcohol	0.020	0.018	0.016	0.016
Security	0.037	0.037	0.038	0.036
Gifts	0.030	0.033	0.026	0.029

Source: Marr and McCready (1986, Tables 2 and 3).

Note: For the purposes of the present study, expenditures on food, health care, reading, education, and security were excluded.

through taxes, roughly eight percent of total taxes paid by immigrants may be regarded as their contribution towards financing public goods.

Discussion of Results

This section presents results of the estimated balance of transfers between immigrants and the non-immigrant population in Canada. First, results for each of the cost components are discussed. Second, immigrant financing of public goods are discussed. Next, income and consumption taxes paid by immigrants and the non-immigrant population are presented. Finally, all of the above results are combined to arrive at the balance of transfers between immigrants and the non-immigrant population. This balance is interpreted as the economic impact of the immigrant population on non-immigrants.

Public Services Used by Immigrants and Non-Immigrants

Below we present detailed measures of public services consumption.

Consumption of Government Transfer Payments

Table 5 provides a summary of total government transfer payments.

The information in Table 5 has been obtained directly from the PUST. As can be seen, all immigrant cohorts in Canada consumed less government transfer payments per capita than the

Table 5

Average Receipts of Government Transfer
Payments - Immigrant by Year of Entry and
Non-Immigrants, Canada, 1980

Year of Entry	Amount (\$)
1979	319
1978	653
1977	758
1976	807
1971-75	868
1966-70	1124
1961-65	1264
1956-60	1376
Non- Immigrants	1764

Source: PUST, special tabulations.

1980 non-immigrant population.¹⁴

Table 6 provides information on the percentage of immigrants and the non-immigrant population consuming government transfer payments. It is observed that where about 28 percent of the non-immigrant households consumed government transfer payments in 1980, this proportion was less for all entry cohorts of immigrants. With the passage of time more immigrants consume government transfer payments, but even after twenty-five years, the proportion receiving government transfer payments is less than that for the non-immigrant population.

¹⁴The data are averages for all family and non-family persons.

Table 6

Percentage of total Population Receiving Government Transfer Payments - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980

Year of Entry	UIC Benefits Only ¹	UIC Benefits & Other Govt. Tr.Payments	Other Govt. Tr.Payments Only	Total
1979	12.0	4.1	0.6	16.7
1978	13.4	2.2	1.1	16.7
1977	11.8	7.5	0.9	20.2
1976	14.9	5.0	0.9	20.8
1971-75	14.9	5.9	1.6	22.4
1966-70	13.25	7.6	1.3	22.15
1961-65	12.4	8.8	1.5	22.7
1956-60	12.8	10.8	1.7	25.3
Non-Immigrants	13.8	12.6	1.9	28.3

¹UIC refers to Unemployment Insurance Compensation.

Source: PUST, special tabulations.

When one looks at the components of government transfer payments it is observed that a significant proportion of both immigrants and non-immigrants in the country consume UIC benefits. However, for some immigrant cohorts, the probability of consumption of the UIC benefits is more than that for the non-immigrant population. The major difference arises in the case of those who consume both UIC benefits and other government transfer payments. A significantly smaller proportion of all immigrant cohorts consume both UIC benefits and other government transfer payments when compared with the non-immigrant

population.

The overall conclusion drawn from the results of this section is that while the probability of consumption of UIC benefits is greater for some immigrant cohorts, the consumption of the overall amount of government transfer payments by immigrants is less than for the non-immigrant population. This finding is consistent with the life-cycle proposition discussed in an earlier section.

Consumption of Educational Services

The cost of educational services at the elementary-secondary level in Canada for the year 1980 was found in this study to be \$2,145 per student enrolled (Appendix 2). The number of students aged 6-17 living at home in each family was obtained from the PUST.¹⁵ This was then used to compute the money value of the consumption of educational services for each family in Canada. The results have been provided in Table 7.

For immigrant households, there is no clear consumption pattern. However, by the third year after their arrival immigrants are likely to consume more educational services than the non-immigrant population.

¹⁵For age group 15-17, only those attending school were considered.

Table 7

Average Use of Educational Services - Immigrants
by Year of Entry and Non-Immigrants, Canada, 1980

Year of Entry	Average ¹ Cost to Treasury
1979	\$790
1978	760
1977	917
1976	873
1971-75	1181
1966-70	1559
1961-65	1584
1956-60	1371
Non- Immigrants	870

¹Average over all families and non-family persons.
Source: PUST and computations by author.

Consumption of Health Care Services

Table 8 provides estimates of the consumption of health care services by the relevant groups. As can be seen, the estimates indicate that the per capita health care costs for immigrants in Canada continue to increase with their length of stay, i.e., as they become older.

For the first ten years immigrants consume less health care services than non-immigrants. After ten years, the consumption by immigrants becomes similar to that of the non-immigrant

Table 8

Average Consumption of Health Care Services - Immigrants
by Year of Entry and Non-Immigrants, Canada, 1980

Year of Entry	<u>Consumption of Health Care Costs</u>	
	1974 Dollars (1)	1980 Dollars (1)x1.845 \bar{v}
1979	472	871
1978	479	884
1977	515	950
1976	531	979
1971-75	520	959
1966-70	527	972
1961-65	552	1018
1956-60	592	1092
Non-Immigrants	551	1017

Source: Calculations by author.

group. After twenty years, immigrant consumption becomes even greater.

The health care costs estimated in this study are reflections of the demographic composition of the two population groups. Table 9 provides the average number of children living at home per 100 families for the immigrant and non-immigrant populations in Canada. It is seen in the above table that immigrants on average have more children than non-immigrant families. This is true even in the case of recent arrivals. One possible reason for this is that current immigration policy tends to give more emphasis to family reunification.

Table 9

Average Number of Children per 100 Families Living at Home
Immigrants by Year of Entry and Non-Immigrants, Canada, 1980

Year of Entry	Children for 100 families	Number of Families in PUST
1979	151	249
1978	142	158
1977	148	230
1976	141	311
1971-75	163	1795
1966-70	171	2098
1961-65	165	1181
1956-60	149	2118
Non-Immigrants	139	46335

Source: PUST, special tabulations.

Table 10 compares the age distribution of immigrant husbands, male lone parents and male non-family persons with the corresponding non-immigrant population. Similarly, the age distribution of immigrant wives, female lone parent and female non-family persons is compared with the corresponding non-immigrant population. In all cases, it is found that the modal age group is 25-44. The spread of the age distribution is, however, more towards the upper end for Canadian-born males vis-à-vis immigrant males. Similarly, for the non-immigrant females the age distribution is skewed more towards the upper side than for immigrant females. This probably reflects the age selectivity found in the immigration process.

Table 10: Percentage Age Distribution of Husbands, Wives, Lone Parents and Non-Family Persons - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980.

Age Group	Immigrants							Non-Immigrants		
	1956-60	1961-65	1966-70	1971-75	1976	1977	1978	1979		
	Husbands, Male Lone Parents and Non Family Males									
1-4	0	0	0	0	0	0	0	0.3	0.3	
5-15	0	0	0	0.2	0.5	0.3	0.5	0.6	0.6	
16-24	2.8	5.4	4.36	5.2	8.5	7.8	15.3	19.6	11.3	
25-44	39.81	54.5	66.8	75.3	70.3	69.1	64.5	55.5	46.95	
45-64	49.91	35.1	25.5	15.1	13.6	13.7	11.33	17.8	29.1	
65-74	6.05	3.68	2.1	3.3	6.2	8.2	7.9	4.6	8.6	
75 & over	1.4	1.33	1.30	0.80	0.85	0.80	0.50	1.53	2.9	
	Wives, Female Lone Parents and Non Family Females									
5-15	0	0	0.17	0.19	0.27	0.35	0.96	0	0.6	
16-24	5.8	8.1	7.3	9.9	13.4	14.8	15.3	19.0	14	
25-44	44.40	56.90	66.90	69.70	60.70	62.00	54.50	50.30	43.4	
45-64	42.20	26.80	20.20	13.7	16.60	14.80	19.10	21.20	28.4	
65-74	5.1	5.1	3.4	4.5	5.1	7.0	7.6	6.4	9.1	
75 & more	2.50	3.10	2.10	2.10	4.00	1.10	2.40	3.10	4.25	

Source: PUST, special tabulations.

It was shown in Appendix 3 that the health care costs in Canada vary according to age groups. Boulet and Grenier (1978) have shown in their study that a significant proportion of health care costs in Canada is incurred by people aged 65 and over. Since proportionately more non-immigrants are aged 65 and over (as was revealed in Table 10) this fact may be responsible for their higher consumption of health care costs.

In the end, it can be argued on the basis of the results in this section that since the age distribution of immigrants is more concentrated in the younger working groups as compared with the non-immigrant population, immigrants impose a smaller burden on the health care system in Canada. Of course, with the passage of time their demand for health care continues to increase as they get older.¹⁶

Payment of Taxes by Immigrants and Non-Immigrant Population

The previous section discussed the use of public services by immigrants and the non-immigrant population in Canada. It was observed that the use of public services tends to increase for immigrants with their length of stay in the country. The public services considered in this study constitute a major portion of government expenditures in Canada. Financing of these expenditures is provided through various sources which include

¹⁶Higher consumption by the 1956-60 cohort may be attributable to a greater proportion of males in this immigrant cohort. The Boulet and Grenier (1978) estimates suggest that for males aged 65 years and over the per capita costs rise at a more rapid rate than for females.

tax levies, federal transfers, and revenues from license fees. In this study we will consider the contribution of immigrants and non-immigrants in Canada only in terms of taxes. Two major tax components, personal income taxes and consumption taxes, are considered.

Estimates of Income Taxes

As discussed earlier, the income tax liabilities are largely dependent on earnings and the demographic composition of various population groups. Before presenting the results of the income tax computations for immigrants and the non-immigrant population in Canada, the earnings and demographic compositions of the two population groups will be considered. This will shed some light on the validity of results.

First, the average annual earnings for the two population groups are provided in Table 11. Differences in earnings of the two groups can be attributed to several factors - differences in their age distribution, differences in the stock of human capital accumulated by them, differences in the time spent earning their income, etc. A direct comparison of the earnings of the two groups could therefore be misleading.

When comparing the earnings of immigrants to non-immigrants in the U.S., Chiswick (1978) held the above-mentioned factors constant. In contrast, this study only holds constant the year of entry of an immigrant cohort. The rationale for this approach is that the main interest of this study is the actual impact of

an immigrant cohort on the non-immigrant population. This approach allows an assessment of future immigrants with similar characteristics.

Columns 3 and 4 of Table 11 indicate that an average immigrant in Canada begins to earn as much as an average non-immigrant from the fourth year after entry, and subsequently earns more.¹⁷

Analysing two major components of total income, wages and salaries in Columns 5 and 6 and self employment income in Columns 7 and 8, it is observed that a major constituent of total income for both population groups in Canada is wages and salaries. The wages and salaries component of immigrants' incomes tends to equal the non-immigrants' component after three years in Canada. On the other hand, their self-employment income tends to match that of non-immigrant individuals ten years after their arrival.

The age distributions of the two population groups in Canada were presented in Table 10. Also, Table 9 presented the number of children per 100 families in the two groups. It was found that the proportion of the non-immigrant population aged 65 years and over was greater than that of immigrants. The average number of children per 100 families was found to be greater for immigrants. Thus, in computations of income taxes, one would expect a greater proportion of non-immigrant individuals

¹⁷Simon (1984) found that in the U.S., immigrants begin to earn as much as the non-immigrants three to five years after arrival.

Table 11: Average Income by source - Immigrants by Year of Entry and Non-Immigrant Population, Canada 1980.

Year of Entry	(1) Husbands and Male Lone Parent	(2) Wives and Female Lone Parent	(3) Average for Family	(4) Average for Family and Non Family Person	(5) Wages and Salaries Families	(6) Wages and Salaries Families and Non Family Person	(7) Self Employment Income Families	(8) Self Employment Income Families and Non Family Person
1979	\$13679	\$4959	\$17730	\$13699	\$15092	\$11841	\$612	\$377
1978	14054	5733	18595	14339	16574	12843	360	242
1977	17864	6998	23235	18954	20394	16492	700	483
1976	18294	6669	23488	19210	20520	16905	1055	765
1971-75	18278	7476	23792	20148	20494	17352	1350	1126
1966-70	22514	7890	28523	24706	24035	20726	2227	1883
1961-65	21664	7548	27516	24006	22791	19841	2206	1745
1956-60	21416	7147	26888	23823	21922	19315	1931	1592
Non-Immigrants	19694	6319	23881	19229	18550	14647	1418	1146

Source: PUST, special tabulations.

claiming the age exemption, and a greater proportion of immigrants claiming exemptions for dependent children.

In summary, it is expected that while filing their income tax returns, immigrants will report earning a higher income than non-immigrants from the fourth year of arrival. Furthermore, they are likely to claim lower deductions for age exemption and more for dependent children.¹⁸ However, in addition to these major deductions, several other deductions from total income are made for income tax purposes. These have also been considered when computing income tax liability for each census family.¹⁹

Finally, in Table 12, the income tax computations for immigrants with varying length of stay and for the non-immigrant population are provided.

Detailed assumptions and computations underlying the above figures are discussed in Appendix 4. It has also been shown in the same Appendix that the probable bias in the estimation is such that the income tax liability of the non-immigrant population is overstated relative to immigrants. Furthermore, some reconciliation of the results with the published data have also been made. It has been found that the overall results of this study fall short of the published data by only \$207. The probable reasons for this small discrepancy are also discussed

¹⁸It may be noted that income tax regulations in Canada are such that the amount claimed per taxpayer for age exemption is higher than that for each dependent child.

¹⁹The interested reader may refer to Appendix 4 in this regard.

Table 12

Estimates of Personal Income Taxes - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980

Year of Entry	Taxes paid Families	Taxes Paid (Percentage of Income)	Taxes paid by Families and Non-family Persons	Taxes Paid (Percentage of income)
	(1)	(2)	(3)	(4)
1979	1663	9.4	\$1166	8.5
1978	1642	8.8	1177	8.2
1977	2639	11.4	2081	11.0
1976	2870	12.2	2250	11.7
1971-75	2827	11.9	2321	11.5
1966-70	4089	14.3	3440	13.9
1961-65	3818	13.9	3236	13.5
1956-60	3661	13.6	3136	13.2
Non-Immigrants	3247	13.6	2472	12.8

Source: PUST, special tabulations.

in the Appendix.

We now turn to an interpretation of Table 12. It is observed in column 3 that income tax payments by the immigrant population exhibit a pattern similar to the time earnings profile of immigrants (as was found in Table 11). The peak level of tax payment is reached between ten to fifteen years after their arrival. After that the average income tax payment appears to exceed that of the non-immigrant population. The proportion of income paid as income tax is also shown to exhibit a similar pattern as shown in column 4.

Estimates of Consumption Tax

The estimates of consumption taxes paid by the two population groups in Canada were obtained by first estimating the consumption level. The consumption level for each immigrant cohort and for the non-immigrant population was estimated using the information on average propensities to consume as obtained from Marr and McCready (1986). An average rate of 11.97 percent was then applied to the consumption level. The results are presented in Table 13.

Table 13

Estimates of Average Consumption Taxes Paid - Immigrants by Year of Entry and Non-Immigrants, Canada, 1980

Year of Entry	Average Income ¹	Average ² Propensity to Consume	Estimated ³ Consumption	Consumption ⁴ Tax Paid
	(1)	(2)	(3)	(4)
1979	\$12535	0.627	7859	941
1978	13163	0.627	8253	988
1977	16869	0.627	10577	1266
1976	16962	0.627	10635	1273
1971-75	17831	0.565	10075	1206
1966-70	21272	0.565	12019	1439
1961-65	20765	0.526	10923	1307
1956-60	20678	0.526	10877	1302
Non-Immigrants	16768	0.563	9440	1130

¹After Tax Income

²Obtained from Table 4.

³Column (2) x Column(3)

⁴0.1197 x Column (3).

As shown in Table 13, the average propensity to consume (APC) for immigrants decreases after they have stayed in the country for five years. The reason for a decline in the APC is consistent with economic theory which suggests that at higher levels of income, the average propensity will be lower. After ten years of stay the APC declines below that of non-immigrants.

Results of the estimates of consumption taxes show that consumption taxes paid by immigrants exceed the payment by non-immigrants after the third year of stay. This is due to the higher income for immigrant cohorts that have remained in the country longer.

The Net Effect of Immigrants in Canada

In order to analyse the net effect of immigrants in Canada through the public treasury, we first analyse an overall balance sheet of transfers between immigrants and the non-immigrant population. This is done using Simon's (1984) approach described in the Methodology Section.²⁰ Table 14 provides the overall balance for this purpose in the case of each immigrant cohort.

It is observed from column 3 of Table 14 that immigrant cohorts that have stayed in Canada for less than 15 years consume less public services when compared with the

²⁰As will be recalled, Simon's (1984) approach involves the assumption that an average household pays for the services it consumes.

Table 14: Estimated Balance Sheet of Transfers between Immigrants and Non-Immigrants, Canada, 1980.

Year of Entry	Services ¹ used by Immgts. (1)	Services ² used by N. Immgts. (2)	Balance (2)-(1) (3)	Taxes Paid ³ by Immgts. (4)	Taxes Paid ⁴ by N. Immgts. (5)	Balance (4)-(5) (6)	Net Effect ⁵ of Immgt. Cohort on N. Immgts. (7)	Alternate ⁶ Calculation (8)
1979	1980	3651	1671	2107	3602	(1495)	468	176
1978	2297	3651	1354	2165	3602	(1437)	209	(83)
1977	2625	3651	1026	3347	3602	(255)	1064	771
1976	2659	3651	992	3523	3602	(79)	1205	913
1971-75	3008	3651	643	3527	3602	(75)	860	568
1966-70	3506	3651	145	4879	3602	1277	1715	1422
1961-65	3866	3651	(215)	4543	3602	941	1019	726
1956-60	3839	3651	(188)	4438	3602	836	940	648

¹Sum of Govt. Transfer Payments, Education and Health Care.

²Same as above.

³Sum of Estimated Income and Consumption Taxes.

⁴Sum of Estimated Income and Consumption Taxes.

⁵Columns (3) + (6) + 0.081xColumn (5).

⁶Columns (3) + (6).

non-immigrant population. Hence there is transfer from these immigrant cohorts to the native born when we consider public services alone. However, the gap between the consumption of the two groups continues to narrow with increased length of stay by immigrants. Immigrants who have stayed in Canada for more than 15 years consume more public services on average, when compared with native born thereby imposing a cost on the native born through public services alone.

Turning to the tax side it is seen in column 7 that after the immigrants have stayed in Canada for ten years, their contribution to public coffers in the form of taxes begin to exceed that of non-immigrants. Hence for the first ten years there is a transfer from non-immigrants to the immigrants when we consider payment of taxes alone. After ten years of stay, immigrants redistribute funds to the non-immigrants.

Column 5 provides the contribution of immigrants towards the financing of public goods. As was discussed in an earlier section the inflow of immigrants into the country does not affect the consumption of pure public goods. Therefore their contribution is not offset by any increase in consumption.

The net effect of immigrants on the non-immigrant population has been calculated in columns 9 and 10, first with their contribution to public goods, and second without taking account of public goods. The calculations with pure public goods may be considered more "realistic." It is observed that even if we do

not take account of contributions to public goods, immigrants clearly benefit the non-immigrant population through transfers to the public coffers. When we account for the public goods contribution, the net balance is positive in all cases. The net balance declines in the second year, however, the reason being that immigrants' incomes are almost the same in the next year (Table 11) but the proportionate employment has declined (see Table 11). Thus, the percentage of immigrants consuming unemployment benefits in the second year is more than that in the first year. One possible reason could be that immigrants are still adjusting to the Canadian environment by switching jobs while those who remain employed may be experiencing an increase in their income. The net transfers clearly increase from the third to tenth year. Afterwards the net transfer declines because of the decline in income tax contributions while their consumption of services continues to rise.

One can find the total transfers per immigrant household accruing to the non-immigrant population circa 1980 by computing a weighted average of the stream of benefits obtained in Columns 9 and 10 of Table 14. The total public treasury transfers accruing to the non-immigrants is found to be \$1107 when provision for public goods is made. Without the public goods provision, this transfer is \$815. Hence it may be concluded that each immigrant household in Canada left at least \$815 for the non-immigrants through the public treasury circa 1980.

It may be concluded from the above findings that the net balance of taxes paid and services received by immigrants in Canada has a positive net impact on non-immigrants for almost every immigrant cohort. Thus, the implication of the life-cycle theory that immigrants should confer a positive balance on the original residents of Canada cannot be refuted.

We have outlined earlier a second approach to the assessment of immigrants' impact. This involves an estimation of their net contribution to the public treasury. This estimation is a function of the difference between their tax contribution and services consumed. Table 15 summarizes this information.

It is observed that results of Table 15 are similar to our earlier results. The weighted average of the net contribution per immigrant household circa 1980 is found to be \$1058 when provision for public goods is made. Without the public goods provision, the net contribution is \$766.

Under the assumption that the performance of immigrant cohorts with different length of stay in Canada represents the performance of a typical immigrant at different periods in his/her lifetime, it may be concluded, on the basis of above results, that a typical immigrant household is a source of public fund transfers to the non-immigrant household in Canada. An immigrant household entering Canada in 1980 when evaluated at a real discount rate of 2 percent,²¹ was worth \$19630 under the

²¹The nominal yield on long term government bonds in 1980 was 12.5 percent while the expected inflation rate was 10.5 percent.

Table 15

Net Contribution to the Public Treasury
by Immigrant Entry Cohorts, 1980

Year of Entry	Taxes Paid ¹	Services Consumed ²	Net Contribution (2)-(1)	Net Contribution with Public Good (3)+aT _n
	(1)	(2)	(3)	(4)
1979	2107	1980	127	419
1978	2165	2297	(132)	160
1977	3344	2625	719	1014
1976	3523	2659	864	1156
1971-75	3527	3008	519	811
1966-70	4879	3506	1373	1665
1961-65	4543	3866	677	969
1956-60	4438	3839	599	891

¹Obtained from Column (4) of Table 14.

²Obtained from Column (1) of Table 14.

first approach and \$18,335 under the second approach. This compares with the average annual employment earnings (wages and salaries) of a non-immigrant household which were only \$14,647 in 1980.

The conclusion drawn from the above analysis is that the net balance of taxes paid and services received by an immigrant household in Canada has a positive impact on non-immigrants even after the immigrant household has lived for twenty five years in the country. This result is similar to that obtained for the

The analysis conducted in this Chapter was based on the implications of life-cycle theory of consumption, savings and investment. This theory hypothesizes a positive impact of immigrants on the non-immigrant population on the basis of their young age at the time of arrival. It is also necessary to analyse the role of certain behavioural characteristics of immigrants in arriving at these results. These characteristics include education, experience, ethnicity, etc., and have been manipulated in the past by policy. An analysis of their impact will shed light on the efficacy of policy and also provide guidance for future policy making. The following part of this thesis provides this analysis.

²²The assumption that various immigrant entry cohorts represent various points in the life-cycle of a typical immigrant may be criticised on at least two grounds. First, following Borjas (1985), the quality of various cohorts may be different. However, a defence against this criticism may be provided on the ground that an observation of the educational mix in various entry cohorts indicated insignificant differences across cohorts. Second and more important criticism may be based on the ethnic diversity across different cohorts which is the result of the notable changes in Canadian immigration policy over the sixties. This later issue has not been addressed here directly. However, some light over the issue is thrown in Part C.

PART C

THE EARNINGS PROFILES OF IMMIGRANTS AND THE NATIVE BORN

In this part the life-cycle earnings profile of immigrants and the native-born population in Canada will be estimated. A human capital earnings model will be specified. Regression analysis will be used to estimate the parameters of this model.

CHAPTER I

THEORETICAL BACKGROUND AND EARNINGS MODEL

Introduction

Part B presented an analysis of the impact of the immigrant population in Canada on the non-immigrant population through the impact on the public treasury. The theoretical background to the analysis was provided by the life-cycle theory of consumption, savings and investment.

An important observation was made in Table 10¹ that a greater proportion of immigrants in all entry cohorts were in the age group 25-64 when compared with the corresponding age group of non-immigrants. However, it can be deduced from the same table that most of the earlier immigrants to Canada arrived at an age younger than the more recent arrivals. This implies that the recent immigrant stock will reach retirement age in less years than the previous movers. Given that the recent flow of immigrants is older, and that there are restrictions on immigration levels, the overall immigrant stock will soon have relatively more older people. This implies a greater dependence of the immigrant stock on public services in the near future. This, of course, would at least partially offset the positive net benefits accruing to the non-immigrant population at present. To analyse this issue, it is important to extend the previous analysis by controlling for the age factor. Doing so

¹Chapter II, Part B.

will allow us to explore whether an immigrant performs better over his life cycle when compared with a non-immigrant of similar age.

An extension of the life-cycle theory of economic performance of individuals is provided by the theory of human capital investment. This theory argues that the differential economic performance of cohorts over their life cycle is due to differential levels of human capital investments. To understand the differential economic performance, earnings are analysed in a model by controlling for the age variable while allowing educational levels to vary among individuals.

In the context of the present study, an understanding of the earnings performance of immigrants and non-immigrants is essential. Several reasons can be advanced in this regard. We will begin by considering briefly each of the variables analysed in Part A.

First, government transfer payments received by a family (or an individual) are largely dependent on their employment and earnings levels. If earnings are too low or the individual is unemployed, government transfer payments provide some compensation. Blau (1984) has argued that earnings enter as an explanatory variable in a model explaining receipt of government transfer payments. On the other hand, as argued in the literature, earnings are in turn largely dependent on the age and educational level of an individual.

Second, the contribution to the public treasury in the form of personal income taxes and also in the form of consumption taxes clearly depends largely upon the earnings of households. For families with a similar demographic composition, income tax payments will largely depend on earnings.

Finally, the health care costs and educational costs are assumed independent of income.

All of the reasons presented above imply that the stream of transfers obtained earlier depends largely on the earnings differential between immigrants and non-immigrants.² For this purpose, it is essential to analyse the earnings differential.

Theoretical Background to the Analysis of Earnings Differentials

As was discussed in the literature review,³ human capital models provide a basis for the analysis of the life-cycle earnings performance of individuals. These models single out individual investment behaviour as a basic cause of the heterogeneity in labour incomes over any life cycle. Investment behaviour in such models occurs as formal education or training which leads to enhanced productivity and a higher stream of earnings. Since this training requires time to complete and its benefits are reaped over a long period of time, the value of resources used

²This also means that the variables that determine the earnings differential between these groups could also be considered as determining the stream of transfers between them.

³Chapter II, Part A.

in training may be considered an investment. The imputed return in earning power that results from this training may be treated as its yield.

As the composition of an individual's human capital stock changes over the life cycle, earnings change correspondingly. The average age-earnings profile illustrates a rapid growth in the initial periods of the working life, subsequently slower growth in later periods, and finally stability in the final periods of working life. An explanation for this phenomenon is found in Y. Ben-Porath (1967, p. 352):

People make most of investment in themselves when they are young, and to a large extent by foregoing current earnings. Observed earnings are therefore relatively low at early years, and they rise as investment declines and as returns on past investments are realized. The main reason why investment is undertaken mostly by the young is that they have a longer period over which they can receive returns on their investment...

The basic model generates some of the qualitative characteristics of the observed life cycle of earnings - typically, an initial period of no earnings followed by a period in which earnings rise at a declining rate and, eventually, decline.

The declining phase of the life-cycle earnings is accounted for by a rational lack of investment by older workers in human capital and natural depreciation of human capital over time. Also, the secular progress of knowledge makes older education and skill vintages obsolete. These facts suggest that as age advances, depreciation in human capital eventually begins to outstrip gross investment. Earnings are then observed to decline as the stock of productive human capital decreases.

On the basis of the above discussion one would expect the age earnings profile - the plot of the expected value of earnings by age - to be concave.

The previous section discussed the relation of earnings performance to the public treasury. In addition, several other fruitful issues can be investigated by analysing the earnings profile.

First, as demonstrated by D. Gauthier (1985), the long run elasticity of aggregate savings, with respect to the net of taxes interest rate, is a function of the instantaneous age earnings profile.⁴ Since both the age and the level of human capital can be influenced by immigration policy, the age earnings profile of an immigrant group at any point in time can be used to manipulate the aggregate savings rate in the economy.

Second, given that the demographic composition can be influenced by policy, the parameters of the earnings profile can be used to influence the level of taxes and consumption of services.

• Third and most important, an analysis of the earnings profile may also help to understand the nature of immigrant and non-immigrant differences in economic performance. Such understanding is useful for the purpose of policy making. Policy makers who wish to minimize the cost to the society of admitting

⁴The instantaneous age earnings profile in a society gives the relationship between the age and earnings structure of its members at a point in time.

an immigrant may find such information relevant for the selection criteria.

Finally, in the case of immigrants, the earnings profile can also be used to shed light on their assimilation process in the country. In the earlier years, the immigrant is unaware of aspects of the country's environment and lacks language and other skills necessary to suit the particular country's demands. As a result, the immigrant will be at a disadvantageous position in the labour market. This fact will be reflected largely in lower earnings.

It is important for policy evaluation to analyse the immigration assimilation process. At least two reasons can be advanced in this regard. First, the contribution of an immigrant cohort to the Canadian economy grows overtime, as the initial costs associated with the disruptive effects of immigrant are offset by increased productivity. Second, if immigrants' earnings grow rapidly as they age, the likelihood of them being subsidized by the native-born population will diminish overtime.⁵ ✓

Specification of the Model

One implication of human capital theory is that an individual's earnings will grow over his lifetime but at a declining rate. This declining rate is due to a reduced human capital investment

⁵These reasons for analysing the immigrant assimilation process have also been noted by G. Borjas and M. Tienda (1987).

by older workers and the natural depreciation of skills over time. Thus, the age variable may be included in the earnings model for an individual in a linear and quadratic form.

Various levels of education are represented by dummy variables in the model. The use of dummy variables avoids any measurement error that could arise by assigning an arbitrary number of years to various levels of education.⁶ In addition, any specification error arising from the functional relationship between earnings and education is also avoided.⁷

Thus, if an individual (i) has an income (Y_i), then at any point in his life-cycle, (Y_i) can be expressed as follows:

$$Y_i = f(A_i, ASQ_i, S_{i1}) \quad (3.1)$$

where A_i and ASQ_i represent the individual's age and square of age respectively, and S_{i1} represents the educational level (1) attained by this individual. Based on the theoretical discussion of the previous section, the age variable is expected to have a positive sign while the age squared variable is expected to have

⁶ Measurement error could arise by wrongly assigning the number of years to a particular level of education. This has been discussed in the literature review presented in Chapter II of Part A.

⁷E. Fuji and J. Mak (1981) have suggested that the earnings equation adopted by Chiswick (1978) has a specification error. However, their findings indicate that the correctly specified earnings model does not yield results that are different from the formulation used by Chiswick.

a negative sign in the model.⁸ The coefficient of the education level variable measures the shift in the earnings profile resulting from the attainment of education level (1) when compared with the excluded category. If the excluded category is the lowest level of education, then human capital theory would imply a positive sign of the education variable coefficient indicating that the earnings of an individual with a higher level of education will be greater than the earnings of another individual with the same age and other characteristics but with lesser education. ✓

The earnings model specified above is a general form of Mincer's (1974) post-schooling model. As discussed in an earlier section, Mincer's equation expressed earnings as a function of schooling and experience variables. Since direct data on labour market experience of individuals are rarely available, Mincer suggested an alternate definition of the experience variable. We have argued in an earlier chapter⁹ that Mincer's assumption for computation of the number of years of labour market experience may not be valid in the case of immigrants. In addition, we also cited evidence from the literature on the inappropriateness of experience proxy used by previous earnings function estimates for immigrants. The present study is based on more recent data

⁸The coefficient of the age squared variable can be algebraically shown to measure the change in the rate of growth of earnings with respect to the change in age, which, as the previous theoretical discussion suggests, should be negative.

⁹Chapter II, Part A.

on immigrant and native-born households. However, these data lack information on the labour market experience of households. To avoid any potential errors in variables problems arising from the use of the experience proxy, this study will refrain from its use.

† The age variable used in this model could be considered an alternative proxy for experience. This may be justified as follows. The coefficient of the age variable in the model measures the increment in earnings that accrues to an individual with a given level of education as he/she gets older. This may be interpreted as the marginal impact of experience that an individual gains from the time spent on activities other than pursuing education. These activities may include work-related or any other experience.

† There are several other issues concerning the earnings model specified above. First, the functional form of the dependent variable is often debated. This debate involves deciding whether earnings should be expressed in absolute dollars, or in natural logarithms. Following Mincer (1974), it can be argued that earnings should be expressed in logarithms since the distribution of logarithm of earnings is likely to be more normal than that of absolute earnings.¹⁰

Another issue relates to the inclusion of labour supply effects in the model. Human capital theory assumes that an

¹⁰Distribution of absolute earnings is likely to have more skewness than that of logarithmic earnings.

individual's objective is to maximize lifetime earnings and that no value is placed on leisure. Hence, the earnings equation relates to the potential rather than actual earnings as noted by Blinder (1974). Now, if the logarithm of annual earnings is the dependent variable and the individual voluntarily chooses to work only part of the year or part time, then some control for labour supply should be included. Mincer (1974) has also suggested that the natural logarithm of the number of weeks worked be included in the earnings equation to control for the labour supply effects on earnings.¹¹ In addition, human capital theorists suggest that the natural logarithm of the number of weeks worked also captures additional human capital effects.¹²

The coefficient of the log of the number of weeks worked in the earnings model measures the elasticity of earnings with respect to the number of weeks worked. A higher elasticity value for a group of individuals can be given two possible interpretations. First, it may be because individuals in that group work more. Second, it may be because individuals in that group have higher weekly wages. Higher weekly wages arise for two reasons. First, as suggested by Mincer (1974) and Chiswick (1974), this could be due to greater investment by such individuals in specific human capital. Second, it may be due to labour market discrimination in favour of such individuals.

¹¹J. Mincer (1974), pp. 22-29.

¹²See Chiswick and Mincer (1972) and Chiswick (1974), ch. 3

A third issue arising from the inclusion of labour supply effects is the simultaneity problem in the earnings model. This problem arises because labour supply could itself be expressed as a function of earnings. This problem has led to a discussion in the literature as to whether to use annual earnings or the wage rate as the dependent variable. There is still no agreement over this issue. The main source of this disagreement, as suggested by Snooks (1983), is a lack of empirical clarity about the relationship among earnings, wage rates and labour supply. For example, Blinder (1973, p.439) argues that wage rates should be used rather than earnings since the former "can seriously bias estimates of the real rates of return to education," if wages depend on education and the labour supply depends on wages.¹³ Mincer (1974) recognises this problem, but concludes that the more skilled workers have higher earnings because they are paid more per hour and work more per week. When this relationship is clearer, Mincer suggests, it should be possible to develop a recursive system embodying both a wage rate function and an employment function. Until this system is developed, a reasonable method is to treat employment as an independent variable.

¹³Blinder (1973, p.439) provides following explanation in this regard:

"Suppose, for example, that wages depend on education and labor supply depends on wages. Then, estimating the effect of education on earnings will over- or underestimate the impact on wage rates according as the labor supply curve is normal or backward-bending."

This study will follow Mincer's suggestion and will use the log of annual earnings as a dependent variable. No formal causality test will be performed. However, a t-test will be performed to test if the coefficient of the log of weeks worked variable is unity. A unit value should indicate that there is no significant difference in the annual and weekly earnings structure. This would mean that the same earnings model could also be estimated by using the log of weekly earnings (estimated as the ratio of annual earnings to the number of weeks worked) as the dependent variable.¹⁴

Given the above discussion our specification will include the logarithm of the number of weeks worked.¹⁵

A modified form of the earnings model presented above will be as follows:

$$\text{Ln}Y_i = f (A_i, \text{ASQ}_i, S_{i1}, \text{Ln}W) \quad (3.2)$$

where the variables $\text{Ln}Y_i$ and $\text{Ln}W_i$ are, respectively, the natural logarithm of annual earnings and the number of weeks worked

¹⁴ A coefficient of unity would mean that the earnings model could also be estimated by constraining the coefficient of the log of weeks worked to unity. This is equivalent to taking the log of weekly earnings obtained by taking the ratio of annual earnings and the number of weeks worked.

¹⁵If Y_w is the weekly earnings, then annual earnings Y may be written as follows:

$$Y = Y_w \times W^a$$

where W is the number of weeks worked and a is the elasticity of earnings with respect to the number of weeks worked.

during the year.¹⁶

A fourth issue emerges in the special case of foreign-born individuals. Their length of stay in the country may be an important determinant of earnings. Initially, the foreign born may suffer from an information gap - their ignorance of customs and lack of language skills yield less information about existing jobs. As time passes, however, the immigrant gains knowledge of the labour market and acquires job-specific training and modifies his skills to suit the requirements of the local market. Thus, while the immigrant initially would have significantly lower earnings as compared with the native born, this gap is expected to become narrower with a greater length of stay in the country. The speed with which this gap closes is expected to be faster for the immigrants coming from a country similar to Canada in terms of language, customs, etc.

Also from the employer's point of view, the length of stay in Canada may serve as a screening device to separate less productive workers from the more productive. An employer will generally prefer a worker with a longer length of stay since he is more aware of job requirements than is a more recent arrival. In sum, the length of stay in Canada, or the Canadian experience, will affect earnings of foreign-born workers by enabling them to invest in formal training, acquire language

¹⁶The semi-log specification of the earnings function with the logarithm of number of weeks worked has received empirical support against alternative functional forms in the works of J. Heckman and S. Polacheck (1974) and J. Welland (1978).

skills and obtain information about the Canadian labour market. Thus, the productivity of an immigrant worker is expected to rise with his length of stay.

The above discussion renders it important to analyse the impact of length of stay in the earnings model for immigrants.

A fifth issue arises from our use of cross-sectional data. The earnings model must also account for earnings differences which arise from personal and locational characteristics which are associated with cross-sectional earnings variations. In this study, the earnings model will be estimated at first without the cross-sectional characteristics. Next, these cross-sectional characteristics will be added to the model and their impact analysed.

Limitations of the Model

While the above model has been utilised in this study to avoid some of the problems that arise from the use of the traditional earnings function, this model has also its limitations. First, as the information on the attainment of education prior to immigration is not available for immigrants, the model cannot be used to analyse the effect of pre-immigration educational attainment explicitly. However, an analysis of various immigrant entry cohorts indicates that, on average, the age upon entry of the head of household grew. The average age at immigration for the 1956-60 cohort was about 25 years while for the 1976-79

cohort it was 36 years. It is assumed in the present analysis that the educational level reported by immigrants in the 1981 Census was largely attained prior to immigration.

Second, cross-sectional data will be utilised to estimate the above model. The results will be used to obtain an age earnings profile of a typical individual by averaging the results for individuals of different ages. This technique may, however, be defended on the ground that the education mix does not differ by immigrant cohort. However, this technique still involves the assumption that the relative distribution (of earnings) among age groups does not change over time. G. Borjas (1985) has criticised the use of this technique. The quality of age cohorts may differ over time due to changes in the quality of education. In the context of immigration, the quality of immigrants is controlled by immigration policy.

Third, the model will be estimated by using ordinary least squares. This technique may yield biased results in the present context, the reason being that among both immigrants and non-immigrants, 25 percent of the sample household did not work in 1980. Thus the earnings of these households were not observable for that year while the explanatory variables of the earnings model were observable. As these households may not be working by choice, this makes the dependent variable nonrandom thereby violating one of the important assumptions of regression analysis. As a consequence, the estimated coefficients of the earnings model are likely to be biased. This bias problem has

been termed in the literature as "selectivity bias."¹⁷ An appropriate technique that accounts for this problem is to use Tobit analysis.¹⁸

The present analysis will not correct for the selectivity bias problem. Instead, the ordinary least squares method will be applied to the entire data set of working and non-working individuals. It is assumed that the direction of bias is similar for both immigrant and native-born households.

¹⁷For a discussion on the selectivity bias the reader may refer to J. Heckman (1976).

¹⁸For a survey of various Tobit models (including the one relevant in present context) the reader may refer to J. Amemiya (1984).

CHAPTER II
EMPIRICAL RESULTS

This chapter analyses the regression results of the earnings model specified in the previous chapter.

Data

As in Part B, the analysis of earnings profile is also based on microdata contained in the 1/100 sample of household/family file of the 1981 Canadian Census. These data have been discussed in detail in Part A.

Two random samples were drawn from the main summary tapes; one representing the immigrant population with the period of immigration between 1956 and 1979, and the other representing non-immigrants. The subsampling has been done mainly to reduce computing costs.¹ These subsamples consist of individuals aged 15 years or over. Individuals reporting negative employment income were excluded from the analysis.² This has been done mainly for the sake of simplicity. The extent of bias introduced in this manner is expected to be negligible, first because the number of such individuals is low, and second because the number

¹The subsampling was performed by using the SPSSX software. The size of non-immigrant sample is 2982 households while for immigrants the sample size is 4962. We chose a larger immigrant sample so that we had enough observations when analysing performance by immigrant groups.

²From the sample of immigrants there were six individuals who reported negative income. From the non-immigrant group there were four such individuals.

does not differ much between the two groups.

Estimations have been performed for husbands in husband-wife families, all lone parents and all non-family persons. In the case of husband-wife families the income of the husband is assumed to be representative of family income. As before, families with a wife only immigrant were excluded from the analysis.

To analyse the effect of ethnicity, earnings models have also been estimated for two sub-groups of immigrants contained in the sample of overall immigrants. The first group consists of immigrants whose place of birth was in Western Europe. The second group consists of immigrants whose place of birth was in Asia, Africa, and Central America including the Carribean countries.³

Specification of Variables

Earnings, age, and level of education data were obtained directly from census microdata. Only earnings which result from self employment and wages and salaries are used.

Educational level data are reported only by intervals. For the purpose of this study, these intervals were classified into

³Immigrants from Western Europe consist of those whose place of birth reported on the PUST was Austria, Belgium, France, Germany, Greece, Italy, Luxembourg, Netherlands, Portugal, Republic of Ireland, and the United Kingdom. The place of birth for immigrants from Asia, Africa, and Central America including Carribean countries have been broadly classified by these regions on the PUST.

six categories. These include, S0: less than grade 9 education; S1: Some high school (grade 9-13) education; S2: high school or equivalent education - represents those who completed high school or its equivalent education; S3: non-university education - represents those who attained an education level above high school but did not attend university; S4: some university education - represents those who attended university but did not obtain any degree, certificate or diploma; S5: university education - represents those who obtained a university degree, certificate or diploma.

A detailed specification and definition of remaining variables is provided in Appendix 5.

Characteristics of Subsample

Table 16 provides sample means of all the variables specified in the basic life-cycle earnings model.

As can be seen, the average earnings of immigrants in 1980 exceeded those of the non-immigrant group by more than \$3000. Immigrants were about two years younger than non-immigrants and worked five weeks more in 1980 than non-immigrants.

The education variable indicates that around 22.1 percent of native-born individuals had an education level less than grade 9. Among immigrants this percentage is 20.1. It is also found that the largest educational group for non-immigrant individuals

Table 17
Means of Variables

Variables	Non-Immigrants	Immigrants		
		All	Asian/African/ Cent.American	W.Europe
Income (\$)	13003	16201	14120	17074
Weeks	32.69	38.43	36.94	39.50
Age(years)	43.84	42.11	39.98	42.89
S1 (Some high-school grd:9-13)	0.240	0.159	0.160	0.168
S2 (High school or Eq.)	0.166	0.125	0.115	0.135
S3 (Non-univ.)	0.191	0.245	0.201	0.268
S4 (Some univ.)	0.041	0.040	0.054	0.024
S5 (Univ.)	0.141	0.230	0.327	0.145
Number	2982	4962	1566	2605

Source: PUST (subsample)

was between grade 9 and high school (40.6 percent as compared with only 28.4 percent for immigrants). In addition, a significant percentage of non-immigrants drop out before completing high school (24 percent as compared with only 15.9 percent for immigrants). Among immigrants, 51.5 percent had attained a postsecondary school level of education as compared with only 37.3 percent for the native-born group. At the postsecondary level immigrants are more likely to have attained university education.

It may be concluded from the above that the educational distribution of the immigrant population in Canada is more skewed towards a higher level of education. However, the proportion of households with more than grade nine education is about the same in both groups.

When we compare earnings by place of origin of immigrants, it is found that the average earnings of immigrants from Europe are about \$3000 more than those of immigrants from Asia, Africa and Central America circa 1980. The average earnings of immigrants from Asia, Africa and Central America are around \$1000 more than those of the non-immigrant group. European immigrants tend to work the greatest number of weeks per year. In addition, they are about a year younger than the native born. Immigrants from Asia, Africa and Central America are on average the youngest of all those considered.⁴

⁴This may be reflecting the policy change in the late sixties which abolished all entry restriction on ethnic grounds. As a consequence of this, immigrant flows in the early seventies had

Turning to the educational variables by source country, immigrants from Asia, Africa and Central America are more likely than other immigrants to have attained an educational level above grade 9 (85.7 percent as compared with only 74 percent for European immigrants). These immigrants are also most likely to have attained a postsecondary educational level with a significantly higher chance of having completed a university education.

Results

Table 17 provides the estimated coefficients for the basic life-cycle earnings model. The corresponding t-values which are reported in parentheses are computed to test the hypothesis that the corresponding coefficient is not statistically significantly different from zero.⁵

We will first analyse these results for all immigrants and compare them with the non-immigrant group. Next, we will analyse the results for the two immigrant groups. The estimated equation is:

⁴(cont'd) a greater proportion of immigrants from Asia, Africa and Central America.

⁵Among immigrants, 20 percent were unemployed in 1980, while this percentage for non-immigrants was 22 percent. Since the dependent variable in the estimated earnings models is expressed in logarithm, the study had to assign a non-zero value to the earnings of such households. It was arbitrarily assumed that such households earned \$1 in the year 1980.

Table 17

Regression Results of Earnings Model

Variable	Native Born	Immigrants		
		All	Asia, Africa & Cent. Amer.	West Europe
LWKS	2.110 (78.65)	2.180 (106.10)	2.100 (59.07)	2.170 (76.24)
A	0.067 (5.88)	0.073 (7.95)	0.067 (3.91)	0.080 (6.55)
ASQ	-0.0008 (-7.06)	-0.0009 (-8.85)	-0.0009 (-4.56)	-0.001 (-7.46)
S1	0.250 (2.51)	0.148 (2.08)	0.235 (1.60)	0.130 (1.53)
S2	0.370 (3.31)	0.353 (4.60)	0.547 (3.41)	0.274 (3.00)
S3	0.300 (2.79)	0.375 (5.69)	0.579 (3.90)	0.328 (4.31)
S4	0.450 (2.53)	0.285 (2.43)	0.805 (3.90)	-0.119 (-0.65)
S5	0.757 (6.45)	0.507 (7.60)	0.773 (5.68)	0.599 (6.68)
CONSTANT	-0.093 (-0.37)	-0.465 (-2.37)	-0.326 (-0.93)	-0.403 (-1.54)
RSQ	0.816	0.813	0.815	0.829
RSQ(adj.)	0.816	0.813	0.814	0.820
Number of Observations	2982	4962	1566	2605
SSR (reg.)	40633.0	46060.3	16041.6	21900.5
SSR (res.)	9129.2	10601.3	3634.1	4779.7
Degrees of Freedom				
--Reg.	8	8	8	8
--Res.	2971	4953	1557	2596

$$\text{LnY} = \delta_0 + \delta_1 A + \delta_2 \text{ASQ} + \delta_3 \text{LnWKS} + \sum_{j=1}^n \delta_j S_{1j} + \epsilon. \quad (3.3)$$

where '1' assumes a value from 1 to 5. The subscript 'i' has been dropped for simplicity.

At first a Chow test is performed to test the hypothesis that the earnings of immigrants and non-immigrants are generated by the same structure. In order to test this hypothesis, the above equation was estimated by pooling the subsamples of immigrants and non-immigrants. The result was then employed to compute the F-statistic given by the formula:

$$F = \frac{(\Sigma e_p^2 - (\Sigma e_1^2 + \Sigma e_2^2))/k}{(\Sigma e_1^2 + \Sigma e_2^2)/(n_1 + n_2 - 2k)} \quad (3.4)$$

where Σe_p^2 is the sum of squared residuals from pooled regression, Σe_1^2 and Σe_2^2 are the sums of squared residuals obtained from regression models based on each of the two subsamples, n_1 and n_2 are the number of observations in respective subsamples and k is the number of estimated parameters including the intercept term. The F-statistic is distributed as F with k degrees of freedom in the numerator and (n_1+n_2-2k) degrees of freedom in the denominator. The results of

the Chow test are presented in Table 18. The results for subgroups of immigrants will be analysed later. At the moment we are concentrating only on the first row.

Table 18

Results of Chow Test

Group	F-value	
Immigrants & Non-Immigrants	1.64	<i>fail to reject null</i>
Asia, Africa, Cent. Amer. & Non-Immigrants	1.67	<i>fail to reject null</i>
W. Europe & Non-Immigrants	1.95	<i>fail to reject @ 0.01 level</i>
Asia, Africa, Cent. Amer. & Europe	5.20	<i>reject null</i>

The computed F-statistic is found to be 1.64. The critical F-value at the 0.05 level of significance with 9 degrees of freedom in the numerator and infinity in the denominator is 1.88.⁶ Thus, the null hypothesis that the life-cycle earnings structure is the same for immigrants and the native born cannot be rejected.

We now turn to the interpretation of individual coefficients in the model.

⁶At the 0.01 level of significance the F-value is 2.41.

The coefficients on the variables log of weeks worked, age, and the square of age are all statistically significant. This is shown by the corresponding t-values. Also these coefficients have the theoretically expected signs.

The coefficient on the log of weeks worked variable measures the elasticity of earnings with respect to the number of weeks worked during the year. This coefficient is found to be similar for both groups. This implies that a proportionate increase in earnings of an immigrant in response to a proportionate increase in the number of weeks worked is the same for immigrants as well as for non-immigrants.

As was discussed in the previous chapter, an elasticity value of unity would indicate that the annual earnings structure for a group is the same as the weekly structure. An investigation of this issue is important as it will indicate whether the earnings model can be estimated with weekly earnings as the dependent variable. If data indicate this, then the simultaneity problem discussed in the previous chapter can be avoided. In order to test the hypothesis that the coefficient of the log of weeks worked variable is unity, relevant t-values were calculated. These are given by the following formula:

$$t = (\delta_3 - 1)/s_3$$

where s_3 is the estimated standard error of the estimated value of δ_3 . The calculated t-value for the non-immigrant group was found to be 41.37 while for immigrants it was 57.43. Thus it can be concluded that the annual earnings structure is different from the weekly earnings structure for individuals in both groups. Hence the model cannot be estimated with weekly earnings as the dependent variable.

The coefficients for the age variables are of particular interest. To analyse these we will first obtain the marginal impact of the age variable on the log of earnings and then the rate of change in this value. This is done in Table 19.

Table 19

Marginal Impact of Age on Log of Earnings
Native Born, and Immigrants

Group	$\frac{\partial \text{LnY}}{\partial A}$	$\frac{\partial^2 \text{LnY}}{\partial A^2}$
Native born	0.067-0.0016A ^{0.067}	-0.0016
Immigrants	0.073-0.0018A ^{0.073}	-0.0018

Before we proceed to analyse the above, it is necessary to note what the derivatives $\frac{\partial \text{LnY}}{\partial A}$ and $\frac{\partial^2 \text{LnY}}{\partial A^2}$ mean. In the regression model estimated above, it can be readily seen that $\frac{\partial \text{LnY}}{\partial A}$ measures the impact of a unit increase in the age variable on the log of

earnings while holding constant the log of weeks worked and the level of schooling. Thus this derivative tells us by how much the log of earnings changes for an individual who has a particular level of education (and weeks worked) as he becomes older. In other words, as was discussed in the previous chapter, we can interpret the age variable coefficient as computing experience.⁷ The derivative $\frac{\partial^2 \text{LnY}}{\partial A^2}$ measures the rate of change in this impact. Now we return to the interpretation of the computed value of the above derivatives.

First, it is immediately seen that the rate of change in the marginal impact of age on the log of earnings is almost the same for both groups.⁸ Thus the rate of increase in the earnings over the life time diminishes at the same rate for both groups. In other words, depreciation of human capital over the life time takes place at the same rate for both groups.

Second, it is observed from the first order derivative that among individuals of the same age, the immigrant experiences almost similar rate of increase in his income (logarithm of earnings increases by 7.3 percent for the immigrants as opposed to 6.7 percent for non-immigrants) as he gets older vis-à-vis the native-born individual. This means that post-schooling experience has almost similar impact on the earnings of immigrants in Canada and for the native born.

⁷This experience may be on-the-job experience or additional knowledge acquired in any other way which accumulates with age.

⁸This is given by the second order derivative.

Finally, we analyse the coefficients of the education variables in the model. The education variables have been included in the model as dummy variables representing various levels of education. Thus their coefficients directly measure a shift in the earnings profile.⁹

The t-values of respective educational variable coefficients suggest that the earnings profile differs significantly for all levels of education when compared with the reference group.

It is also observed that as one moves from lower to higher levels of education, the coefficients increase in magnitude with the exception of university drop-outs in the case of immigrants, and post-high school, non-university education in the case of non-immigrants.¹⁰

⁹The shift compares with the reference group, composed of individuals with less than grade 9 education.

¹⁰Although several studies can be cited from the literature on the returns to education, these studies are not comparable with the present study due to differences in the incorporation of the education variable. Most of these studies utilise the 1971 Census data and do not compute returns to various levels of education. However, one such study by R. Holmes (1976) analysed the earnings differential between males and females in Canada. Utilising the 1967 Survey of Consumer Finances, he computed the present values of potential lifetime earnings for males and females at different levels of education. It is not clear from the paper how postsecondary non-university level education has been treated. However, when one considers the percentage increment in the present value of the potential lifetime earnings, it is found that this increment is smaller when the educational level changes from "high school" (S2) to the "some university" (S4) level than for any other increment in educational level. For those who obtained a University degree, the returns are significantly higher when compared with the high school level.

Finally, it is found that the educational variable impact for immigrants is similar to non-immigrants at the level of secondary school (S2). At the postsecondary non-university level, returns are slightly higher for immigrants. At all other levels, immigrant education receives lesser reward in Canada.

To sum up, we have found in this section that there is no significant difference in the earnings profile of immigrants and non-immigrants in Canada. When individual variables are analysed, it is found that the labour market experience of immigrants is valued more than that of non-immigrants.¹¹ At the same time the weekly earnings of immigrants are almost equal to non-immigrants. However, education has a higher impact on the earnings of non-immigrants except for the postsecondary, non-university level.

Estimated results for sub-groups of immigrants

Statistics suggest that in Canada up to the beginning of the 1970's, the inflow of immigrants was largely from European countries. However, since 1967, Canadian immigration policy has allowed the composition of immigrant flows to change by source region. As a result, immigrant inflows from other areas, especially from the less developed countries of Asia, Africa and Central America have increased.¹²

¹¹This is revealed by the age coefficient.

¹²The present composition of the immigrant population by period of entry and place of birth can be found in Table 23 which appears in a later section.

In this section we will analyse the results of estimated earnings model for these two subgroups of immigrants. This analysis is important for several reasons. First, it will shed some light on the impact of immigration policy changes since the late sixties which have had a significant impact on the ethnic composition of immigrant flows. Second, the estimated parameters of the earnings profile can serve as the basis for manipulating the ethnic mix of the immigrant population to obtain higher returns from immigration.

Table 18 provided results of the Chow test to test for the significance of difference in the earnings profile of immigrants and non-immigrants. The computed F-value reported in the second and third rows of the table are obtained by applying the Chow test to compare the earnings structure of immigrants from Europe and from Asia, Africa and Central America with that of non-immigrants. It is found that the computed F-values are 1.95 and 1.67 respectively. The critical F-value, as before, is found to be 1.88 at the 0.05 level of significance. Thus, we cannot reject the null hypothesis in the case of Asian, African and Central American immigrants that earnings differences when compared with the native-born population are not statistically significant.¹³ However, the null hypothesis can be rejected in the case of European immigrants. Furthermore, as the fourth row of the same table indicates, the calculated F-value for comparing the earnings structure of the two immigrant groups

¹³The critical F at the 0.01 level is again 2.41.

with each other is 5.20 which is greater than the critical F-value both at 0.01 and 0.05 levels. Thus, statistically significant differences exist between the earnings structure for the European versus the Asian, African and Central American groups of immigrants.

We will now turn to the interpretation of coefficients of individual independent variables in the model.

Again, as before, the elasticity of earnings with respect to the number of weeks worked is found to be statistically significant. To test the hypothesis that the elasticity coefficients are statistically significantly different from unity, the t-values have been computed as before. These are found to be 30.94 for European immigrants and 41.11 for the other immigrants. Thus, the null hypothesis that the elasticity value is not significantly different from unity cannot be accepted in either case. It is concluded as before that the annual earnings structure of both immigrant groups is different from their weekly structure. Thus the earnings model for these two groups cannot be used to analyse their weekly earnings. This result is the same as for overall immigrants.

The magnitudes of the elasticity coefficients are similar for both groups.

Turning to the age variable coefficient, the t-values suggest their statistical significance. Furthermore, coefficients of both the age and age squared variables have the

expected signs. To analyse the impact of the age variable for the two groups we compute the partial derivatives as reported in Table 20.

Table 20

Marginal Impact of Age on Log of Earnings
Europeans, and Asians, Africans & Central Americans

Group	$\frac{\partial \text{LnY}}{\partial A}$	$\frac{\partial^2 \text{LnY}}{\partial A^2}$
Europeans	0.080-0.002A	-0.002
Asians, Africans & Cent. Amer.	0.067-0.0018A	-0.0018

As revealed by the second order derivative provided in Table 20, it is seen that the rate of depreciation for accumulated human capital is approximately the same for both immigrant groups.

Furthermore, among individuals of the same age, European immigrants experience the greatest increase in their income as they become older for the same level of education (the coefficient of the age variable is the highest for these immigrants). This essentially means that the post-schooling experience attained by this group is considered to be of more significant value than for the other groups.

Finally we turn to an interpretation of the education variable coefficients. For Asian, African and Central American

immigrants, all education variables are found to be significant and the highest among all groups. The impact of each educational level on the log of earnings is the highest for these immigrants when compared with the excluded category. It is also interesting to note for this group that the educational level impact on log of earnings is even higher than that for the native born at all levels except for the less than grade nine level. University drop-outs in this group have the highest earnings (keeping other variables constant). In contrast, among European immigrants, university drop-outs receive insignificant rewards to education.

In sum, the results of the earnings model indicate that although the overall earnings structure may not differ between all immigrants and the native born, significant differences in the earnings profile do exist between subgroups of immigrants and the native-born population. Furthermore, significant differences in the earnings profile across subgroups of immigrants are also found.

The coefficients of the earnings model indicate that among Asian, African and Central American immigrants, education has the highest impact on log of earnings. These immigrants receive the same reward to their experience as the native born. Across immigrant groups, major differences lie in educational rewards and returns to post-school experience.

A Comparison of the Impact of Foreign and Canadian Labour Market Experience

As was discussed in the Canadian immigration policy review, one of the criteria for immigrant selection is their labour market experience. No direct information on labour market experience prior to or after immigration is available from the PUST. Thus, given that age is a proxy for experience in an earnings model with education as one of the independent variables, an age at immigration variable may be introduced as a proxy for post-schooling experience acquired prior to immigration.¹⁴

Similarly, the number of years since migration may be considered a proxy for post-schooling experience acquired in Canada for a given education level. To isolate the impact of each of these two experience effects separately, one can substitute the age variable in the model as follows.

$$A = \overset{24}{AIM} + \overset{12}{YSM} \quad (3.5)$$

where, as before, A is the age of the individual, AIM is the age at which the individual immigrated to Canada, and YSM is the number of years since immigration, representing the number of years the immigrant individual has spent in Canada.¹⁵

¹⁴It may further be noted that among all immigrant cohorts, the average age at immigration (computed as the difference between current age and the number of years since migration) has varied from 24.6 years in the 1956-60 cohort to 36.4 years in the 1976-79 cohort. It may be safe to assume that, most immigrants attained their education prior to immigration.

¹⁵The AIM and YSM variables are not directly obtainable from the PUST. Hence these were calculated by considering the age of the immigrant individual and the year of arrival in Canada. The PUST

Allowing all coefficients to vary, the above allows us to write the basic earnings model for immigrants as follows:

$$\ln Y = \delta_0 + \delta_1 AIM + \delta_2 YSM + \delta_3 AIMSQ + \delta_4 AIM * YSM + \delta_5 YSMSQ + \delta_6 \ln WKS + \sum_{j=7}^{11} \delta_j S_j + \epsilon. \quad (3.6)$$

Results of the modified model are provided in Table 21 for all immigrant groups. In short all the experience variables have significant effects.

In order to analyse the impact on earnings of the post-schooling experience acquired prior to and after immigration, one can estimate the marginal impact of respective experience variables by evaluating the derivatives $\frac{\partial \ln Y}{\partial AIM}$ and $\frac{\partial \ln Y}{\partial YSM}$. These derivatives are provided in Table 22. The impact of pre-immigration experience is evaluated at zero years since immigration. The impact of Canadian experience is evaluated at the average age at immigration of 28.435 years which is the average for all immigrants. As expected, it is found that in the case of overall immigrants, a year spent in Canada has a larger impact on the log of earnings than a year spent abroad. Furthermore, this impact is lower the later in life one immigrates.¹⁶ Among European immigrants, the impact of a year spent abroad is the lowest. However, the impact for Asian,

¹⁵(cont'd) provides information on the year of arrival by discrete numbers between 1971 and 1979. For earlier immigrants, the period of arrival is given by intervals of 5 years. Therefore, in such cases, the middle year was considered as the year of arrival.

¹⁶ The value of the derivative $\frac{\partial \ln Y}{\partial YSM}$ indicates this.

Table 21

Regression Results with Foreign and
Canadian Experience

Variables	All Immigrants	Asian, African & Centr. Americans	W. Europeans
LnWKS	2.17 (105.16)	2.09 (58.69)	2.17 (76.03)
S1	0.15 (2.09)	0.21 (1.40)	0.13 (1.55)
S2	0.35 (4.51)	0.50 (3.10)	0.28 (3.04)
S3	0.37 (5.63)	0.51 (3.44)	0.33 (4.28)
S4	0.29 (2.45)	0.74 (3.62)	-0.11 (-0.63)
S5	0.52 (7.79)	0.70 (5.15)	0.60 (6.70)
δ_2 YSM	0.09 (4.84)	0.10 (3.13)	0.05 (2.02)
δ_5 YSMSQ	-0.002 (-2.80)	-0.002 (-1.91)	-0.0003 (-0.48)
δ_1 AIM	0.063 (6.52)	0.051 (2.91)	0.080 (5.91)
δ_3 AIMSQ	-0.0008 (-8.41)	-0.0008 (-3.84)	-0.001 (-7.50)
δ_4 AIM*YSM	-0.0014 (-4.99)	-0.0013 (-2.19)	-0.002 (-4.59)
CONST	-0.39 (-1.76)	-0.22 (-0.58)	-0.21 (-0.64)

$\frac{\delta_{2\text{AIM}}}{\delta_{\text{AIM}}} = 0.063$
 $\delta_{\text{AIM}} = -0.0016$

Continued...

Continued Table 21

RSQ	0.81	0.82	0.82
RSQ (adj.)	0.81	0.82	0.82
Number	4962	1566	2605
SSR (reg.)	46101	16083	21903
SSR (res.)	10560	3593	4777
DF (reg.)	11	11	11
DF (res.)	4950	1554	2593

Table 22

Marginal Impact on Log of Earnings of
Foreign & Canadian Experience.

Year	Overall Immigrants		Asian, African and Central American		European	
	$\frac{\partial \ln Y}{\partial AIM}$	$\frac{\partial \ln Y}{\partial YSM}$	$\frac{\partial \ln Y}{\partial AIM}$	$\frac{\partial \ln Y}{\partial YSM}$	$\frac{\partial \ln Y}{\partial AIM}$	$\frac{\partial \ln Y}{\partial YSM}$
1	0.016	0.044	0.004	0.063	0.024	0.001
5	0.008	0.032	-0.002	0.047	0.016	-0.002
10	-0.001	0.018	-0.009	0.027	0.006	-0.005

Marginal Impact of Foreign Experience:

$$\frac{\partial \ln Y}{\partial AIM} = \delta_1 + 2\delta_3 AIM + \delta_5 YSM \quad \text{at } YSM = 0.$$

Marginal Impact of Canadian Experience:

$$\frac{\partial \ln Y}{\partial YSM} = \delta_2 + 2\delta_4 YSM + \delta_5 AIM \quad \text{at } AIM = 28.435$$

Note: The estimated coefficients from the earnings model were rounded off to 3 digits. Hence some discrepancies in the above calculations may be found.

African and Central American immigrants is negative if they immigrate five years later (i.e., at the age of 33.435 years), while the European immigrants continue to experience a positive impact. A year spent in Canada has a positive impact for Asian, African and Central American immigrants even up to ten years after arrival. This impact is insignificant for Europeans. Asian, African and Central American immigrants experience the greatest increase in their earnings for a year spent in Canada.

The results obtained for the two subgroups are not surprising. The European immigrants are from technologically advanced countries, culturally similar to Canada, and hence the earnings increment in Canada is not very large. In the case of other immigrants, the incremental earnings are larger representing their assimilation process.

It is also observed that immigrants perform better the younger they are at the time of immigration.

Combining the results of this section with the findings on the impact of education, it can be seen that in the case of Europeans, the impact of education is lower while the impact of experience acquired abroad is larger vis-à-vis the Asian, African and Central American immigrants. The Asian, African and Central American immigrants however, are more educated and the impact of education on the log of their earnings is higher than Europeans at all levels of education. Thus, more emphasis on the labour market experience as an immigrant selection criterion

seems a fruitful policy in the case of European immigrants. While Asian, African and Central American immigrants with a higher education should be admitted, a larger increment in their earnings with the passage of time in Canada suggests higher returns to their training.¹⁷

Immigrant Assimilation in Canada

It was argued earlier that immigrant earnings should increase with their length of stay as they become assimilated into the Canadian society. At the time of arrival immigrants suffer from language and cultural barriers. They also lack an appropriate knowledge of the country's labour market. Furthermore, employers may also prefer to hire those who have been in the country longer and understand better the working atmosphere. As a result of these factors one is likely to observe that immigrants initially earn less than the native born but their earnings increase over time.

The above discussion implies that the Canadian society may subsidize immigrants during their initial stay. The longer it takes an immigrant to adjust, the greater the subsidy and hence the larger the social cost.

¹⁷When one looks at the age at arrival of the Asian, African and Central American immigrants, it is found that these immigrants were the oldest at the time of arrival. The average age at arrival for all immigrants, European immigrants and Asian, African and Central American immigrants was respectively 28.4, 26.8 and 30.9 years.

It has been discussed before that until the early sixties, immigration policy in Canada emphasized the admission of specific groups of European immigrants. The rationale behind this policy was that they would assimilate more rapidly in Canada both socially and economically. With the abolition of discrimination on the basis of country of origin, the suitability of an immigrant is now determined by the "point system."¹⁸ The point system takes into account various characteristics such as age, education, experience, occupational skills and language skills. Thus, an investigation into immigrant assimilation will shed further light on the efficacy of selection criteria in the current policy.

In order to analyse the immigrant assimilation process, the analysis will be conducted in two steps. First, the impact of period of immigration on earnings will be analysed. Next, ~~changes in the earnings of immigrants with years since migration to Canada will be compared with the changes in earnings of the native-born population of the same age.~~

Length of stay and Immigrant Earnings

To assess the impact of length of stay in Canada on immigrant earnings, the earnings model was reestimated to include the effect of the period of immigration. For this purpose four dummy variables were defined as follows:

FOR1 = 1 if the immigrant arrived during 1976-79.

¹⁸For a discussion of the point system the reader may refer back to the introductory chapter.

= 0 otherwise.

FOR2 = 1 if the immigrant arrived during 1971-75.

= 0 otherwise.

FOR3 = 1 if the immigrant arrived during 1966-70.

= 0 otherwise.

FOR4 = 1 if the immigrant arrived during 1961-65.

= 0 otherwise.

The reference group included all immigrants who arrived during the period 1956-60.

Thus, the estimated equation is:

$$\ln Y = \delta_0 + \delta_1 A + \delta_2 ASQ + \delta_3 \ln WKS + \sum_{k=4}^8 \delta_k S_k + \sum_{m=9}^{12} \delta_m FOR_t + \epsilon. \quad (3.7)$$

where 't' assumes values from 1 to 4.

Table 23 provides the average values for the period of immigration dummy variables. These averages indicate the proportion of the immigrant population in the sample that arrived in the respective periods. Overall 25 percent of sample immigrants arrived during the period 1956-60. Comparing immigrants from Asia, Africa and Central America with those from Europe, it is found that a greater proportion of immigrants from Asia, Africa and Central America arrived after 1971 (63.9 percent). Immigrant flows from Western Europe have declined significantly since 1971. These statistics reflect changing Canadian immigration policy as discussed before.

Table 23
Averages for Period of Immigration
Dummy Variables

Variables	All Immigrants	Asian, African Centr. American	W. Europe
FOR1(1976-79)	0.126	0.242	0.060
FOR2(1971-75)	0.230	0.397	0.148
FOR3(1966-70)	0.248	0.235	0.258
FOR4(1961-65)	0.152	0.079	0.200

The modified model results are presented in Table 24. First, we test if the inclusion of dummy variables for immigration periods improves the explanation of earnings. For this purpose the null hypothesis is stated to be that the addition of dummy variables does not improve the model's fit.

To test the above hypothesis, an F-test was performed. The formula for the test statistics is given below:

$$F = \frac{(\Sigma e_r^2 - \Sigma e^2)/C}{\Sigma e^2/(N-K)} \quad (3.8)$$

where Σe_r^2 is the sum of squared residuals obtained from the restricted model (one without the period of immigration variables) and Σe^2 is the sum of squared residuals obtained from the unrestricted model (one with the period of immigration variables), C is the number of restrictions, N is the number of

Table 24

Results of the Earnings Model for Immigrants

Variables	All Immigrants	Asia, Africa & Central America	W. Europe
LnWks	2.17 (105.83)	2.09 (58.59)	2.17 (75.17)
A	0.066 (4.47)	0.054 (3.09)	0.082 (6.57)
ASQ	-0.0008 (-8.09)	-0.0008 (-3.93)	-0.001 (-7.48)
S1	0.148 (2.07)	0.218 (1.48)	0.132 (1.55)
S2	0.346 (4.51)	0.510 (3.18)	0.277 (3.03)
S3	0.372 (5.64)	0.540 (3.61)	0.331 (4.34)
S4	0.285 (2.43)	0.753 (3.64)	-0.11 (-0.60)
S5	0.520 (7.80)	0.730 (5.31)	0.603 (6.71)
FOR1 (1976-79)	-0.264 (-3.51)	-0.603 (-3.03)	0.062 (0.54)
FOR2 (1971-75)	-0.158 (-2.52)	-0.430 (-2.22)	0.061 (0.72)
FOR3 (1966-70)	-0.054 (-0.90)	-0.228 (-1.16)	-0.003 (-0.04)
FOR4 (1961-65)	0.013 (0.20)	-0.240 (-1.04)	0.047 (0.62)
CONST	-0.160 (-0.73)	0.459 (1.10)	-0.477 (-1.70)

Continued...

Continued Table 24

RSQ	0.81	0.82	0.82
RSQ(adj.)	0.81	0.82	0.82
SSR (reg.)	46099	16079	21903
SSR (res.)	10562	3597	4778
Number	4962	1566	2605
DF (reg.)	12	12	12
DF (res.)	4949	1553	2592

observations, and K is the total number of parameters in the unrestricted model. The F -statistic is distributed as F with C degrees of freedom in the numerator and $(N-K)$ in the denominator.

Results for the F -test are reported in Table 25.¹⁹ It is found that the computed F -statistic is insignificant in all cases. Hence inclusion of the period of immigration variables does not increase the explanatory power of the model in any of the cases considered.

Table 25

F-value to Test the Hypothesis that Inclusion of Period of Immigration Variables does not Improve the Fit of Earnings Model for Immigrants

Statistic	All Immigrants	Asia, Africa & Central America	W. Europe
F (computed)	1.05	0.89	0.06
F (critical)			
0.05, 4, infin.	2.37	2.37	2.37
0.01, 4, infin.	3.32	3.32	3.32

¹⁹The critical F -values have been obtained by considering four degrees of freedom in the numerator and infinity in the denominator. The degrees of freedom in the denominator are 1857 for all immigrants, 992 for Western Europe, and 569 for Asia, Africa and Central America. Since available F Tables provide values up to only 120 degrees of freedom in the denominator and then report for infinite degrees of freedom, the infinite degree of freedom was considered. F -values for denominator degrees of freedom less than infinity are higher.

We now turn to the interpretation of the coefficients of each of the dummy variables for period of immigration. These dummy variables measure the effect of arrival date on earnings vis-à-vis earnings of the 1956-60 immigrant cohort. For recent Asian, African and Central American immigrants the log of earnings are significantly smaller than of those who arrived from the same areas during the 1956-60 period. The log of earnings are found to increase over time and match the earnings of the reference group between ten to fifteen years of arrival. Similar results hold for Asian, African and Central American immigrants.

In the case of European immigrants, it is found that their earnings differential (expressed in log) from the pre-1960 European immigrants is insignificant even in the initial years of arrival.

Turning to the coefficients of original variables in the model, it is found that with the exception of Asian, African and Central American immigrants, these coefficients have not changed significantly with the inclusion of period of immigration variables. For Asian, African and Central American immigrants, the coefficients of the human capital variables (both age and education) have declined in magnitude. The reason for this may be that part of the returns to education for this group are realized only after a long stay in Canada.

Earnings Differential between immigrants and non immigrants

The next step in the analysis of the immigrant assimilation process is to analyse changes in the earnings of immigrants with years since migration to Canada and compare these changes with the changes in earnings of the native-born population of the same age. In particular, we are interested in investigating how the earnings gap between the two groups changes as immigrants stay longer.

The results of the Chow test applied to the basic model had indicated that there is no statistically significant difference between the sets of coefficients of the basic earnings model estimated for immigrants and non-immigrants. Similar results held for the Asian, African and Central American immigrants when their earnings model was compared with that of non-immigrants.

In order to analyse the changes in the earnings gap over time between immigrants and non-immigrants, the data for overall immigrants were pooled with non-immigrant data and a single earnings model was estimated. Immigrants were identified in this model by five dummy variables. These dummy variables identified immigrants by five different periods of entry.²⁰ A similar procedure was adopted to analyse the differential between Asian, African and Central American immigrants and the native born. In the case of European immigrants, however, equations 3.5 and 3.9

²⁰Although a breakdown of post-1970 immigrants is available on a yearly basis from the PUST, immigrants have been grouped by five-year periods to avoid having too few observations in a cell.

were utilised to study the earnings differential.²¹

The dummy variables included in the pooled model are defined below:

FOR1 = 1 if the immigrant arrived between 1976-79.
= 0 otherwise.

FOR2 = 1 if the immigrant arrived between 1971-75.
= 0 otherwise.

FOR3 = 1 if the immigrant arrived between 1966-70.
= 0 otherwise.

FOR4 = 1 if the immigrant arrived between 1961-65.
= 0 otherwise.

FOR5 = 1 if the immigrant arrived between 1956-60.
= 0 otherwise.

✓ The reference group in the above case is of all native-born households. The estimating equation based on pooled data is:

$$\ln Y = \delta_0 + \delta_1 A + \delta_2 ASQ + \delta_3 \ln WKS + \sum_{j=4}^8 \delta_j S_j + \sum_{m=9}^{13} \delta_m FOR_t + \epsilon. \quad (3.9)$$

where 't' assumes a value from 1 to 5.

To study the earnings differential between European immigrants and native born, equations 3.5 and 3.9 were utilised. This is because results of Chow test had indicated statistically significant differences in the earnings structure of these two

²¹Equation 3.5 was used to obtain estimated life-cycle earnings of the native born. Equation 3.9 was used to obtain estimated life-cycle earnings of a European born immigrant.

groups.

The estimated results of equation 3.11 are provided in Table 26. All variables of the basic model are significant in the pooled model. Our interest here is the coefficients for the dummy variables which identify immigrants.

In the case of overall immigrants it is found that while holding constant the number of weeks worked, age, and education variables, immigrants in Canada earn significantly less than non-immigrants during the first five years of arrival (i.e., the FOR1 variable has a negative coefficient and its t-value is large). However the differential narrows over time and becomes insignificant between six to ten years after arrival. After immigrants have stayed in the country for fifteen years, their earnings significantly exceed the earnings of native born.²²

In the case of Asian, African and Central American immigrants, it is found that these immigrants have a significant earnings disadvantage over non-immigrants for the first ten years after arrival (the t-values are significant and also the magnitudes of the coefficients of FOR1 and FOR2 are high in absolute value). The differential becomes insignificant after ten years and is positive for those who have stayed more than twenty years.

²²The t-values of the variables FOR4 and FOR5 are significant at the 0.10 level of significance.

Table 26

Estimated Results of Earnings Model
Using Pooled Data

Variables	All Immigrants versus Native Born	Asian, African & Central American Immigrants versus Native Born
LnWKS	2.15 (131.42)	2.10 (98.03)
A	0.06 (9.15)	0.06 (6.71)
ASQ	-0.0008 (-10.80)	-0.0008 (-8.91)
S1	0.19 (3.24)	0.24 (2.90)
S2	0.35 (5.48)	0.40 (4.41)
S3	0.35 (6.13)	0.38 (4.32)
S4	0.34 (3.41)	0.57 (4.19)
S5	0.59 (9.94)	0.71 (8.18)
FOR1	-0.19 (-2.70)	-0.37 (-4.04)
FOR2	-0.07 (-1.32)	-0.19 (-2.50)
FOR3	0.04 (0.67)	-0.01 (-0.15)
FOR4	0.11 (1.63)	-0.04 (-0.23)

Continued...

Continued Table 26

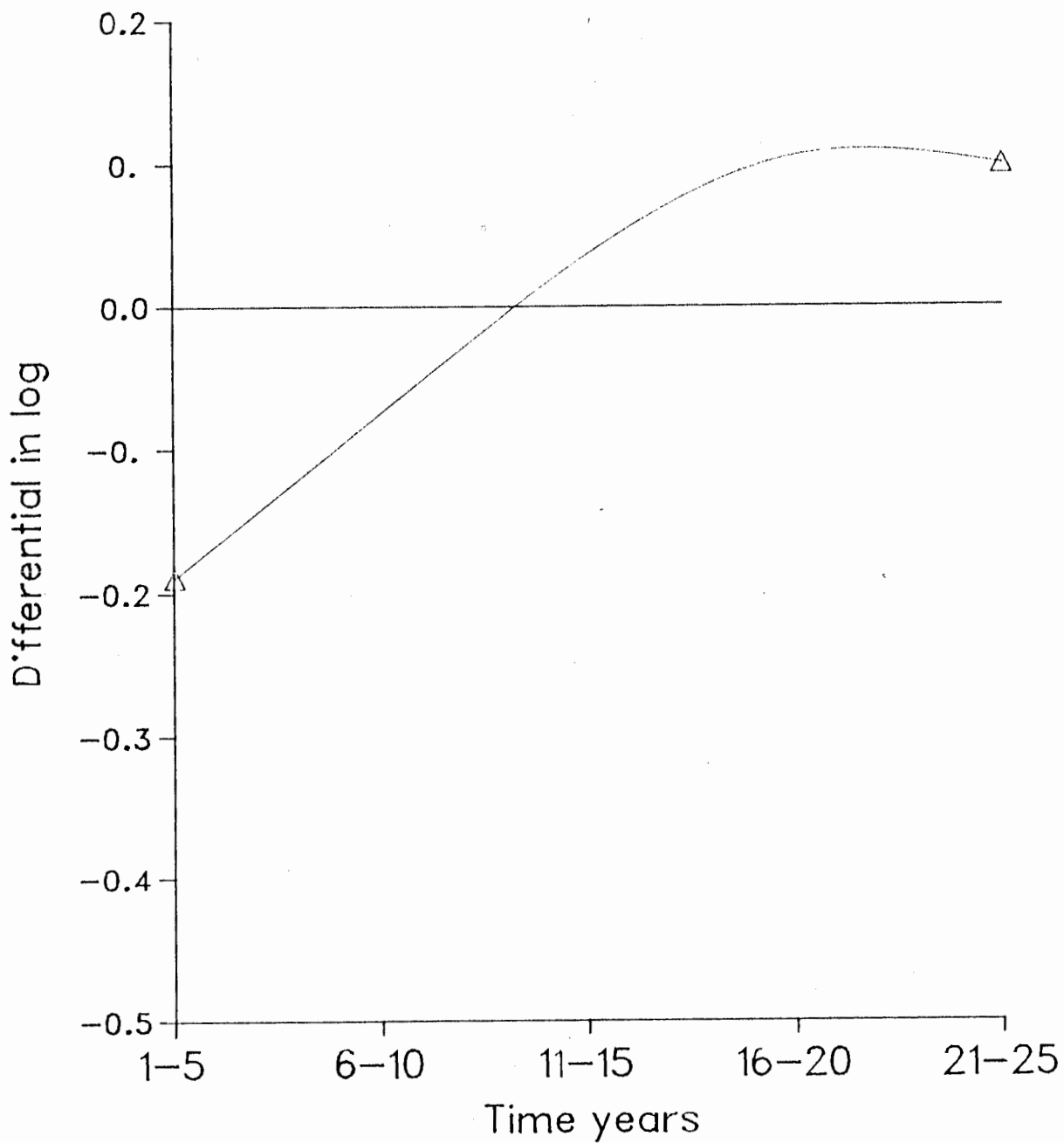
FOR5	0.10 (1.81)	0.19 (0.98)
CONST	-0.16 (-1.05)	0.004 (0.02)
RSQ	0.82	0.82
RSQ (adj.)	0.82	0.82
No. of Obsvns.	7944	4548
SSR (reg.)	88845	57240
SSR(res.)	19720	12744
DF (reg.)	13	13
DF (res.)	7930	4534

The coefficients of the dummy variables of the pooled model have also been plotted in Figures 2 and 3.²³ measure the magnitudes of the differences in log of earnings between native born and overall immigrants, and between native born and Asian, African and Central American immigrants. As revealed in Figure 2, earnings of all immigrants continue to increase with their length of stay. Although the differential is negative during the first six to ten years after arrival, the variance makes this differential insignificant as suggested by the t-value. The differential tends to become zero after fifteen years. In the case of Asian, African and Central American immigrants, Figure 3 shows that the negative differential is higher in the beginning than that for overall immigrants. Over time this differential reduces, eventually becoming in favour of the immigrants. This indicates that these immigrants undergo a significant income adjustment process in Canada.

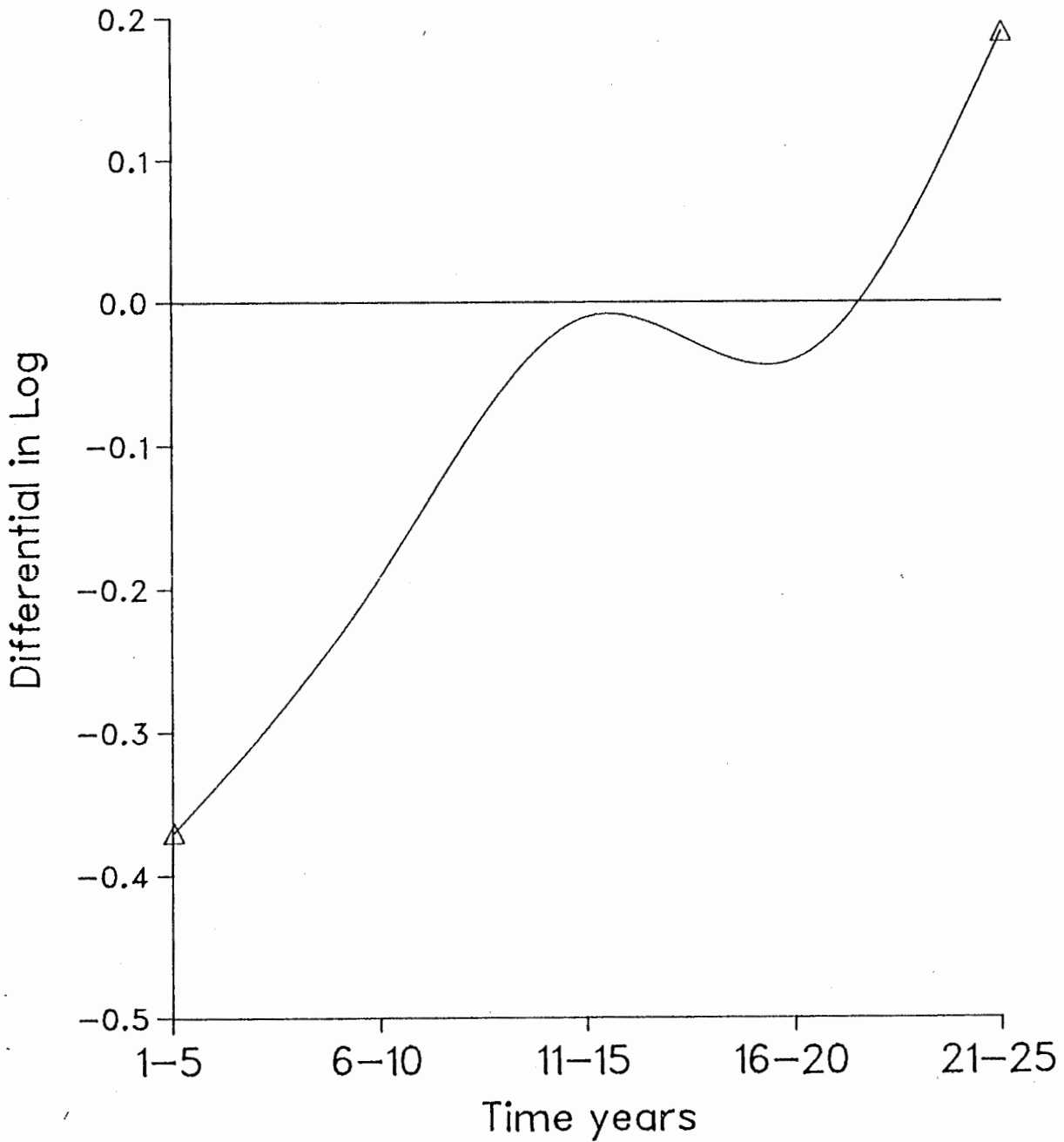
Figure 4 provides earnings differentials between the native born and European immigrants. These differentials have been obtained by using equation 3.5 for the native born and equation 3.9 for the European immigrants. The calculations were performed for the average characteristics of the immigrant group and for a native-born group of similar characteristics. It is found that for all of the 25 years the differential is in favour of the

²³Figures 2 and 3 plot the coefficients of the dummy variable FOR_t , where 't' assumes a value from 1 to 5, obtained by estimating equation 3.9 for the two groups mentioned in the text. The smoothness of the curve is due to the algorithm in the Tellegraf package (available at Simon Fraser University Computing Centre) that was used to obtain the graphs.

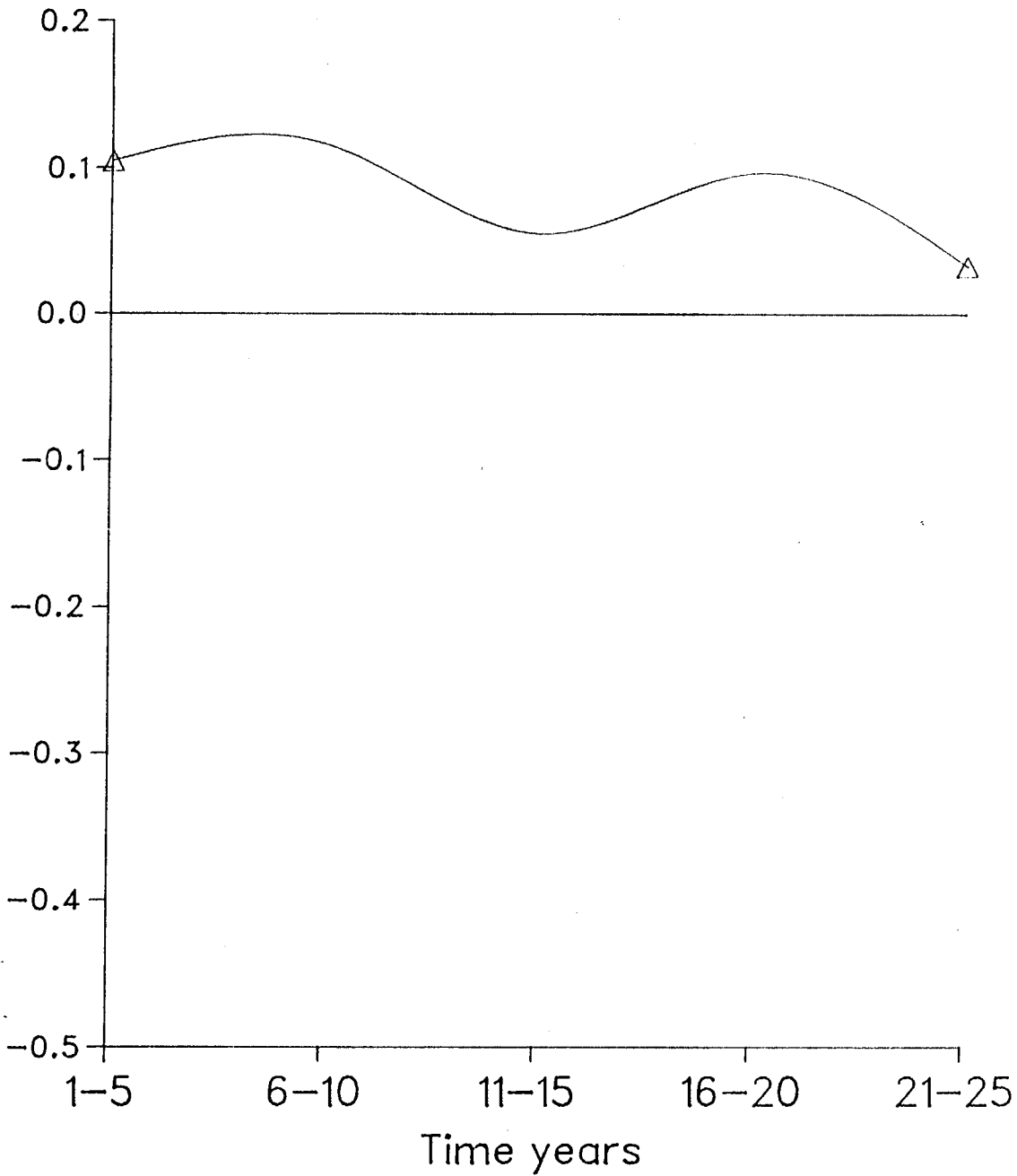
Earnings Differential
Between Immigrants & Native
Born, Canada 1980
Figure 2



Earnings Differential
Between Asian, African and
Central American Immigrants
and Native Born, Canada 1980
Figure 3



Earnings Differential
Between European Immigrants
and Native Born, Canada 1980
Figure 4



European immigrants in Canada. Over time however, the differential tends to narrow.²⁴

The above results are consistent with expectations. While the Asian, African and Central American immigrants do experience an assimilation process, European immigrants do not experience such a process. Being from technologically advanced countries culturally similar to Canada, these immigrants have an advantage over other immigrants.

²⁴It was also found earlier that foreign experience in the case of European immigrants has a positive impact on earnings in Canada while Canadian experience has an insignificant and negative impact. The fact that the earnings differential for these immigrants begins with a high positive value and then narrows over time, may be attributed to this earlier finding.

CHAPTER III

AN EXPANDED EARNINGS MODEL

In the previous chapter we presented and analysed results of the basic life-cycle earnings model. The explanatory variables of the model were justified by the theory of human capital. In addition, except for the number of weeks worked variable (which was included as a proxy for the labour supply), all other variables represented characteristics which can be manipulated by immigration policy in obtaining desired results. However, it may be argued that the estimated model omitted several variables which on a cross section basis lead to systematic earnings differentials between individuals. For example, once they are in Canada, immigrants may prefer one place of location over the other and may chose to be part-time workers (if they prefer leisure over work). In addition, certain demographic characteristics such as marital status and family type also have their impact. All of these variables, as noted by Chiswick (1978) and Blinder (1973), can be sources of systematic earnings differentials between individuals. This chapter will present and analyse an expanded earnings model that incorporates some of the variables that are likely to have their influence on a cross-sectional analysis.

For some purposes, the results of the basic model are relevant, while for others it may be necessary to incorporate the effects of other variables that have their influence on a cross-section analysis. For example, for immigration policy,

what is important is immigrant earnings versus the earnings of native born adjusted for human capital characteristics. The expanded model examines the factors underlying earnings differences, many of which are matters of free choice on the part of individuals, for example, region of residence and part-time versus full-time work. These factors cannot be directly manipulated by selection procedures in the immigrant approval process.

Specification of an Expanded Earnings Model

Earlier studies, (e.g., Chiswick 1978v, Blinder 1973v), have identified several sets of characteristics that may be relevant for our purpose. First, there is a set of human capital characteristics that includes education and experience. Second, there is a set of demographic characteristics that includes gender, marital status, size and composition of family, language and age. Third, there is a set of employment characteristics that includes occupational choice, industry of employment, type of employment (full time or part time) and amount of time spent working. Finally, there is a locational variable.

All of the above variables are important for a cross-sectional analysis of earnings. However, we are limited by data availability. Furthermore, some of these characteristics are likely to be correlated in a cross section (e.g., occupation and industry). Also, when we account for data on all of these variables, the size of individual cells is likely to decrease so

that the estimated results may no longer be reliable.

To overcome the above problems, one has to make a careful choice among variables so that most of the systematic variations in the dependent variable are captured. A specification of the expanded earnings model is provided in the following sections. Later we will attempt to justify why some of the variables included here are preferred over others.

The equation of the expanded earnings model is provided below:

$$\text{LnY} = \delta_0 + \delta_1 A + \delta_2 \text{ASQ} + \delta_3 \text{LnWKS} + \sum_{j=4}^8 \delta_j S_1 + \delta_9 \text{GENDER} + \sum_{j=10}^{11} \delta_j \text{FAM}_n + \sum_{j=12}^{17} \delta_j \text{PROV}_p + \sum_{j=18}^{19} \delta_j \text{NATWORK}_k + \epsilon. \quad (3.10)$$

where, as before, the subscript 'l' assumes a value from 1 to 5. The subscript 'n' assumes values 1 and 2, the subscript 'p' assumes a value from 1 to 6, and the subscript 'k' assumes values 1 and 2. The variables Y, LnWKS and S_1 have been defined earlier. The definitions of other variables are provided below.

Variables Incorporating Personal Characteristics

FAM1 = 1 if the person belongs to a family without children.
= 0 otherwise.

Fam2 = 1 if the person belongs to a family with children.
= 0 otherwise.

GENDER = 1 if the person is male.
= 0 otherwise.

Locational Variables

PROV1 = 1 if province of residence is Quebec.

= 0 otherwise.

PROV2 = 1 if province of residence is Ontario.

= 0 otherwise.

PROV3 = 1 if province of residence is Manitoba.

= 0 otherwise.

PROV4 = 1 if province of residence is Saskatchewan.

= 0 otherwise.

PROV5 = 1 if province of residence is Alberta.

= 0 otherwise.

PROV6 = 1 if province of residence is British Columbia.

= 0 otherwise.

Nature of Employment Variables

Variables to incorporate the nature of employment¹ have been included in the model as below:

NATWORK1 = 1 if the person is full-time worker.

= 0 otherwise.

NATWORK2 = 1 if the person is part-time worker.

= 0 otherwise.

The reference group subsumed in the constant term in each case is the non-family individual, female person (female

¹The nature of employment refers to whether the individual is employed as a full-time worker or a part time worker.

non-family person and female lone parent), unpaid family worker, who did not work in 1980 and is a resident of Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island, Yukon, or the Northwest Territories.

We have already justified the inclusion of the education, age and weeks worked variables. Mean values for the additional variables of the expanded earnings model are provided in Table 27.

The province of residence in Canada may be partly responsible for variations in the earnings of individuals with the same level of education, age, and number of weeks worked. This is because employment opportunities and the level of earnings are partly determined by the economic conditions prevailing in the region of residence. Economic conditions in Canada differ markedly across provinces. For example, in the year 1980, around 85 percent of the total Canadian Gross Domestic Product (GDP) was earned in four Canadian provinces.² Furthermore, because of economic concentration, these provinces provide home to around 80 percent of the Canadian population. As a consequence, if the distribution of immigrant population by provinces differed from that of the native born, one would expect a systematic earnings differential to occur. Table 27 illustrates the distribution of immigrants and native born by six Canadian provinces (in addition to other characteristics

²These were Alberta, British Columbia, Ontario and Quebec. From these, Quebec and Ontario generated 60 percent of the GDP.

Table 27

Averages of Additional Variables of
Expanded Earnings Model

Variable	Native Born	<u>Immigrants</u>		
		All	Asia, Africa, Cent. America	West Europe
GENDER	0.735	0.811	0.755	0.845
NATWORK1	0.703	0.824	0.785	0.852
NATWORK2	0.069	0.049	0.063	0.038
PROV1 (Que.)	0.297	0.156	0.185	0.150
PROV2 (Ont.)	0.313	0.547	0.507	0.587
PROV3 (Man.)	0.044	0.029	0.034	0.021
PROV4 (Sask.)	0.051	0.011	0.011	0.010
PROV5 (Alta.)	0.101	0.083	0.093	0.071
PROV6 (B.C.)	0.097	0.159	0.160	0.146
FAM1	0.206	0.161	0.119	0.167
FAM2	0.442	0.574	0.553	0.615

Source: PUST (subsample)

that will be discussed later). It is seen that both population groups tend to be concentrated in Quebec, Ontario, Alberta and British Columbia. However the degree of concentration is greater for immigrants. Around 94.5 percent reside in these provinces while the corresponding percentage for the native born is only 79.9. Among immigrants, the distribution of population by provinces seems similar with 96 percent of European immigrants and 94 percent of Asian, African and Central American immigrants residing in Quebec, Ontario, Alberta and British Columbia.

One may therefore attribute a part of the excess earnings of immigrants over the native born to their locational advantage. Hence it was deemed necessary to control for the province of residence in the expanded model.

Dummy variables for six Canadian provinces were defined earlier. The public use sample provides information on the province of residence of an individual. The information is available for all ten Canadian provinces. For the purpose of this study, we have defined six dummy variables for the provinces. The remaining four provinces and two territories have been considered as the reference group. These areas were combined since they individually represent a very small proportion of the total population. Especially for the case of immigrants, the proportion was very small³ in each province. One

³While the distribution of immigrants and native born by province has been provided in Table 27 (along with other characteristics), the following table provides the proportionate distribution of the two population groups over the reference

is likely to get imprecise estimates if each of these provinces are included as separate variables in the model.

Differences in earnings by gender classifications is well documented in literature. For example, Malkiel and Malkiel (1973) provided evidence on the male-female earnings differential in the case of the U.S. In the Canadian case, such evidence has been provided by Holmes (1976), Kuch and Haessel (1979) and more recently by P. Miller (1987). As suggested by these authors, one of the reasons for the differences in earnings by gender could be due to productivity differences, and another reason may be discrimination in the labour market on the basis of gender. As can be seen from Table 27, 81.4 percent of all immigrants in the sample are males, while this percentage for the native born is only 73.2. In addition, a greater proportion of European immigrants are females vis-â-vis Asian, African and Central American immigrants.⁴ One may partly attribute the lower earnings of the native born in Canada to their differential gender composition. Hence a dummy variable for the gender of the individual is included in the expanded

³(cont'd) group.

Province	Proportion Residing	
	Native Borns	Immigrants
=====	=====	=====
Newfoundland	.029	.002
Nova Scotia	.036	.006
New brunswick	.035	.002
PEI, Yukon, N.W. Territories		

Source: PUST (subsample).

⁴It was mentioned in Chapter 2 that a greater proportion of recent immigrant arrivals are females.

model. This variable takes a value 1 if the individual is male and 0 otherwise.

Chiswick (1978) has argued that married men tend to have higher labour force participation rates, invest more in human capital and have better health than men who are not married. Therefore, given the same age, education and place of residence, married men would have higher earnings. It has also been documented in the literature that family heads with children are likely to have greater labour force participation rates and earn more than those without children. Thus, in this study, husbands in families with children, and lone parents (both male and female) are expected to have earnings different from others. To account for this, two dummy variables have been introduced. One variable accounts for an individual who is a family person without children.⁵ Another variable accounts for an individual who is a family person with children.⁶ Thus, the reference group in this case will include non-family persons. Table 27 suggested that the proportion of immigrant family heads with children is greater than in the non-immigrant group. Also, a large proportion of European immigrants are family members.⁷

Finally, we controlled for the effects of full-time and part-time employment on earnings. Full-time work is defined as

⁵In the present sample, these will be husbands in families without children.

⁶Such individuals will be husbands and lone parents.

⁷The average for both FAM1 and FAM2 is higher for this group.

"work for the full-work week for the most normal work hours."⁸

No complete specific definition was given for full-time weeks worked since standard full-time hours per week differ across occupations and industries. For this reason full-time data do not refer to any specific number of hours per week. Division of work by part-time and full-time may reflect tastes for work for lower and higher pay.⁹ As can be seen from Table 27 most immigrants and native-born persons tend to be full-time workers. However, an immigrant is more likely to be a full-time worker than a native-born person. It is observed that among immigrants the proportion of full-time workers differs significantly across individuals from various regions. Immigrants from Europe are more likely to be full-time workers than those from Asia, Africa and Central America.

It can be argued that significant differences may exist in the earnings structure across industries and occupations. This is because some industries may have a comparative advantage over others. Furthermore, some of them may be unionized. Differences in earnings across occupations have been a source of debate among human capital theorists. Blau (1976) suggests that human capital theory has still been unable to answer the question of why specific human capital exists.

⁸Statistics Canada (1982).

⁹For example, an individual who works part time may be willing to accept lower pay for the convenience of having a part-time job.

In order to account for earnings differentials across occupations and industries, the earnings models were estimated for native born and immigrant groups by adding dummy variables for nine one-digit industries and fifteen one-digit occupations.¹⁰ The adjusted R square of the regression declined by one percent indicating the existence of strong multicollinearity.¹¹ Essentially this means that by adding dummy variables for occupations and industries with the above mentioned variables, an insignificant amount of further information was captured in the model. Hence it was decided to drop the occupational and industry variables.

In addition to the variables for occupation and industry one may also want to control for variables such as union membership

¹⁰The PUST provides information on ten one-digit industries and sixteen one-digit occupations.

¹¹The possible reasons for multicollinearity may be given as follows. First, by looking at the occupation and industrial classifications provided by Statistics Canada, it seems that most occupations can be identified with industries. For example, construction workers will most likely be employed in the construction industry, transport equipment operators will be employed in the transport industry, etc. Thus while analysing microdata one may find strong correlations between occupation and industry variables. Second, it may be argued that it is unnecessary to control for occupation if education variables are already included in the model. This is because education is most likely to determine a person's occupation. Thirdly, following Chiswick (1978), part of the process of change associated with time in Canada is the occupational mobility of the foreign born. It may be expected that recent immigrants experience more changes in occupations and industries than native born in the same age group. Fourth, it may also be noted that various provinces in Canada have a strong concentration of industries in relation to others. For example, the industrial base in Ontario and Quebec is more oriented toward manufacturing. In British Columbia it is more oriented toward natural resources. Thus, by including a variable for location by province we may have also proxied industrial effects on employment and earnings.

status, and health status. However these variables are not available from the public use sample.¹²

Estimation of expanded earnings model

Table 28 provides coefficient estimates of the expanded earnings models estimated for all groups in Canada. At first an F-test will be performed to test if the set of additional regressors in the earnings model improves the fit.¹³ The computed F-values are provided in Table 29. In all cases it is found that the computed F-value exceeds the critical value. Thus, the null hypothesis that the additional regressors do not improve the fit of the earnings model cannot be accepted in any of the above cases. Hence the cross sectional characteristics of our data as incorporated in the additional variables do account for variations in the log of earnings.

¹²One cannot deny the relationship between an individual's health and his labour force participation. Any health impairment that limits an individual's ability to work would adversely affect his earnings. S. Bowles (1970) has stated that to the extent that migration is correlated with other variables such as schooling, its effect may in part be captured by the schooling variable. Furthermore the immigrant selection procedure in Canada is such that an individual has to pass a medical examination before acceptance. Thus it is expected that immigrants in general will not have any notable health impairments. However, one cannot generalize for the case of native born as no relevant information is available.

Furthermore, it is expected that earnings of workers in the unionized sector will be greater than those in the nonunionized sector. Without any information on the extent of unionization within each group, no estimate can be made of the effect of unionization.

¹³The formula for the F-test has been provided in the previous chapter.

Table 28

Regression Results of Expanded Earnings Model

Variable	Native Born	<u>Immigrants</u>		
		All	Asia, Africa & Cent. Amer.	West Europe
LWKS	0.978 (13.08)	1.134 (20.92)	1.030 (10.11)	1.171 (15.93)
A	0.054 (4.63)	0.045 (4.77)	0.052 (2.91)	0.052 (4.10)
ASQ	-0.0006 (-5.06)	-0.0005 (-5.02)	-0.0006 (-3.16)	-0.0006 (-4.47)
S1	0.335 (3.50)	0.143 (2.09)	0.134 (0.94)	0.177 (2.15)
S2	0.411 (3.89)	0.358 (4.90)	0.420 (2.69)	0.331 (3.78)
S3	0.413 (3.99)	0.367 (5.79)	0.462 (3.22)	0.377 (5.04)
S4	0.562 (3.29)	0.232 (2.06)	0.609 (3.06)	-0.092 (-0.53)
S5	0.900 (8.00)	0.520 (8.09)	0.610 (4.61)	0.677 (7.73)
GENDER	0.536 (6.41)	0.353 (5.76)	0.287 (2.70)	0.449 (5.22)
NATWORK1	4.53 (15.69)	4.31 (19.91)	4.43 (10.94)	4.11 (13.90)
NATWORK2	3.39 (12.02)	3.51 (16.56)	3.50 (8.96)	3.39 (11.56)
PROV1	-0.006 (-0.051)	-0.075 (-0.46)	0.241 (0.64)	-0.080 (-0.37)

Continued...

Continued Table 28

PROV2	-0.076 (-0.67)	0.04 (0.25)	0.39 (1.06)	0.019 (0.09)
PROV3	-0.050 (-0.28)	-0.229 (-1.18)	0.271 (0.65)	-0.290 (-1.08)
PROV4	-0.153 (-0.92)	0.118 (0.48)	0.602 (1.18)	0.005 (0.02)
PROV5	0.063 (0.46)	0.148 (0.87)	0.520 (1.35)	0.024 (0.10)
PROV6	0.175 (1.26)	0.021 (0.13)	0.339 (0.89)	-0.014 (-0.06)
FAM1	-0.19 (-1.98)	0.16 (2.34)	0.11 (0.78)	0.084 (0.91)
FAM2	0.047 (0.59)	0.168 (3.01)	0.098 (0.98)	0.089 (1.16)
CONSTANT	-0.685 (-2.59)	-0.745 (-3.02)	-1.029 (-1.98)	-0.714 (-2.17)
RSQ	0.836	0.831	0.833	0.837
RSQ(adj.)	0.834	0.830	0.831	0.836
Number of Observations	2982	4962	1566	2605
SSR (reg.)	41582.7	47096.1	16383.3	22342.8
SSR (res.)	8179.4	9565.4	3292.4	4337.4

Table 29

F-test for Set of Additional Regressors

Group	F-value	Critical Value
Non-Immigrants	6.29	1.835(approx.)
All Immigrants	10.10	1.835(##)
Asian, African & Central American	2.99	1.835(##)
Europeans	4.75	1.835(##)

Next, we employ the Chow test to assess if the sets of coefficients differ significantly across the groups considered. The Chow test results are provided in Table 30.

The computed F-value from the Chow test indicates that there is a statistically significant difference in the sets of coefficients for immigrants versus non-immigrants. Hence, when demographic, locational and employment variables are controlled for, there exists evidence for statistically significant differences in the earnings structure of the two groups. However, evidence for statistically significant differences in the earnings structure of any of the two immigrant subgroups and the non-immigrants is weak, while the earnings structure of the two immigrant groups does differ significantly one from the other.

Table 30
Chow Test on the Expanded Model

Group	F-value	Critical F	
		0.01 lev.	0.05 lev.
All Immigrants/Non-Immigrants	2.53	1.88	1.57
Asian, African & Cent. American/Non-Immigrants	1.48	1.88	1.57
European Immigrants/ Non-Immigrants	1.74	1.88	1.57
Asian, African & Cent. American/European	1.89	1.88	1.57

We will now analyse the coefficients of individual variables. For this, we turn to Table 28.

First, it can be seen that, as before, the coefficient of the elasticity of earnings with respect to the number of weeks worked remains statistically significant for all cases in the expanded model. The coefficient has declined in all cases since part of the impact of the number of weeks worked is realised through the choice of full-time or part-time work. The magnitude of this coefficient is smallest for non-immigrants. This indicates greater firm specificity of human capital embodied in the immigrant stock. Given that locational distribution may also

account for the immigrants' industrial distribution, it may be possible that immigrants in Canada are distributed in the country according to the firm specificity of human capital.

When the t-test was performed, it was found that there was not enough evidence to suggest that annual and weekly earnings structures differ in the case of non-immigrants. A similar result holds for Asian, African and Central American immigrants. Differences in the annual and weekly wage structure were found to hold in the case of overall immigrants and for those from Europe.¹⁴

The age variable is also statistically significant in all cases and assumes correct signs in its linear as well as in its quadratic forms.

The marginal impact of age on the log of earnings is given in Table 31.

First of all, it is observed that the second order derivatives do not vary significantly across groups in the expanded model.

Second, it is found by observing the first order derivatives, that when overall immigrants are compared with non-immigrants, among individuals with the same age the non-immigrant households will experience slightly more of an

¹⁴The computed t-values to test the hypothesis that the elasticity coefficient is unity are found to be -0.29, 2.47, 0.29 and 2.33 for non-immigrants, all immigrants, Asian, African & Central American and European immigrants respectively.

Table 31

Marginal Impact of Age on Log of Earnings
in the expanded Model

Group	$\frac{\partial \text{LnY}}{\partial A}$	$\frac{\partial^2 \text{LnY}}{\partial A^2}$
Non-Immigrants	0.054-.0012A	-0.0012
Immigrants	0.045-.0010A	-0.0010
Asian, African & Central American immigrants.	0.052-.0012A	-0.0012
European Immigrants	0.052-.0012A	-0.0012

increase (5.4 percent as opposed to 4.5 percent for immigrants) in their incomes as they get older. This result is opposite to what was found in the basic model. The rate of growth is the same for Asian, African and Central Americans when compared with those from West Europe.

Given the age coefficients, we can compute the maximum earnings point in the life cycle.¹⁵ The results are reported in Table 32.

It is found that both immigrants and native-born individuals reach their peak level of income approximately at the same time given other characteristics. Also, among the immigrant subgroups, the peak income level is reached at the same time. In

¹⁵The calculation is performed by setting the first order partial derivatives to zero and then solving the expression for age.

Table 32
Age at Maximum Earnings

Group	Age
Non-Immigrants	45
Immigrants	45
Asian, African & Central Americans	43
Europeans	43

addition, since the average age of individuals in any group (Table 28) is lower than the peak earnings point, an average person belonging to either group is on the rising portion of his or her earnings profile.

Finally, the age coefficients also indicate that the overall experience factor for immigrant subgroups is rewarded similarly. However overall, immigrants are rewarded a little less.

The education variables remain significant for non-immigrants as before. All of these coefficients have risen in magnitude.

In the case of overall immigrants, the coefficient declined substantially for those who did not complete university. The other educational variable coefficients have the same magnitudes as before. Furthermore, the statistical significance of these

variables has not changed.

In the case of European immigrants the statistical significance and signs of the education variables remain the same as in the basic earnings model. The magnitudes of these coefficients have, however, increased as opposed to the case for immigrants from Asia, Africa and Central America who experienced a decline in these coefficients in the expanded model. However, as before, the education variable coefficients are the highest for Asian, African and Central American immigrants indicating the highest impact on the log of earnings.

The t-value of the gender variable coefficient indicates that for the non-immigrant group, earnings of men significantly exceed the earnings of women. The differential is found to be 56.6 percent in favour of men.¹⁶ For immigrants, however, the t-value indicates limited evidence for a significant gender earnings differential.¹⁷ The differential is only 17 percent in favour of men.

Coefficients of both full-time and part-time workers are found statistically significant as expected. Among immigrants,

¹⁶Miller (1987) has analysed the male-female earnings differential for the native-born Canadians. His analysis is also based on the 1981 Census utilising the public use sample household /family file. His results indicate that on average the female rate of pay is 70 percent of the male rate of pay. However, when other variables (education, experience, number of children, etc.) are held constant, the average female wage is only around one-half of that received by males. The findings of the present study do not contradict Miller's result.

¹⁷The t-value is significant only at the 0.1 level.

these coefficients are the highest for immigrants from Asia, Africa and Central America.

The coefficients of the province variables are surprising. For non-immigrants, all province dummy variables have statistically insignificant coefficients indicating no significant difference in the earnings of the residents of these provinces when compared with the excluded category.¹⁸ The most surprising result is that all of these coefficients have negative signs. Similarly, for immigrants all province variable coefficients are found to be statistically insignificant.

Within the subgroups of immigrants it is found that, with the exception of Manitoba, all other provinces have a significant positive impact on Asian, African and Central American immigrant earnings. For European immigrants, no significant impact of the province of residence is found.

Both family variables are insignificant for the non-immigrant population. Thus the earnings of a family person do not differ from the non-family person in the case of the native-born population. However, the magnitudes indicate that the earnings of those without children are probably less than the non-family person. The coefficients of these variables are, however, positive and significant for the all-immigrants case and also for Asian, African and Central American immigrants.

¹⁸ The excluded category, as mentioned earlier, includes residents of Newfoundland, New Brunswick, Nova Scotia, the Northwestern Territories and Yukon, and Prince Edward Island.

PART D
SUMMARY AND CONCLUSIONS

This thesis analysed some economic impacts of the post-1955 immigrant population on the native-born residents in Canada. The life-cycle model was used to measure the impact of post-1955 immigrant flows on the Canadian public treasury. An investigation into immigrant assimilation in Canada was also conducted. In addition, the effects of various policy-prone characteristics such as education, labour market experience, gender and ethnicity were also analysed to rationalise their impact on economic performance.

A balance sheet of public fund transfers between immigrants and the native-born population was estimated. The components in this balance sheet included both the consumption of major tax financed public services and the tax contributions of the native born and various entry cohorts of immigrants. Two major tax categories, income and consumption taxes, were considered. In addition, financing of some public goods was taken into account.

Cost estimates indicated that a typical immigrant household consumes less Canadian public services than does the average native-born household. Data for receipt of government transfer payments were obtained directly from census microdata and indicated that all entry cohorts of immigrants consume significantly less government transfer payments than the native-born population. Also, the percentage of immigrant entry cohorts receiving such payments is lower than that of non-immigrants.

The monetary value of the consumption of educational services by immigrants and the native-born population in Canada was obtained by considering the number of children living at home in each census family. It was found that the use of educational services by an immigrant family tends to match the native family consumption sooner after immigration than any other public service. Although no consistent pattern in the consumption of educational services is found, it appears that immigrants consume more educational services than the native born after the third year of arrival in Canada.

Health care costs were estimated for each family and non-family person included in the one percent sample of microdata. Per capita health care costs by age and gender are available from published sources. These were used to estimate health care costs by accounting for the age and gender of each non-family person and for family heads and their spouses. Also, the age of children in each family was considered. It was found that the consumption of health care services by immigrants rises with their length of stay in the country. The average consumption of health care services by immigrants equal that of the native born 15 to 20 years after their arrival date.

The contribution side of the estimated balance sheet included income and consumption tax payments and also the financing of some public goods. The average tax contribution of immigrants is found to exceed that of natives 15 years after their arrival.

The overall balance sheet indicates that even if immigrants' contribution toward financing of public goods is ignored, the net balance of taxes paid and services received by them had a positive net impact on the native-born population in every year after their arrival. Thus, the evidence seems to support the implications of the life-cycle theory.

To analyse the impact of policy-prone characteristics such as education, labour market experience, etc., immigrant earnings profiles were estimated and compared to the profiles of non-immigrant household heads. Human capital theory was used to construct the earnings model. Regression analysis was employed to estimate this model.

Statistical tests performed on the basic earnings models indicated that there is no significant difference in the earnings profiles of immigrants in general and the native-born population. However, when certain cross-sectional variables were controlled for, some evidence existed for statistically significant differences in earnings structures between the two population groups.

Differences in earnings profiles were also found to exist across the groups of European immigrants and immigrants from Asia, Africa and Central America. Some evidence of statistically significant differences between the earnings of European immigrants and the earnings of native born was also found. However, the earnings structure of Asian, African and Central

American immigrants was not found to differ significantly from the earnings structure of native-born.

The differences in earnings may be largely attributed to differential returns on human capital, locational choice, and family structure. Educational variables have the highest return for immigrants from Asia, Africa and Central America except at the lowest and highest educational levels. For all immigrants, returns are higher only at the postsecondary non-university level.

The earnings differentials between men and women were found to be insignificant for all immigrants and their subgroups, while significant differences exist between the earnings of men and women for non-immigrants. In addition, immigrant earnings peak almost at the same time in their life cycle as non-immigrant earnings.

No direct information on the labour market experience of individuals is available from the microdata. Hence, age of individuals was used as a proxy for labour market experience in the earnings model. Immigrants were found to have similar returns to their post-schooling labour market experience as non-immigrants.

The study also analysed the marginal impact of immigrant labour market experience both prior to and after immigration. For this purpose, age at immigration was considered as proxy for experience acquired prior to immigration and the length of stay

in Canada was considered as proxy for experience acquired in Canada. It was observed that in the case of European immigrants, for whom the impact of education was found to be lower, the impact of labour market experience acquired in their home country was greater when compared with the Asian, African and Central American immigrants. However, the marginal impact of experience acquired in Canada was higher for the latter group.

The question of immigrant assimilation in Canada was approached by controlling for period of immigration in the immigrant earnings model. The earnings of European immigrants never differ significantly from the native-born cohort. However, the earnings of Asian, African and Central American immigrants tend to equalise with the non-immigrants only after 15 years of arrival. Hence these immigrants take a longer time to assimilate in Canada.

The results of the earnings model may be utilised to evaluate one more important policy related point. This is: How likely are immigrants to become dependent on the social transfer system after their arrival? As discussed in earlier chapters, immigrants arrive young and as they age they become more dependent on the social transfer system. As a consequence, the results of Part B may not hold in the long run. To analyse this issue, one may use the earnings model to obtain the present value of the life-cycle earnings of immigrants and non-immigrants. To analyse this issue, calculations of the present values of lifetime earnings of overall immigrants,

European immigrants and of non-immigrants were performed.¹⁹ The results have been provided in Table 33.

Table 33

Present Value of Life Cycle Earnings - Immigrants,
Non-Immigrants, Canada, 1980

Group	Discounted Earnings ¹	Ratio of Discounted Immigrant Earnings to Non-Immigrant Earnings
Non-Immigrants	\$35,050	--
Immigrants	71,984	2.05
Europeans	45,417	1.30

¹Based on the Expanded Earnings Model and a 2 percent real discount rate. It may be noted that since the dependent variable is logarithmic, the reported values are geometric means. The values seem low due to the inclusion of non-working individuals for whom earnings of \$1 was assumed.

These results have been obtained by discounting expected income streams over 25 years for individuals aged 28 years.²⁰ The results of Table 33 indicate that the present value of earnings for all immigrants and also for those from Europe is larger than that of non-immigrants.

¹⁹The Chow test applied on the expanded model indicated no significant differences between the earnings of non-immigrants and immigrants from Asia, Africa and Central America.

²⁰As mentioned in earlier chapters the average age of an immigrant at the time of arrival was approximately 28 years.

The above findings are manifestations of the differential characteristics of immigrants vis-à-vis the native-born group. Hence, it may be concluded that in general, immigrants in Canada are likely to earn more than the native-born. Similarly, the European immigrants also earn more than the native born. Furthermore, the results of Chow test applied on the expanded earnings model had indicated no significant difference in the the earnings structure of Asian, African and Central American immigrants when compared with the native born. One would thus expect that the current stock of immigrants in Canada is unlikely to receive net transfers in future from non-immigrants.

In sum, even given the wide post-1955 swings in immigration policy, Canada has been successful in choosing the appropriate characteristics of immigrant population.

As any other study, this study has its limitations. The main limitation is the use of cross-section data. Lack of consistent time series data on immigrant earnings and their demographic composition prohibits a time series analysis. Perhaps the same analysis could be performed by using data from the 1971 Census and then comparing the performance of a particular cohort in 1970 and in 1980. However, the 1981 Census data did permit a comparison of recent immigrants with those who have lived longer - up to 25 years - in the country.

In addition to the above, absence of direct information on the work history of individuals and educational attainment of

immigrants before and after immigration also limits the scope of the study. However, given that an average immigrant at the time of arrival was old enough to have acquired most of his education abroad, the results of education variable impact on immigrant earnings could still be interpreted as the impact of education acquired abroad.

None of the above limitations, however, are likely to alter the results of present study significantly.

APPENDIX 1

Table A1.1

Ten Leading Countries of Birth of Immigrants
for Each Period of Immigration, Canada, 1981

Before 1961

Country of Birth	Number	% of total
United Kingdom	524,900	29.8
Italy	214,700	12.2
United States	136,900	7.8
Poland	118,000	6.7
U.S.S.R.	112,600	6.4
Netherlands	112,400	6.4
Federal Republic of Germany	107,200	6.1
Yugoslavia	39,100	2.2
German Democratic Republic	28,400	1.6
Austria	28,300	1.6
Percentage of above in total immigrants arriving before 1961		80.8

1961-1970

Country of Birth	Number	% of total
United Kingdom	195,300	21.1
Italy	141,000	15.2
United States	67,000	7.2
Portugal	57,300	6.2
Greece	40,700	4.4
Yugoslavia	33,200	3.6
Federal Republic of Germany	31,400	3.4
India	28,200	3.0
Jamaica	23,600	2.5
France	19,100	2.1
Percentage of above in total immigrants arriving during 1961-1971 period		68.7

Continued...

Continued Table A1.1

1971-1981

Country of Birth	Number	% of total
United Kingdom	158,800	13.8
United States	97,600	8.5
India	75,100	6.5
Portugal	66,400	5.8
Philipines	55,300	4.8
Jamaica	49,900	4.3
Social Republic of Vietnam	49,400	4.3
Hong Kong	42,200	3.7
Italy	29,100	2.5
Guyana	27,500	2.4
Percentage of above in total immigrants arriving during 1971-1981 period		56.6

Source: Statistics Canada (1984).

APPENDIX 2

Calculations of Average Education Cost (per student)

Most of the governmental grants at the elementary and secondary levels are consumed by the school boards (around 83% in 1980). The following table provides the total cost component with the relevant amounts for the public schools.

Table A2.1

	1979-80 (\$'000)	1980-81 (\$'000)
A. TOTAL PUBLIC EXPENSES		
School Boards	11,175,876	12,359,541
Transfer to Private Schools	-13,221	-16,197
Departmental Expenses	1,470,506	1,709,730
Special Education	105,036	117,132
Departmental Administration	127,414	129,210
Total	12,865,611	14,299,416
B. FINANCING BY FEDERAL AND PROVINCIAL GOVTS.		
Federal Government	291,399	374,656
Provincial Governments	8,927,245	10,192,935
Total	9,218,644	10,567,591

Source: Statistics Canada (1979-80a).

Explanation

1. All of the above expenditures and financing exclude "overseas and undistributed" items.
2. Departmental Expenses include services to school boards, contributions to teachers' pension funds, Department of National Defence, Canada, and other. Again, these expenditures exclude "overseas and undistributed" item.
3. The items under "Special Education" include: handicapped outside public schools, government correspondence schools, reform schools, and academic training in federal penitentiaries.
4. The "Total Public Expenses" exclude expenditures for federal schools, which include expenditures overseas and

- expenditures on native Indians and Eskimos.
5. The balance of financing is provided by municipal governments, fees and other services.

Computation of per student costs

To compute the cost per student during 1980, we should also account for depreciation of capital outlay. Except for school board expenditures, all of the expenditure items given earlier are considered as operating expenses. Details of these expenditures are provided in Statistics Canada (1979-80a). The per student cost is estimated as under:

Table A2.2

SCHOOL BOARD EXPENDITURES (1980)

Operating	\$11,357,297	
Depreciation Expenses	100,224	11,457,521
Other Expenses (Average of 2 years)		<u>1,829,514</u>
Total		<u>13,287,035</u>

ENROLLMENT IN PUBLIC SCHOOLS

Average for 2 years at Elementary, Secondary Level in age group 6-18 years	4,517,325
--	-----------

Assumptions relating to the above

1. Depreciation expenses computed as 10 percent of annual capital outlay.
2. Percentage of total public expenditure on elementary and secondary education financed by federal and provincial governments is the same as the financing of total public expenditures on schools by the two government levels. It should be noted that total governmental finance also includes a small amount provided to private schools (around 1.2% of total public and private school expenses in 1980-81). A breakdown of this expenditure by government levels and by type of expenses is not available. Thus these expenses are not included in computations.

Table A2.3

Average Cost Per Student

Expenses	\$13,287,035
Financed by federal and provincial govts. (72.4%)	9,677,899
Enrollment	4,517,325
Average Cost	<u>\$2,145</u>

APPENDIX 3

Table A3.1

Calculations of Health Care Costs

	1974 <u>\$('000')</u>	1980 <u>\$('000')</u>
<u>Professional Earnings of Physicians (A)</u>	1,043,690	1,672,448
<u>Hospital Expenses Operating Expenses</u>	3,871,000	7,685,062
Proportion of Income from Patient Services in Total Revenue	0.945	0.939
Operating Expenses Financed by Patient Services (B)	3,658,095	7,216,273
Total Health Care Costs (A+B)	4,701,785	8,888,721
Population ('000')	22,161	24,061
Per Capita Health Care Costs (\$) (C)	212.20	369.43
Proportion Financed by Governments (D)	0.70	0.74
<u>Per Capita Public Health Expenditure(CxD)</u>	<u>148</u>	<u>273</u>

Calculations and Data Sources

Professional Earnings of Physicians

For the year 1974 data on physician's professional earnings were obtained from Boulet & Grenier (1978) Table 1.5 page 30. For the year 1980 these have been obtained from *Taxation Statistics* 1982.

Hospital Expenses

The operating expenses are for the Public General and Allied Hospitals in Canada. These data for the year 1974 have been obtained from Statistics Canada (1974). For the year 1980, they are from Statistics Canada (1979-80b).

The proportion of income from patient services in operating revenue was computed as a ratio of operating income resulting from patient services to total operating income. These data were also obtained from the above two sources.

Operating expenses financed by patient services were computed by applying the proportion of income from patient services in total revenue to the total operating expenses.

The proportion financed by governments was obtained using information from Statistics Canada (1980b,1981c).

Calculations of Total Health Care Costs

The per capita estimates provided by Boulet and Grenier (1978) are provided in the Appendix Table 3.2. As these estimates are in terms of 1974 dollars they had to be converted in terms of 1980 dollars. The conversion in terms of 1980 dollars was made using two different methods. These methods are discussed as follows:

1. The Consumer Price Index for Health Care between 1974 and 1980 rose by 60.3 percent.¹ The Boulet and Grenier estimates for 1974 were increased by this percentage to arrive at 1980 figures.
2. The per capita public health expenditures were estimated for the year 1974 and then for 1980. The calculations have been provided in Table I.1. As can be seen, these costs rose by 84.5 percent during the said period. The Boulet and Grenier estimates were increased by this amount to arrive at estimates for 1980.

Two different estimates for health care costs were obtained using the above two methods. In both cases it was assumed that per capita health care costs by age group and gender increased in the same proportion in all age groups over the six-year period.

The 1980 estimates for per capita health care costs by age group and sex were then used to arrive at health care expenditure for each family and for each non-family person. In the case of families, health care expenditures relating to husband, wife, and lone parent were estimated by considering the information on age as provided on the PUST. For children in

¹The source of this information is Statistics Canada (1978,1980d).

these families, the following information is available from the PUST:

1. Number of children under 6 years of age.
2. Number of children between 6 and 14.
3. Number of children between 15 and 17.
4. Number of children between 18 and 24.
5. Number of children of age 25 and over.

For calculations relating to health care costs of children, Boulet & Grenier's estimates were used to obtain weighted average costs for a child in each of the above age groups. For children aged 25 and over, it was assumed that the upper limit is 30 years and weighted average for that group was used to estimate health care costs of a person. It should also be noted that the information on children falling in each of the above categories has been provided in such a manner on the PUST that the higher number is suppressed. For example, in the case of children under six years of age, the number four or more is top coded to four. While calculating health care costs for children, we have arbitrarily increased the highest number by one.

Having obtained two different estimates of health care costs for immigrant and non-immigrant populations in Canada, per capita costs were estimated using the entire sample in order to compare that with the actual figure for the year 1980. For this purpose, total health care expenditures were obtained for all census families and non-family persons. These expenditures were then divided into total number of husbands, wives, lone parents, non-family persons and children in census families. This gave an estimate of per capita health care costs.

The estimates from the first method where the per capita health care costs for each age group were raised by the percentage increase in the CPI between 1974 and 1980 (i.e., 60.3 percent) gave the estimated per capita health care costs of \$235 for the sample. The second method where per capita health care costs were raised by the percentage increase in physicians' and hospitals' costs (i.e., 84.5 percent) gave estimated per capita costs of around \$260 for the sample. The actual per capita costs using the costs of physician and hospital services, were found to be \$273, as shown in Table I.1. Since the later estimates were found to be closer to the actual, this study will utilise the later estimates, i.e., where the Boulet & Grenier estimates for the year 1974 were raised by 84.5 percent to distribute the total health care expenditures between immigrants and non-immigrants.

Table A3.2

Adjusted per capita cost of services under the medical care and hospital insurance programs, by age and sex

Age Group	Males			Females		
	Phys. ¹ Serv.	Hosp. ² Serv. ²	Total	Phys. ¹ Serv.	Hosp. ² Serv.	Total
0-1	387.6	966.5	1,354.1	357.6	897.0	1,254.6
1-4	54.4	103.5	157.9	45.2	82.5	127.7
5-9	40.2	47.0	87.2	32.5	38.4	70.9
10-14	31.6	34.8	66.4	27.6	31.3	58.9
15-19	36.1	51.3	87.4	47.7	52.8	100.5
20-24	42.9	64.2	107.1	73.3	69.8	143.1
25-29	47.6	60.5	108.1	89.0	88.0	177.0
30-34	50.2	74.1	124.3	98.5	117.2	215.7
35-39	56.0	85.2	141.2	104.9	139.0	243.9
40-44	63.2	112.4	175.6	110.3	159.7	270.0
45-49	72.8	151.7	224.5	116.6	187.3	303.9
50-54	84.0	198.5	282.5	115.0	202.7	317.7
55-59	98.0	269.2	367.2	113.0	244.6	357.6
60-64	110.6	359.8	470.4	114.1	302.3	416.4
65-69	121.2	466.5	587.7	117.8	410.4	528.2
70-74	130.8	655.6	786.4	121.3	573.0	694.3
75-79	136.4	962.9	1,099.3	131.3	780.9	912.2
80 and more	136.4	1,362.3	1,498.7	131.3	1,366.9	1,498.2

¹Physician's Services

²Hospital Services

Source: Boulet & Grenier (1978)

APPENDIX 4

Calculation of Personal Income Taxes

The calculation of Personal Income Tax was performed for each individual¹ by considering each item on the individual's income tax return forms. These items are discussed below. An SPSSX software program was written to compute the value of each item. The computed values of income tax payment by households were broken down by immigrant and non-immigrant households to arrive at average values for each group. A discussion of the methodology and underlying assumptions follows thereafter.

Total Income

Income from Employment

This is the same as wages and salaries reported separately for husband, wife, lone parent and non-family person. This is defined on the PUST as follows: "These are Gross wages and Salaries before deduction of such items as income tax, pensions, unemployment insurance etc. Included in this source are military pay and allowances, tips, commissions, bonuses and piece-rate payments as well as occasional earnings in 1980. All income in kind such as free board and lodging is excluded."

Net Employment Earnings

These are calculated as the difference between wages and salaries and employment expense deduction. The employment expense deduction is calculated as:

Employment Expense Deduction= \$500 if Wages & Salaries
equal or exceed \$16667
= 3% of wages and
salaries otherwise.

¹These included husbands, wives, lone parents and non-family persons.

Pension Income

This includes all items under Old Age Pension included in total income reported on the PUST. Items included under this heading are payment by the federal government on account of Old Age Security, Guaranteed Income Supplement and Canada/Quebec Pension Plan Benefits. Also included are spouse's allowances to 64 year-old spouse of old age security recipients.

In addition to the above, the items on the PUST that are included under "Retirement Pensions and other Money Income" are assumed to account for the item "Other Pensions or Superannuation" as required to report under "Pension Income" on tax return forms.

Income from other Sources

These include the following items on the tax return forms:

1. Family Allowances
2. Unemployment Insurance Benefits
3. Taxable Capital Gains
4. Other Income.
5. Investment Income

On the PUST, the first two items are listed under "Total Government Transfer Payments - Census Family or Non - Family Person." Similarly, the third and fourth items are included in "Retirement Pensions and Other Money Income."

The "Investment Income" as listed on the PUST "interest from deposits in banks, trust companies, co-operatives, credit unions, etc., bond and debenture interest, all dividends from both Canadian and foreign sources, net rents from real estate, mortgage and loan interest received, regular income from an estate or trust fund, and interest from insurance policies from Canadian and foreign sources for all members of a census family or for non-family persons." All of these items are taxable in Canada.

Income from Self Employment

This is the total net income from non-farm self employment and the net income from farm self employment. The definition of these items on the PUST coincides with the definition for tax purposes.

Deductions from Total Income

Canada/Quebec Pension Plan Contributions

Contributions through employment earnings were computed as under:

C/QPP Contrbn.= \$212.4 if total income exceeds \$11800
=0 if total income equals \$1000 or less.
= 1.8% of total income otherwise.

Unemployment Insurance Premiums

UIP = 2% of total income to a maximum of \$203.84.
= 0 if total income is negative.

For the following items data from Canada (1982) were obtained by fifty-four different income groups.

1. Registered Pension Plan Contribution
2. Registered Retirement Savings Plan.
3. Registered Home Ownership Savings Plan Contributions
4. Annual Union, Professional or Like Dues
5. Tuition Fees
6. Allowable Business or Investment Losses
7. Other Deductions

Average amount per taxpayer in each income group were computed.

Claims for Personal Exemptions

The total claims filed under this heading are the total of Basic Personal Exemption, Age Exemption, Married and Equivalent Exemption, and Exemption for Wholly Dependent Children. Details of these items are provided below.

Basic Personal Exemption

\$2890 was claimed for this purpose for all persons.

Age Exemption

\$1810 was claimed for persons aged 65 or over.

Married & Equivalent Exemption

For husband wife families this amount is calculated as follows:

Married Exemption = \$2990 - income of spouse
= \$2530 if spouse income less than \$460.
= 0 if spouse income exceeds \$2990.

The amount has been claimed for husband or wife, whoever has the higher income. In cases where husband and wife have the same income this amount has been claimed for the husband. However, if in such cases the age of the wife is 65 or over while the age of the husband is less than 65, the married exemption is claimed for the wife.

In the case of lone parent families the amount of \$2530 has been claimed for the eldest child.

Exemption for Wholly Dependant Children

1. For all children aged less than 17 years, \$540 was claimed.
2. For all children aged more than 17 years, \$990 was claimed.

It should be noted here that according to tax laws the above exemptions should be reduced by a certain percentage of child's income within certain limits and no such exemption is allowed if the child's income exceed this limit. However no information on the child's income is available from the PUST. Thus flat amounts of \$540 and \$990 were claimed.

As can be recalled from Table 4 in the text, immigrant families in Canada have a higher average number of children living at home than do non-immigrant families. Thus by claiming the maximum for child exemption we have probably overstated this exemption for the immigrant families thereby understating their income tax payment.

In the case of husband-wife families the Child Exemption has been claimed for the spouse with higher income.

Other Deductions from Total Income

For the following items, data from Canada (1982) were obtained under fifty-four different income groups.

1. Standard Deduction
2. Medical Claims
3. Charitable Donations
4. Eligible Deductions Transferred from Spouse
5. Pension Income Deduction
6. Disability Deduction
7. Allowable Investment Losses
8. Allowable Investment Losses
9. Allowable Capital Losses

As mentioned earlier, averages for each taxpayer were computed by income groups. To calculate Interest, Dividend and Capital Gain Deduction (line 51 on the tax return form) the Census Family Investment Income, as defined earlier, was used. The maximum claimed is \$1000 and in case of husband-wife families, it is claimed for the spouse with higher income.

The Education Deduction (line 54) was calculated as \$600 per child attending school. This was also claimed for the spouse with higher income. Where the incomes of the two spouse are equal, this amount has been claimed for the older spouse.

Other items under this heading, e.g., Gifts to Canada or a Province, Unemployment Benefits Repayable etc., have been included in the item "Other Deductions" mentioned above.

Taxable Income

This is obtained from the difference between "Total Income" and the aggregate of all deductions from the "Total Income," claims for personal exemptions, and other deductions from total income. Where this amount was negative it was to zero.

Federal Taxes Payable

These have been calculated by applying the prevailing federal tax rates to the taxable income.

Basic Federal Tax

This was calculated by subtracting Dividend Tax Credit obtained per claim per income group from the published source, from federal taxes payable.

Federal Tax Reduction

If Basic Federal Tax is less than or equal to \$200, Federal Tax Reduction (FTR) is equal to Basic Federal Tax (BFT). If BFT is between \$200 and \$2222, FTR=\$200. If BFT exceeds \$2222 FTR= 9% of BFT. Maximum FTR=\$500.

Total Federal Tax Payable

This is obtained as the difference between BFT and FTR.

Provincial Taxes Payable

These have been calculated for each province by considering the provincial tax rates and the relevant provincial tax credits. The information on provincial tax rates and provincial tax credits has been obtained from Commerce Clearing House (1982).²

Child Tax Credit

This has been calculated as \$238 per child living at home reduced by 5% of the excess of family income over \$21380.

Amount Due

This is calculated as the sum of total federal tax payable and total provincial tax payable reduced by the child tax credit.

²Copies of provincial tax return forms (with the exception of Quebec) are provided as annexures in Commerce Clearing House (1982). To compute provincial income tax payable in Quebec, original forms for the province of Quebec were obtained from the Department of National Revenue.

Discussion of the Methodology and Underlying Assumptions

In the case of census families income tax is calculated separately for husband and wife and for the lone parent. No income tax has been calculated for children in census families since separate information on their earnings is not available. The calculation has also been performed separately for non-family persons. Each item on the tax return form was taken into account. For some items information from the PUST allowed an exact calculation, while for several other items, reliance on published data had to be made. The important variables on which information was obtained directly from the PUST include income of the respondent to use in the calculation of income tax; income of spouse to use in calculation of married exemption; age of respondent to use in calculation of age exemption; number of children in a census family and their ages to calculate Child Exemption and Child Tax Credit; number of children going to school to calculate the Education Deduction; status of dwelling, i.e., whether owner-occupied or rented, to calculate the property tax and renter's tax credit, and so on. The available information on the province of residence was also used to estimate provincial taxes.

In addition, Canada/Quebec Pension Plan contributions and Unemployment Insurance premiums were calculated by using information on wages and salaries. Standard Deductions for Personal Exemption (\$2890), Married Exemption and for dependent children were also directly observed.

A complete list of the variables on which information were obtained from Canada (1982, Table 1) is provided below:

1. Pension Income Deduction
2. Disability Deduction
3. Standard Deduction
4. Medical Claims
5. Charitable Donations
6. Eligible Deductions Transferred from Spouse
7. Other Dependant Exemption
8. Registered Pension Plan Contribution
9. Registered Retirement Savings Plan Deduction
10. Registered Home Ownership Savings Plan Contribution
11. Annual Union, Professional and like Dues
12. Tuition Fees
13. Child Care Expenses
14. Allowable Investment Losses
15. Allowable Capital Losses
16. Other Deductions

These data have been distributed over 54 different income groups. Data on each one of the above items filed under "All

Returns" by all of the income groups have been used.

The amount claimed for each of the above items was divided by the number of returns filed in that income group to get an average per claim for that group. This average figure was then applied for all families and non-family persons in that income group. In all, 54 different income groups were considered. It should be noted that most of these items are dependent on income of an individual.³ The tax rates do not tend to vary significantly within one income group. It is also hoped that by considering the average claim in other deductions by income groups most of the variations in the "other deductions" have been captured.

Some light may be also shed on the probable bias introduced in following the above methodology to account for "other deductions" by considering the individual items. It is observed from the data on these items that at lower levels of income the average claim for Annual, Union, Professional and like Dues and for Tuition Fees is the highest. However as we move towards higher income levels the average claim for Registered Pension Plan Contributions (RPP), Registered Retirement Savings Plan Contribution (RRSP) and Pension Income Deductions (PID) increase at rates faster than any other items. After crossing the income group \$5500-6000 the average for these claims becomes higher than any other items. The average for union, professional and like dues and for tuition fees declines. This may be because a major portion of these items is probably fixed in nature. The average for all items besides RRP, RRSP and PID is insignificant at income levels higher than \$5500-6000. Also, it is the high rate of increase in these items that causes the average for all items to increase with the level of income.

Having established a positive relationship between the average claim for "other deductions" and the level of income, let us now consider the spread of income for immigrant and the and non-immigrant population in Canada. Table A4.1 provides the average income for each population group, number of people in each group and the standard deviation of income for each group.

Table A4.1

	Average Income (A.I)	Count	Std.Dev.	Std.Dev./A.I.
Immigrants	\$22,283	11006	13944	0.626
Natives	19,229	71512	12976	0.675

³The lowest of these income groups was \$2750-3000 and the highest was \$100,000 and over.

Also provided in the same table is the ratio of standard deviation to average income (Std.Dev./A.I.). As can be seen, this ratio is higher for non-immigrants than for immigrants. This means that for the same mean income, a group of non-immigrants will have a higher income than immigrants. As the "other deductions" vary directly with income, it is likely that the claim made by a group of non-immigrants with the same mean income as immigrants will be higher than that for immigrants. However, in this study we have applied the same deduction for both groups if they belong to the same income group. It can thus be concluded that probably in this manner we have understated "other deductions" for non-immigrants thereby overstating non-immigrant income tax relative to immigrants.

Having obtained an estimate of income tax paid by each family in Canada, this variable was separated for immigrants and the non-immigrants. An average for each group was obtained. In the case of immigrants the variable was further separated for various immigrant groups by their period of entry in Canada.

Some light may also be shed on the accuracy of the calculations of income taxes by comparing the average for the entire sample with published data. Table 12 compares the average income taxes paid in Canada as computed in this study with the figures published in the *Taxation Statistics (Canada (1982))* for the year 1980⁴.

As can be seen from Table A4.2, the average income reported on all returns filed in Canada in 1980 was \$13,700 which is \$1,188 more than the total income assessed in this study. One possible explanation for this disparity is that the income obtained from *Taxation Statistics* includes the income of all family members (including children), while in this study the income of family heads only has been used.⁵

The average absolute tax computed in this study is \$207 less than that obtained from the published source. This disparity may be attributed to the disparity in income and also to some of the

⁴It should be recalled that in this analysis, immigrant cohorts that arrived in the country before 1956 and those who arrived in 1981 were not considered. Also excluded were families with wife only immigrant. However, the figures reported in column 3 of Table III.2 are for the entire sample. The total returns filed in this study include those filed by husbands, wives, lone parents and for non-family persons who are aged 15 years or older. The income taxes reported from *Taxation Statistics* are after deducting for Dividend Tax Credit and Child Tax Credit

⁵The average income after accounting for all family members' income in Canada from the PUST is around \$13,600 which is close to the figure reported by *Taxation Statistics*.

Table A4.2

Payment of Taxes by Individuals who
Filed Income Tax Returns, 1980

(1)	Taxation Statistics (2)	This Study (3)
Total Returns Filed (Taxable+Non-Taxable)	14,764,878	149,378
Income Assessed (\$'000)	202,272,000	1,868,940
Average Income (\$)	13,700	12,512
Total Taxes paid (\$'000)	26,535,371	239,004
Average Taxes Paid (\$)	1,807	1,600
Taxes/Income (%)	13.1	12.8

assumptions made in the calculations. However, it is important to note that the proportion of income paid as taxes as found in this study is close to that obtained from the published source.

APPENDIX 5

Specification of Variables in the Basic Earnings Model

In all sets of estimating equations, the dependent variable is the natural logarithm of annual earnings. Information on annual earnings by source are available directly from the microdata. Annual earnings are defined to include total employment earnings during 1980. These include wages and salaries (before deduction) and self-employment income. Wages and salaries include military pay and allowances, tips, commissions, bonuses and piece-rate payments as well as occasional earnings in 1980. All income in kind such as free board and lodging is excluded from this source of earnings. Self-employment income includes net income from non-farm self employment and net income from farm self employment. Both of these sources of self-employment earnings are net of operational expenses including depreciation.

The number of weeks worked refer to the number of weeks during which the individual worked in 1980, even if for only a few hours. The variable is coded in continuous integers ranging from 00 to 52. Since there is strong evidence that a considerable number of respondents who were full year workers excluded their paid vacation or sick leave, the weeks 49 to 52 were collapsed into 49.

The age variable on the public use sample refers to age at last birthday (as of the census reference date, June 3, 1981) and is derived from the date of birth. The variable has been reported as single years of age ranging from 00 to 84, then 85 for any age of 85 years and over. Among non-immigrants there were six individuals in the sample for whom the age variable was coded 85. Among immigrants there were no such individuals. The maximum age was 82 among immigrants.

The level of education has been defined as the highest grade or year of elementary or secondary school attended, or the highest year of university or other non-university education completed. In the Public Use Sample Tape, highest level of schooling is reported in intervals. For estimation purposes these intervals were grouped into five different categories. These are described as under:

1. Elementary-Secondary with less than grade 9.
2. Elementary-Secondary including grades 9-13, secondary (high) school graduation certificate and trades certificate or diploma.
3. Other non-university education including with or without trades or other certificates or diploma.
4. University education without certificate, diploma or degree.

5. University education with any degree, certificate or diploma.

For the purpose of this study each of the above education levels is expressed by a dummy variable which takes on a value 1 if the individual has attained the particular education level and 0 otherwise. The reference group against which the coefficients of these dummy variables are compared, comprises of those who had less than grade 9 education. The definitions of each of the five dummy variables created for this study are provided below:

- S1 = 1 if the individual has grade 9-13
= 0 otherwise.
- S2 = 1 if the individual has hi-school graduation certificate or trades certificate or diploma.
- S3 = 1 if the individual had post secondary non-university education.
= 0 otherwise.
- S4 = 1 if the individual attended university but did not receive any degree, certificate or diploma.
= 0 otherwise
- S5 = 1 if the individual completed university education.
= 0 otherwise.

REFERENCES

1. Amemiya, T. 1984. "Tobit Models: A Survey." *Journal of Econometrics* 24, no. 1/2: 3-61.
2. Angus, D. E., L. A. Lefebvre and C. Strohmer. 1983. "An Analysis of Hospital Expenditures in Canada." *Statistics Canada Catalogue No. 83-522E*, Ottawa.
3. Becker, G. S. 1968. *Human Capital* New York: National Bureau of Economic Research.
4. _____ and B. R. Chiswick. 1966. "Education and the Distribution of Earnings." *American Economic Review Papers and Proceedings* 56, no. 2: 358-369.
5. Ben-Porath, Y. 1966. "The Production of Human Capital and the Life Cycle of Earnings." *Journal of Political Economy* 75, no. 4: 352-365.
6. Berry, R. A. and R. Soligo. 1969. "Some Welfare Aspects of International Migration." *Journal of Political Economy* 77, no. 5: 778-94.
7. Bhagwati, J. N. and T. N. Srinivasan. 1983. "On the choice between Capital and Labor Mobility." *Journal of International Economics* 14, no. 3/4: 209-21.
8. Blau, F. D. 1984. "The Use of Transfer Payments by Immigrants." *Industrial and Labor Relations Review* 37, no. 2: 222-239.
9. Blinder, A. S. 1971. "Estimating a Micro Wage Equation Pitfalls and Some Provisional Estimates." *Econometric Research Program Research Memorandum No. 131*, Princeton University.
10. _____. 1973. "Wage Discrimination: Reduced Form and Structural Estimates." *The Journal Of Human Resources* 8, no. 4: 436-455.
11. _____. 1976 "On Dogmatism in Human Capital Theory." *Journal of Human Resources* 11, no.1: 8-22.
12. Blitz, R. C. 1977. "A Benefit-Cost Analysis of Foreign Workers in West Germany, 1957-73." *Kyklos* 30, Fasc. 3: 479-502.
13. Borjas, G. J. 1985. "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants." *Journal of Labor Economics* 3, no. 4: 463-89.

14. _____ and M. Tienda. 1987. "The Economic Consequences of Immigration." *Science* 235, no. 4789: 645-651.
15. Boulet, J. and G. Grenier. 1978. "Health Expenditures in Canada and the Impact of Demographic Changes on Future Government Health Insurance Program Expenditures." Ottawa: Economic Council of Canada Discussion Paper No. 123.
16. Bowles, S. 1970. "Migration As Investment: Empirical Tests of the Human Investment Approach to Geographical Mobility." *Review of Economics and Statistics* 52, no. 4: 256-352.
17. Browning, E. K. and W. R. Johnson. 1979. *The Distribution of the Tax Burden* Washington, D. C.: American Enterprise Institute.
18. Canada. 1964. *Immigrant Family Expenditures and Standard of Living in 1959* Ottawa: Department of Citizenship and Immigration.
19. _____. 1974. *Urban Family Expenditures on Shelter and Household Durables* Ottawa: Statistics Canada.
20. _____. 1975. *Highlights of the Green Paper* Ottawa: Information Canada.
21. _____. 1982. *Taxation Statistics* Ottawa: Department of National Revenue.
22. _____. 1978, 1979, 1980, 1981, 1982, 1983. *Immigration Statistics* Ottawa: Department of Manpower and Immigration.
23. _____. 1985. *Annual Report to Parliament on Future Immigration Levels* Ottawa: Department of Manpower and Immigration.
24. Carliner, G. 1980. "Wage Differences by Language Group and the Market for Language Skills in Canada." *Journal of Human Resources* 16, no. 3: 384-399.
25. Carrin, G. and J. V. Dael. 1984. "An Empirical Model of the Demand for Health Care in Belgium." *Applied Economics* 16, no. 3: 317-34.
26. Chiswick, B. R. 1978. "The Effect of Americanization on the Earnings of Foreign-Born Men." *Journal of Political Economy* 86, no. 5: 897-921.

27. _____ . 1979. "The Economic Progress of Immigrants: Some Apparently Universal Patterns." in *Contemporary Economic Problems* Ed.: William Fellner. Washington, DC: American Enterprise Institute, pp. 357-99.
28. _____ . 1980. *An Analysis of the Economic Progress of Immigrants* Report prepared for the US. Department of Labour.
29. _____ . 1980. "Immigrant Earnings Patterns by Sex, Race, and Ethnic Groupings." *Monthly Labour Review* 103, no. 10: 22-25.
30. _____ . 1982. "The Impact of Immigration on the Level and Distribution of Economic Well-Being", in *The Gateway: U.S. immigration issues and policies* Ed.: Barry R. Chiswick. Washington, DC: American Enterprise Institute.
31. _____ and P. W. Miller. 1987. "Earnings in Canada: The Roles of Immigration Generation, French Ethnicity and Language." in *Research in Population Economics* 6, forthcoming.
32. Clark, D. P. and H. Thompson. 1986. "Immigration, International Capital Flows, and Long Run Income Distribution In Canada", *Atlantic Economic Journal* 14, no. 3: 24-29.
33. Commerce Clearing House. 1982. *Canadian Master Tax Guide* 37th edition, Commerce Clearing House Canadian Limited.
34. Denton, F. T. and B. G. Spencer. 1983. "Population Aging & Future Health Costs in Canada." *Canadian Public Policy* 9, no. 2: 155-63.
35. DeVoretz, D. and D. Maki. 1975. "The Brain Drain and Income Taxation: Canadian Estimates." *World Development* 3, no.10: 705-716.
36. _____ . 1980. "The Size and Distribution of Human Capital Transfers from LDCs to Canada: 1966-73." *Economic Development and Cultural Change* 28, no. 4: 779-800.
37. _____ . 1983. "The Immigration of Third World Professionals to Canada: 1968-1973." *World Development* 11, no. 1: 55-64.

38. DeVoretz, D. and S. A. H. Akbari. 1987. "The Substitutability of Immigrants in Production: Evidence from Canada." Manuscript prepared for the Department of Employment and Immigration, Government of Canada.
39. Dooley, M. and P. Gottschalk. 1984. "Earnings Inequality Among U.S. Males: trends and the effect of labor force growth." *Journal of Political Economy* 92, no. 1:59-89.
40. Dooley, M. 1986. "The Overeducated Canadian? Changes in the Relationship Among Earnings, Education and Age for Canadian Men: 1971-81." *Canadian Journal of Economics* 19, no. 1: 142-57.
41. Dornbusch, R., S. Fischer and G. Sparks. 1985. *Macroeconomics* 2nd Canadian Edition, McGraw Hill Ryerson Limited.
42. Feige, E. L. 1979. "How Big is the Irregular Economy?" *Challenge* 22, no. 5: 5-13.
43. Foot, D. K. 1983. "The Impacts of Population Growth and Aging on the Canadian Labor Force." in *Canadian Labour Markets in the 1980s* Kingston: Industrial Relations Centre, Queen's University, pp. 50-64.
44. _____. 1987. "Population Aging and the Canadian Labour Force." Ottawa: The Institute of Research on Public Policy Discussion Paper # 87.A.5.
45. Foot, D. K. and J. C. Li. 1986. "Youth Employment in Canada: A Misplaced Priority?." *Canadian Public Policy* 12, no. 3: 499-506.
46. Freeman, R. B. 1979. "The Effect of Demographic Factors on Age Income Profile." *Journal of Human Resources* 14, no. 3: 289-318.
47. Fujii, E. T. and J. Mak. 1983. "On the Specification of the Income Equation for Immigrants." *Southern Economic Journal* 49, no. 4:1141-1146.
48. Gallais-Hamonno, G. 1977. "The Direct Short-Term Effects and Advantages of the Migration of Manpower or Capital." in F. Bourguignon and G. Gallais-Hamonno with B. Ferret, *International Labour Migrations and Economic Choices: The European Case* (Paris, OECD) pp. 72-77.

49. Gauthier, D. 1986. "Savings and Taxes in a Life Cycle Growth Model with Age Earnings Profile." Ottawa: Economic Council of Canada, Discussion Paper number 288.
50. Green, A. G. 1976. *Immigration and the Postwar Canadian Economy* Macmillan of Canada.
51. Greenwood, M. J. 1983. "The Economics of Mass Migration from Poor to Rich Countries: Leading Issues of Fact and Theory." *American Economic Review* 73, no. 2: 173-177.
52. Greenwood, M. J. and J. M. McDowell. 1986. "The Factor Market Consequences of U.S. Immigration." *Journal of Economic Literature* 24, no. 4: 1738-1772.
53. Grenier G. and J.P.Marcino. 1975. "Earnings of Immigrant Workers in France." *International Labor Review* 3, 163-165.
54. Gronau, R. 1974. "Wage Comparisons - A Selectivity Bias." *Journal of Political Economy* 82, no. 6: 1119-1145.
55. Grossman, J. B. 1982. "The Substitutability of Natives and Immigrants in Production." *The Review of Economics and Statistics* 64, no. 4: 596-603.
56. Grubel, H. G. and A. D. Scott. 1966. "The International Flow of Human Capital." *American Economic Review* 56, no. 2: 268-74.
57. Gunderson, M. 1979. "Earnings Differentiat between Public and Private Sectors." *Canadian Journal of Economics* 12, no. 2: 229-242.
58. Hawkins, F. 1974. "Canadian Immigration Policy and Management." *International Migration Review* 8, no. 2:141-53.
59. Hanock, G. and M. Honig. 1985. "'True" Age Profiles of Earnings: Adjusted for Censoring and for Period and Cohort effects." *Review of Economics and Statistics* 67, no. 3: 383-394.
60. Heckman, J. and S. Polachek. 1974. "Empirical Evidence on the Functional Form of the Earnings Schooling Relationship." *Journal of American Statistical Association* 69, no. 3: 350-354.

61. Jenness, R.A. 1974. "Canadian Migration and Immigration Patterns and Government Policy." *International Migration Review* 8, no. 1:5-22.
62. Jones, F.L. 1983. "On Decomposing the Wage Gap: A Critical Comment on Blinder's Method." *Journal of Human Resources* 28, no. 1:126-130.
63. Jones, K. and A.D. Smith. 1970. *The Economic Impact of Commonwealth Immigration* Cambridge University Press.
64. Kennedy, B. R. 1987. "'True' Age Profiles of Earnings: Confirmation and Extension of Hanoch and Honig." A joint working paper of The Institute for Research on Public Policy and Statistics Canada, Social and Economic Studies Division, Ottawa.
65. _____ . 1987. "Age, Sex, Time, and Earnings." A joint working paper of The Institute for Research on Public Policy and Statistics Canada, Social and Economic Studies Division, Ottawa.
66. Kage, J. 1967. "The Recent Change in Canadian Immigration Regulations." *International Migration Review* 2, no. 1:47-50.
67. Klevmarcken, N. A. 1982. "On the Stability of Age-Earnings Profiles." *Scandinavian Journal of Economics* 84, no. 4:531-554.
68. Koutsoyiannis, A. 1977. *Theory of Econometrics* 2nd. Edition, MacMillan.
69. Kraus, M.B. & W.J. Baumol. 1979. "Guest Workers and Income-Transfers Programs Financed by Host Government." *Kyklos* 32, Fasc. 1/2:36-46.
70. Kuch, P. and Haessel, W. 1979. *An Analysis of Earnings in Canada* Ottawa: Statistics Canada.
71. Lefbvre. L.A., Z. Zsigmond & M.S. Devereaux. 1979. "A Prognosis for Hospitals." *Statistics Canada Catalogue* No. 83-520E, Ottawa.
72. Long, J. E. 1980. "The Effect of Americanization on Earnings: Some Evidence for Women." *Journal of Political Economy* 88, no. 3:620-629.
73. MacMillen, M. J. 1982. "The Economic Effects of International Migration: A survey." *Journal of Common Market Studies* 20, no. 3:245-267.

74. Malkiel, B.G. and J.A. Malkiel. 1973. "Male-Female Pay Differentials in Professional Employment", *American Economic Review* 63, no. 4:693-705.
75. Marr, W. L. and D. J. McCready. 1986. "The Expenditure Patterns of the Canadian-Born and the Foreign-Born in Canada." Ontario: Wilfrid Laurier University, Department of Economics Research Report No. 8691.
76. Marr, W. L. and M.B. Percy. 1986. "Immigration Policy and Economic Growth." Ontario: Wilfrid Laurier University, Department of Economics, unpublished paper.
77. Meng, R. 1987. "The earnings of Canadian immigrants and native-born males," *Applied Economics* 19, no. 8:1107-1119.
78. McLaughlin, N. 1985. "The Labor Force Participation of Canada's Immigrants." in *The Labor force Statistics Canada*, Catalogue No. 71-001, Ottawa.
79. Miller, P. W. 1987. "Gender Differences in Observed and Offered Wages in Canada, 1980." *Canadian Journal Of Economics* 20, no. 2:225-244.
80. Mincer, J. 1958. "Investment in Human Capital and Personal Income Distribution." *Journal of Political Economy* 66, no. 4:281-302.
81. _____. 1970. "The Distribution of Labor Income: A Survey." *Journal Of Economic Literature* 8, no. 1:1-26.
82. _____. 1974. *Schooling, Experience and Earnings* New York: National Bureau of Economic Research (Distributed by Columbia University Press).
83. Modigliani, F. 1966. "The Life Cycle Hypothesis of Savings, the demand for wealth, and the supply of Capital." *Social Research* 33, no. 2:160-217.
84. Mutti, J. and S. Gerking. 1983. "Changes in Income Distribution and welfare from Greater Immigration of Unskilled Workers." *European Economic Review* 23, no. 1:103-16.
85. Parai, L. 1974. *The Economic Impact of Immigration* Ottawa: Canadian Immigration and Population Study.
86. Parai, L. 1975. "Canada's Immigration Policy, 1962-74." *International Migration Review* 9, no. 4:449-77.

87. Rawlyk, G. A. 1962. "Canada's Immigration Policy 1945-1962." *The Dalhousie Review* 42, no. 3:287-300.
88. Reder, M. W. 1963. "The Economic Consequences of Increased Immigration." *Review of Economics and Statistics* 45, no. 3:221-30.
89. Reimers, C. W. 1983. "Labour Market Discrimination Against Hispanic and Black Men." *Review of Economics and Statistics* 65, no. 4:570-79.
90. _____. 1984. "The Wage Structure of Hispanic Men: Implications for Policy." *Social Science Quarterly* 65, no. 2:401-416.
91. Richmond, A. H. and W. E. Kalbach. 1980. *Factors in the Adjustment of Immigrants and their Descendants* Statistics Canada, Ottawa.
92. Rivera-Batiz, F. L. 1981. "The effects of Immigration in a Distorted Two-Sector Economy." *Economic Inquiry* 19, no. 4:626-39.
93. _____. 1983. "Trade Theory, Distribution of Income and Immigration." *American Economic Review* 73, no. 2:183-87.
94. _____. 1983. "The Economics of the "To" and "Fro" Migrant: Some Welfare Theoretical Considerations." *Scandinavian Journal of Economics* Vol. , pp. 403-13.
95. Samuelson, P. A. 1975. "Optimum Social Security in a Life-cycle growth market", *International Economic Review* 16, no. 3: 530-47.
96. Sapir, A. (1983) "Foreign Competition, Immigration and Structural Adjustment", *Journal of International Economics* 14, no. 3/4: 381-94.
97. Simon, J. L. 1982. "The Overall Effect of Immigrants on Natives' Incomes", in *The Gateway: U.S. immigration issues and policies* Ed.: Barry R. Chiswick. Washington, DC: American Enterprise Institute, pp.314-48.
98. _____. 1984. "Immigrants, Taxes and Welfare in the United States", *Population Development Review* 10, no. 1: 55-69.
99. Sindelar, J. L. 1983. "Differential use of Medical Care by Sex." *Journal of Political Economy* 90, no. 5:1003-1019.

100. Snooks, G. D. 1983. "Determinants of Earnings Inequality Amongst Australian Artists", *Australian Economic Papers* 22, no. 41: 322-332.
101. Statistics Canada. 1979, 1980a, 1981a. *Advance Statistics of Education* Catalogue No. 81-220.
102. _____. 1984. *Canada's Immigrants* Catalogue No. 99-936.
103. _____. 1981b. *Canadian Statistical Review* Catalogue No. 11-003E (August).
104. _____. 1980b, 1981c, 1985, 1986. *Canada Yearbook* Catalogue No. 11-402 E/1985.
105. _____. 1982. *1981 Census Dictionary* Catalogue No. 99-901.
106. _____. 1980c, 1981d. *Consolidated Government Finance* Catalogue No. 68-202.
107. _____. 1978, 1980d. *Consumer Prices and Price Indexes* Catalogue No. 62-010 (April-June).
108. _____. 1979. *Educational Statistics for the Seventies* Catalogue No. 81-569.
109. _____. 1979-80a. *Financial Statistics of Education* Catalogue No. 81-208.
110. _____. 1979-80b. *Hospital Annual Statistics* Catalogue No. 83-232.
111. _____. 1974. *Hospital Statistics* Vol. II, Catalogue No. 83-228.
112. _____. Household/Family file (1981 census of Canada) (machine readable data files) Statistics Canada, Ottawa, Ontario. Simon Fraser University/dlib SPSSX 2nd ed. (1986) and accompanying documentation (n.d.) (pp. 382).
113. Stewart, J. B. and T. Hyclack. 1984. "An Analysis of the Earnings Profiles of Immigrants", *Review of Economics and Statistics* 66, no. 2: 292-96.
114. Tandon, B. B. 1977 *An Empirical Analysis of Earnings of Foreign-Born and Native-Born Canadians* unpublished Ph.D Thesis, Ontario: Queen's University.

115. _____. 1978. "Earnings Differentials Among Native Born and Foreign Born Residents of Toronto", *International Migration Review* 12, no. 3: 406-10.
116. Tomes, N. 1983. "Religion and the Rate of Return on Human Capital: Evidence for Canada", *Canadian Journal of Economics* 16, no. 1: 122-138.
117. _____. 1985. "Religion and the Earnings Function", *American Economic Review* 75, no. 2: 245-250.
118. Weinfeld, M. 1987. "Immigrants are Key to the Future", *Globe and Mail* Toronto, (June 16, p. A7).
119. Usher, D. 1977. "Public Property and the Effects of Migration upon other residents of the Migrants' countries of origin and destination," *Journal Political Economy* 85, no. 5: 1001-20.
120. Welland, J.D. 1978. "Cognitive abilities, Schooling and Earnings" *Review of Economics and Statistics* 60, no. 4: 622-27.