

University of Ottawa  
Faculty of Social Sciences  
Department of Economics

MACROECONOMIC IMPACT OF IMMIGRATION  
IN CANADA

Major Paper

Prepared for the Completion of  
M.A. in Economics

By Hindia Mohamoud

With the Supervision of  
Professor Emmanuel Apel

## AKNOWLEDGEMENT

I would like to thank all the people who have contributed to the completion of this paper in different ways.

First and foremost I would like to thank Professor Apel for his guidance and continuing support. My deep appreciation goes to Professor Peter Dungan of the Institute of Policy Analysis, University of Toronto, who is one of the developers and maintainers of the FOCUS model that this paper has used for its analysis. This paper would not have been possible without his time, patience and guidance through the model. I would also like thank to Steve Murphy for his technical assistance with the computer version of the FOCUS model.

Finally I would like to thank Professor Grenier and Professor Gray for their comments on the paper. My sincere thanks also goes to Hormoz Khakpour for assisting with the editing and proof-reading of the paper.

# Contents

	Page
1. Introduction	1
1.1 Objective & Methodology	2
1.2 Definitions	4
2. Theoretical Framework for the Analysis of the Economic Impact of Immigration	5
2.1 Supply Side Impact of Immigration	6
2.1.1 Immigrants' Economic Endowment	6
2.1.2 Domestic Production Function and Immigrants Labour Supply: Impact on Employment and Wages	8
2.1.3 Impact on Domestic Capital Stock	14
2.2 Income Distribution Impact	16
2.3 Aggregate Demand Impact	18
2.4 Impact on Prices and Equilibrium Output	20
2.5 Immigration and Economic Growth: Impact on Productivity & Technology	21
3. Literature Review	24
3.1 Surveys & Microeconomic Investigations on Immigrant-Native Differences	24
3.1.1 Demand Behaviour of Immigrants	24
3.1.2 Supply Behaviour of Immigrants	30
♦ Labour Market Performance	30
♦ Savings and Capital Accumulation Behaviour of Immigrants	32
3.2 Previous Studies on the Macroeconomic Impact of Immigration	34

	Page
4. Theoretical Description of the FOCUS Model	39
4.1. The FOCUS Model as a tool of Analyzing the Economic Impact of Immigration	41
5. Changes to the FOCUS model for the Simulation Experiments	44
5.1. First Set of Changes: The Number and Demographic Structure of Immigrants	44
5.2. Second Set of Changes: Labour Supply Behaviour of Immigrants	45
5.3. Third Set of Changes: Government Expenditure Induced by Immigrants	47
5.4. Fourth Set of Changes: Saving Behaviour of Immigrants	48
5.5. Fifth Set of Changes: Initial Capital Endowment of Immigrants	49
5.6. Regrouping the Changes	50
6. Simulation Results	
6.1. Results of Experiment 3: Impact of the Number and Economic Behaviour of Immigrants	51
6.2. Comparing the Results of the three experiments	62
Conclusion	69
References	73
Appendix A	77
Appendix B	84
Appendix C	86

## APPENDIX A

### TABLES FOR SECTION 6

		Page
Table A.1. (Data for Graph 1)	Level Changes in GDP Components	77
Table A. 2. (Data for Graph 2)	Pre- and Post-immigration Components of GDP	77
Table A.3. (Data for Graph 3)	Pre- and Post-immigration Expenditure Shares of GDP	78
Table A.4. (Data for Graph 4)	Level Changes in Different Categories of Investment	78
Table A.5. (Data for Graph 5)	Pre- and Post Immigration Unemployment Rate	79
Table A. 6. (Data for Graph 6)	Pre- and Post-immigration Productivity and Inflation rate	79
Table A. 7. (Data for Graph 7)	Pre- and Post-immigration Real Wages	80
Table A. 8. (Data for Graph 8)	Pre- and Post-immigration Levels of Stock of Capital	80
Table A. 9. (Data for Graph 9)	Pre- and Post-immigration GDP Growth	81
Table A.10. (Data for Graph 10)	Pre- and Post-immigration Output Gap	81
Table A.11. (Data for Graph 11)	Pre- and Post-Immigration Income per Capita	82
Table A.12 (Data for Graph 12)	Level Changes in Income Shares	82
Table A. 13 (Data for Graph 13)	Pre- and Post-immigration Net Savings : Government, Foreign and Domestic	83

## APPENDIX B

### INPUTS IN THE FOCUS MODEL

		Page
Table B.1 (First Set of Changes)	Compound Percentage Growth (due to Immigration)of the FOCUS Population variables	84
Table B.2 (Second Set of Changes)	Pre- and Post-immigration Aggregate Participation rates by Age/sex	84
Table B.3 (Second Set of Changes)	Pre- and Post-immigration Full Employment Unemployment Rate (NAIRU)	85
Table B.4 (Fourth Set of Changes)	Aggregate Personal Saving Rate (RSP) by Immigrants' Saving Behaviour	85

## APPENDIX C

### OUTPUT TABLES FOR THE THREE EXPERIMENTS

		Page
Table C.1	Output for Experiment 1	87
Table C.2	Output for Experiment 2	89
Table C.3	Output for Experiment 3	91
Table C.4(Data for Graphs 14-21)	Comparing the Three Experiments	93

# MACROECONOMIC IMPACT OF IMMIGRATION IN CANADA

## 1. Introduction

Immigration in Canada serves three objectives: from an economic standpoint it is considered an instrument of economic growth. Immigration, it is said, not only enriches the labour market through admission of independent class immigrants but also stimulates the overall economic development through other channels. The white paper on immigration affirmed that

“Without a substantial continuing flow of immigrants, it is doubtful that we could sustain the high rate of economic growth and the associated cultural development which are essential to the maintenance and development of our national identity beside the economic and cultural pulls of our neighbour to the south”<sup>1</sup>.

The second objective of immigration is social, focusing on family reunification. Finally, immigration has a humanitarian objective, which allows the admission of those who have fled their home country in fear of persecution. In addition to the above, immigration is seen as an instrument of population growth as well as a mechanism to delay the forecasted population decline and ageing (Seward, 1987). The latter objective, however, may be viewed as a subcategory of the economic function.

These objectives of the immigration policy are reflected in the class composition of immigrants. Immigrants come under three major classes: the economic class, consisting of investors, entrepreneurs and skilled workers; the family class and the refugee class. The proportion of immigrants admitted in each of these three classes has varied from year to year. Since 1995, the relative proportion of the independent class (also referred to as the economic class) has increased, reflecting greater importance accorded to the economic objective in the Canadian immigration policy<sup>2</sup>.

---

<sup>1</sup> White Paper on Immigration, 1966. This phrase would also suggest an implicit political *objective*. It is the only instance where a political objective is hinted. Conversely, a political consequence of immigration is fairly discussed.

<sup>2</sup> Canada Citizenship & Immigration Plan; 1991-97 has specified the class composition of immigrants as follows:

Immigrant Class	1996	1997-1999	2000
Economic	50	52	53

However, a consensus is lacking among analysts on the economic impact of immigration. The existing economic theories do not offer a conclusive view on the effect of immigration on the host economy. It is even argued that assessing the overall economic impact is outside the boundaries of conventional economics, where effective research tools and paradigms are lacking. The economic impact of immigrants on the host economy depends critically on the process of integration in the receiving society. Yet, economic research tools hardly capture the economic and social transition inherent in the process of immigration. "Other perspectives such as political economy, as well as 'soft' studies of 'economic' activities by sociologists (e.g. qualitative studies, fieldwork, or ethnographies of immigrant /ethnic enclaves or enterprises) may shed some light on the economics of immigration"<sup>3</sup>. The study of the economic impact of immigration should therefore ideally constitute the subject of multidisciplinary studies.

In the present state of the literature of the economics of immigration, attention is mostly directed to different aspects of the economic impact of immigration such as on the labour market and government sector, etc. Furthermore, a number of surveys have been done to observe the economic behaviour of immigrants relative to the Canadian-born population. Combining the outcomes of these research areas to present the aggregate impact of immigration is a necessary and important endeavour, not so far undertaken. Indeed the existing macroeconomic studies merely analyse the effect of the demographic change of the population, induced by immigration. This study purports to fill this research gap.

### 1.1. Objective and Methodology

The objective of this paper is to assess the future medium term (1999-2000), macroeconomic impact of the present rates of immigration. To achieve this goal, the paper will primarily draw on the results of previous studies on the economic and socio-demographic characteristics of immigrants, as well as on studies of the impact of

---

Family	46	44	44
Other	4	4	3

<sup>3</sup> Metropolis Project (1996).

immigration on particular sectors/markets of the economy such as the labour market, the housing market and government sector. The information gathered from these studies will be used as inputs in the FOCUS model, a Canadian macro-econometric model, and simulation experiments on how these characteristics interact with the overall Canadian economy will be conducted.

There are several possible approaches to the analysis of the impact of immigration on the host economy. First, the impact of immigrants on the welfare (measured by income per capita) of the native-born population can be analysed. Second, the impact of immigration on the income of the entire population, including the immigrants' income, and on the growth rate of the host economy can be studied. Here the differences of immigrants with respect to the native born in terms of labour supply behaviour, saving and consumption patterns, etc, change the growth rate of the economy from what it would have been with population increase from natural sources only. It is not only the number of immigrants that impacts the economy but their socio-economic characteristics also change the behaviour of the economy. Finally, the economic effect of immigrants can be analysed through the impact of the capital they bring in the host economy. Here the effects of the investment choices of this capital are analysed and the economy-wide effects of these choices are observed.

This paper will use the last two approaches. It will test how immigrants' socio-economic characteristics affect important macroeconomic variables such as unemployment rate, income per capita, aggregate capital stock and productivity, and the growth rate of the economy. Three simulation experiments will be undertaken to observe how these characteristics interact with the economy. First the impact of a population increase of the size and demographic structure of the actual annual immigrant inflow will be analysed. This simulation exercise will examine the impact of additional people with Canadian economic characteristics. Second, the economic behaviour of immigrants and how this impacts the economy will be studied. To do this, appropriate variables of the FOCUS model will be adjusted to take into consideration the changes induced by immigrants. The comparison of the outcomes of these two simulation exercises will roughly answer the question how immigration as a source of population increase differs from natural increase. Third, the impact on the economy of the capital immigrants bring

with them will be studied.

## 1.2. Definitions

Most of the literature used for this paper defines immigrant anybody not born in Canada<sup>4</sup>, regardless of the length of stay and citizenship status. However, as mentioned above, the objective of this paper is to measure the future impact of the present rate of immigration into Canada, i.e. the future impact of the actual annual inflow of immigrants on the Canadian Economy. This objective indicates that *recent immigrants* and not *all immigrants* should constitute the subject of our study. Thus arises an inconsistency stemming from the fact that the behaviour of the *average* immigrant is different from that of the *recent* immigrant. Indeed, the economic behaviour of the immigrant changes with time as he/she adjusts to the new environment. To deal with this inconsistency, some of the results of these studies are adjusted. Also some of the studies offer the economic behaviour of immigrants by arrival cohorts. In this case the recent arrivals' characteristics will be used.

Finally, it is necessary to define who is a "recent immigrant". This study arbitrarily defines recent immigrants as those who have been in Canada from 1 to 10 years. The reason behind such choice is that this study covers a ten-year time span (1999-2000) and thus, in the last year of this period, it considers recent immigrants those who have come in the first year of the study.

---

<sup>4</sup> Given this broad definition of who is an immigrant, refugees - although technically not immigrants - are included in the "immigrant" group of the population. Since there are no economic requirement for the admission of refugees, the inclusion of this category is expected to understate the economic benefits of immigrants in narrow sense.

## **2. Theoretical Framework for the Analysis of the Impact of Immigration**

The economic effects of immigration are numerous and complex. By altering the volume, age/gender and occupational composition of the population, immigration affects both the aggregate demand and supply of the economy, and consequently the industrial structure, the level of aggregate and per capita income and the distribution of income among sectors and among factor owners. Along with these changes, and given the distinct economic behaviour of immigrants, the savings, the capital formation path and the labour force participation rates are also affected by immigration. A theory explaining the interaction among all these effects is therefore required. Some researchers place the analysis of the impact of immigration in the realm of international economic theory (Globerman, 1992 and Freeman 1987). In principle, the migration of people is parallel to international movement of goods and capital. As in the case of capital movement, migrating population is seeking to maximise the return to their individual skills and capital. If the increased wealth created by immigrants is not repatriated entirely to the country of origin, the host country may capture some of the gains (Globerman, 1992). The analogy, however, is somewhat flawed. The economic analysis of immigration involves people with their extremely diverse interaction with the host economy. Immigrants are not only an important addition to the production process, but they impinge on the full range of human activity, which, in turn, feed back on the economic domain.

The international movement of labour would ensure an efficient allocation of labour between sectors and between countries and higher world aggregate and average incomes would ensue. The efficiency gains from this improved allocation of labour were estimated for the year 1977 to exceed the world GNP of that year (Marr and Percy 1985, pp. 70-71; Withers, 1987, pg. 28). However, these economic benefits are not fully realised as restrictions are placed to the level of immigration in the host nations. The reason for these restrictions is that immigration, while necessarily improving the allocation of labour globally, may produce perverse short term effects - such as displacing domestic workers and reducing the income per capita - in the domestic

economy. This paper will focus on the domestic impacts of immigration, and particularly impacts on the Canadian economy. Although interconnected, it would be profitable, for the sake of clarity, to distinguish between supply and demand-side impacts of immigration.

## **2.1. The Supply Side Impact of Immigration**

Immigrants influence the supply side of the economy by increasing the supply of all the factors of production except land: capital, labour, technology and entrepreneurship. In addition, since immigration affects the supply of these factors differently, it changes the relative price of both the factors of production and the output goods. This change of prices of the factors of production will then affect the aggregate capital to labour ratio, the productivity, and the growth rate of the economy. All these impacts will then lead to a redistribution of income among sectors and factor owners. It is thus important to study the endowments of the immigrants on the one hand and the characteristics of the aggregate domestic production function, on the other.

### **2.1.1. Immigrants' Economic Endowments**

Immigrants are mainly endowed with labour. Consequently, the proportion of the population that is in the labour forces tends to increase with the inflow of immigration. There are three reasons for this. First, immigrants are concentrated in age groups with high participation rates. Secondly, It is often argued that immigrants have higher age/sex specific participation rates. Third, immigrants may be willing to work longer hours. The 1996 census of Canada shows that, immigrants who comprised 17.4% of the population accounted for 19% of the labour force<sup>5</sup>. Over the period 1966-86, the labour force grew by 74 per cent. Of this growth, 23 per cent were immigrants who arrived in this period (Beaujot, 1992). Citizenship and Immigration Canada declared that 54% of immigrants

---

<sup>5</sup> Statistics Canada: The Daily, March 17, 1998.

admitted into Canada in 1997 were in the prime age range of 25-54. Also, in 1996, 67 per cent of immigrants who were 15 years or older declared the intention to work while only 19% announced that they did not intend to work. The remaining 14 per cent professed to be students (Citizenship and Immigration Canada, 1997). In addition, immigrants are more likely than people born in Canada to have full-time, full-year jobs. In 1991, 63 per cent of employed immigrant men worked full time full year compared to 59 per cent of Canadian-born employed men. Similarly, among women, 50 per cent of employed immigrant women worked at full time full year jobs compared with 45 per cent of the Canadian-born women<sup>6</sup>. It should also be noted that a large majority of immigrants are workers, i.e. offer their labour as opposed to capital. In the 1998 immigration plan, 45% of immigrants are to come as skilled workers, while only 9% will come as business immigrants (investors and entrepreneurs)<sup>7</sup>.

On average, immigrants have higher age-specific participation rates than the native population. However, the labour force activities of the immigrants vary with the length of stay in Canada. Indeed as the length of stay increases, immigrants acquire greater proficiency in the official languages of Canada<sup>8</sup>, and more locally pertinent experience, which enable them to increase their participation in the labour force.

Although immigrants are mostly endowed with labour, they also come with significant capital. Nash (1987) noted that in 1984, each immigrant that came under the entrepreneur class brought into Canada an average amount of funds of circa \$562,000.

---

<sup>6</sup> Ministry of Supply and Services Canada (1996): Profile of Immigrant Population: An Analysis of Selected Demographic and Socio Economic Characteristics.

<sup>7</sup> Citizenship & Immigration Canada: Annual Immigration Plan, 1998

**<sup>8</sup> Labour Force Participation rates by Sex and Knowledge of Official languages for Immigrants aged 15 Years and Over**

English Only		English & French	
Male	75%	Male	85%
Female	68%	Female	70%
French Only		Neither English nor French	
Male	70%	Male	52%
Female	50%	Female	30%

Source: 1991 Census of Canada, unpublished data

The average for business immigrant (entrepreneurs, self-employed and investors) was about \$390,000. Employment and Immigration estimates that the total funds brought in by all immigrants in the period 1983-84 were \$2,675 million. The significance of these amounts can be clarified if we consider that the amount of funds brought in by only the entrepreneur immigrants were equivalent to about 25 per cent of the total foreign direct investment in Canada in 1986. Similarly, these funds represented 21 per cent of the total amount of Canadian direct investment abroad (\$7,963 million) in the same year.

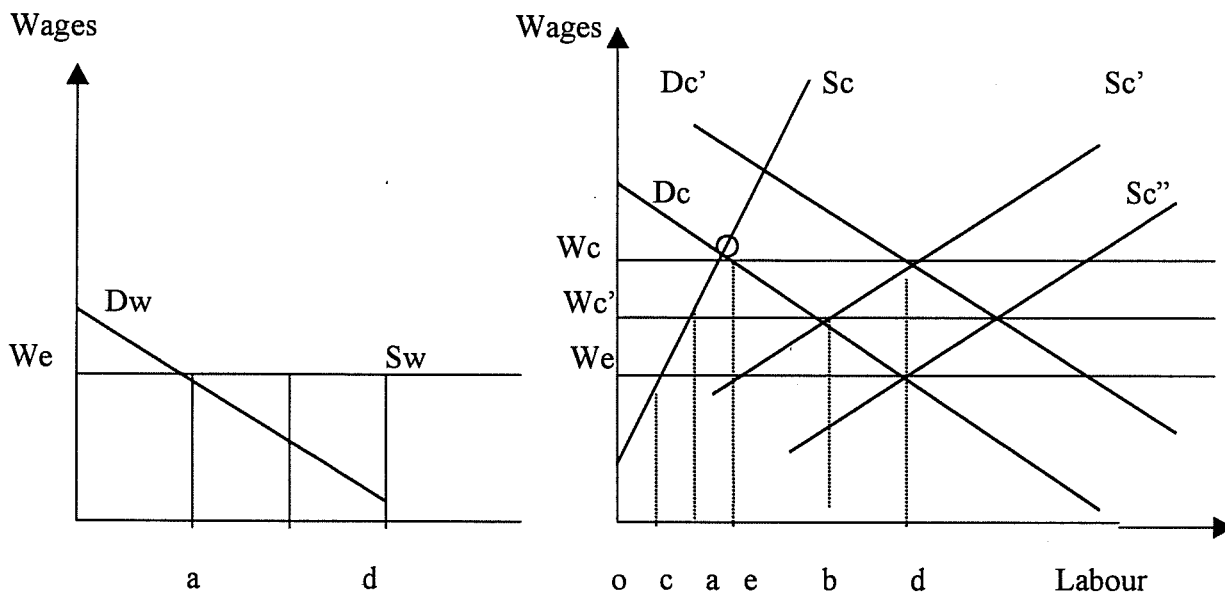
Besides labour and capital, immigrants come endowed with human capital as well. However the quantification of this variable is controversial<sup>9</sup>. One measure of human capital content of immigrants may be their educational attainment. Statistics Canada reports the educational level of recent immigrants (those who arrived in the period 1991-96). About 34 per cent of recent immigrants aged 24-54 had completed university, compared with 19 per cent of the Canadian born-population. At the lower levels of education, 19 per cent of recent immigrants aged 25 to 54 has not completed high school, compared with 21 per cent for the Canadian -born population. 43 per cent of recent immigrants, aged 25 to 54, were post-secondary graduates and these graduates were more likely than the Canadian graduates to have studied in the fields of science and technology (29 per cent and 16 per cent respectively).

### **2.1.2. Domestic Production Function & Immigrants' Labour supply: Impact on Employment and Wages**

Immigration affects both the supply of, and the demand for labour. The former through increased labour force and the latter through higher public and private expenditure on both consumption and investment. The following graph adopted from DeVoretz helps to identify the directions of changes in employment and wages.

---

<sup>9</sup> The human capital embodied in a worker is obtained through formal training, through on-the-job training and through skills acquired with experience. Recent immigrants compare less favorably with the Canadian-born workers on the last two types of training. The weight to attach to each category of human capital investment in their contribution to productivity is an unsettled issue.



The left panel shows a perfectly elastic world supply of labour, while the right panel shows the labour market of the immigrant receiving country, i.e. Canada. If transportation and other costs of immigration were assumed to be negligible,  $cd$  or  $a'd'$  workers would immigrate to Canada, and the Canadian labour supply would increase from  $S_c$  to  $S_c''$  and its wage rate would fall to world equilibrium level  $W_e$ . If instead, Canada closed its borders, the wage rate would be  $W_c$ . In the case where there is a binding quota of immigration, as in reality there is, labour supply would increase from  $S_c$  to  $S_c'$ . Consequently, the wage rate would fall to  $W_c'$  and total employment increases from  $Oe$  to  $Ob$ . However, given the wage elasticity of the domestic labour supply, native employment declines from  $Oe$  to  $Oa$ . Thus while the level of employment increases, immigration might potentially displace domestic workers by the amount  $ae$ . There are also, however, supply shifts - such as increased complementary capital and increased investment opportunities - induced by immigrants. These supply shifts would cause the labour demand curve ( $D_c$ ) to move to become  $D_c'$  and consequently, there would not be any wage decline or displacement of domestic workers.

Given the elasticity of input substitution, the resulting wage rate and employment level would depend on the elasticity of substitution between native and immigrant workers on the one hand, and the elasticities of the domestic labour supply curve and of the derived demand for labour, on the other. The more elastic or responsive the domestic

supply curve is to changes in real wages, the greater the potential for immigrant arrivals crowding out domestic residents from employment (Marr & Percy, 1985).

If heterogeneous labour is considered - skilled and unskilled labour - a relevant issue in deciding the magnitude and direction of the impact of immigration on employment is whether immigrants are substitutes or compliments to the national inputs, i.e. capital, skilled and unskilled labour. DeVoretz (1989) has modelled and tested the substitutability of immigrants to national labour and capital, both economy-wide and sector by sector. He specified and estimated a production function and then derived the demand equations (factor share equations) for each factor including capital, employed native born, employed foreign born workers who came into Canada before 1971 and employed foreign born workers who came after 1971<sup>10</sup>. To estimate these demand equations, the author used data for 125 Canadian manufacturing and non-manufacturing industries using the 1980 three-digit SIC code. In terms of employment, these industries represented 93 per cent of the Canadian labour force. From the coefficients of these estimated demand equations, the author calculated the elasticities of complementarity. He found that there is no significant substitution between immigrant (both vintages) and native workers. That is, there is no displacement of domestic workers caused by immigrants. However, the author found that immigrants who arrived after 1971 did displace earlier immigrants. Furthermore, only native born labour was found to be significantly complementary to capital. These findings of DeVoretz suggest that the displacement phenomenon cannot be empirically supported and also that immigrants are not capital using. In other words, the employment of immigrants does not require a significant investment in physical capital, whereas an increase in the employment of native workers does. This is indicative, according to the author, of the high human capital content of immigrants since unskilled labour has in general the highest complementarity to physical capital. However, these economy-wide results change when only industries with foreign-born labour concentration are considered. In these

---

<sup>10</sup> The author justified the distinction among immigrant workers between those who came before and after 1971 by the different human capital content of the two cohorts. Immigrants' occupational mix changed from semi skilled in the 1950s to highly qualified, human capital intensive in the 1970s. It would be more profitable to differentiate between immigrants coming before and after 1967 since this year has seen an important policy change. In 1967, the Canadian immigration policy changed from one that placed emphasis on national origin of prospective immigrants to one that stresses individual skills, regardless of

industries, both recent and earlier immigrants are significant substitutes for the native born workers. Furthermore, neither the native-born nor the immigrant workers are compliments to capital in these industries. Conversely, in industries with high concentration of largest average firms, immigrants are compliments to both native workers and capital.

Other researchers confirm DeVoretz's findings. Seward (1989), when examining the role of immigrants in the structural change of the Canadian economy found that immigrants do indeed facilitate structural change. That would make them complementary in a broad sense to Canadian workers.

Based on the above findings, it may roughly be concluded that if, at the aggregate level, immigrants are complements to Canadian-born workers and substitutes to earlier immigrants and to capital, then the wage rate of native workers would increase, whereas that of earlier immigrants would fall. The impact on the national average wage rate is unclear and would depend on the absolute number of immigrants and the proportion of the changes in the returns to the different categories of labour.

The implication of the above discussions on the level of employment is however, clear. At the aggregate level immigrants, far from adversely affecting the native employment, they in fact help create incremental employment. The difference between the outcomes of the economy-wide and sector specific investigations implies that while immigration causes displacement of workers in some sectors, it creates employment, through higher demand and complementarity to inputs, in other sectors. Hence immigration should not create any significant unemployment for the native workers. The unemployment of the whole population, including the immigrants, may however increase since in addition to the original unemployment of the natives, there is now also the unemployment of part of the immigrants.

This theoretical conclusion is confirmed by statistical causal testing on the relationship between immigration and the unemployment rate. Marr and Siklos (1995) researched the relationship between immigration and unemployment since 1920s. They found that there is a two-way relationship between immigration and unemployment. On the one hand the rate of unemployment influences the level of immigration because

---

his/her country of origin. However, data limitation has constrained the author. See DeVoretz 1989.

prospective immigrants are discouraged by high unemployment rate<sup>11</sup> and, on the other, immigration influences the unemployment rate. They found that immigration and unemployment are inversely related, but that the impact of immigration on unemployment is slight. For instance, they discerned that "a one per cent increase in immigration actually produces a fall of 0.1 per cent in the unemployment rate after one year" (pg. 321). The Economic Council of Canada (1991) reaches the same conclusion. They assert that "immigration creates no permanent unemployment and even transitory impact seems very unlikely." (pg. 53). They found that it is the unemployment rate that impacts negatively on the level of immigration: "there is one less prospective immigrant for every three persons unemployed." (pg. 56).

Despite the similarity in the conclusions reached through statistical causality testing and economic theory, simulation experiments done with large-scale macroeconomic models of the Canadian economy almost unanimously produce a positive relationship between immigration and unemployment (see section 3 on the literature review). This contrast is explained by the Economic Council of Canada as being due to the fact that the "structure [of these models] draws heavily upon what is known as the 'Keynesian aggregate-demand theory of unemployment'". According to this theory, wages fail to adjust the demand for labour to the increased supply of labour. Furthermore, the demand for labour itself adjusts to the higher demand for goods and services only with a certain lag. Consequently, with a permanent growth of the labour force, increased unemployment will be inevitably observed.

It goes without saying that in the very short term larger labour force produces higher unemployment rate. People require time to look for a job; firms need time to observe the market, to calculate if it is profitable to invest and increase employment. Therefore an increased unemployment rate is bound to ensue. But this result should not be interpreted as meaning that immigrants affect negatively the unemployment rate of the natives. Even if the native unemployment falls, increased aggregate unemployment may still be observed.

---

<sup>11</sup> It is not clear from the writing of the authors whether they are making reference to the pre-set level of immigration, which is set low when unemployment is high.

Simon (1989), formalising a theory introduced by Harrison (1983) presents a model that is based on the imbalance between the demand for goods (thus demand for labour) and the immigrants' labour supply. The idea is that while every immigrant necessarily and immediately consumes; he/she has lesser chances than the native of being employed in the jobs induced by his/her consumption. This is because first, "most of the employed labour force does not change jobs every year" (pg. 214); and second, because the latter group has more local (and pertinent) experience and higher networking capacities. Consequently, under conditions of wage rigidity, immigration actually decreases the unemployment rate of the native workers. This model realistically takes into consideration the job turnover rate, the ratio of immigrant and natives' propensity of finding a job; and the fraction of new jobs likely to be created by immigrants. It is useful to briefly present this model.

Let:

$U_n$  = the number of unemployed natives in the absence of immigrants, whose effect is being analysed

$U_n'$  = the number of unemployed natives in the presence of immigrants

$E_n$  = the number of employed natives in the pre-immigrant situation

$E_n'$  = the number of employed natives in the post-immigrants situation

$M$  = the number of immigrants whose effects are being analysed.

$s$  = the proportion of natives who leave their jobs each year and seek new jobs, i.e. the job turnover rate

$d$  = average immigrant's spending for consumption relative to average native spending for consumption; this may be thought of as the fraction of new jobs created by an immigrant

$a$  = the relative likelihood of an immigrant and a native of being hired for a particular job opening, an indicator of the relative job-finding success

$aM$  = the number of job seekers in the immigrant group.

The number of natives unemployed in the post-immigrant situation would be

$$Un' = \frac{Un + sEn - (sEn + dM)}{sEn + Un + aM}$$

This means that, with immigration, the unemployed natives are in number equal to the sum of the originally unemployed natives ( $Un + sEn$ ), less the number of newly available jobs given by the job turnover rate and those jobs created by immigrants' expenditure ( $sEn + dM$ ), multiplied by the ratio of natives seeking work to the sum of natives and immigrants seeking work.

Subtracting the pre- and post-immigration native unemployment,

$$Un' - Un = \frac{(a - d) sEnM - dMUn}{sEn + Un + aM}$$

For native unemployment to fall ( $Un' - Un < 0$ ), it is necessary and sufficient that  $(a - d)sEnM - dM < 0$  or  $d(sEn + Un) > sEn$ . This condition is necessarily satisfied if  $Un > 0$  and  $d > a$ , i.e. if there is unemployment before immigration and if the proportion of immigrants' consumption to native consumption is higher than the relative likelihood of an immigrant and a native of being hired for a job. This model shows that the conditions for native unemployment to fall are quite robust.

In light of the above analysis, it is safe to make the following conclusion: at the aggregate level, immigrants generate new employment. Consequently the native unemployment is very likely to fall. However, because the labour force has increased and it takes time for the demand of labour to adjust to it, increased overall unemployment rate is bound to be observed. In addition, to the extent that the economic agents expect immigrant arrivals, new employment may be created in advance, which partially offsets the unemployment rate among immigrants.

### 2.1.3. Impact on Domestic Capital Stock

The output per head that can be obtained in any given level of employment depends on the capital stock that is existent at the time. With increasing globalisation of the financial

markets, an open economy should have no difficulty in maintaining an optimal capital to labour ratio. However, it is not indifferent for the level of GDP, whether the funds for investment are domestically or foreign owned (see section 2.2). The question then arises as to how immigration affects the capital to labour ratio of the host economy. Increases in the stock of capital depend on increases in the flow of investment, which in turn depend on the incentive to invest (demand influence) and the availability of savings (supply influence). The demand influence of the flow of investment will be discussed in section 2.3. The supply of savings will be the main focus of this section. The question to investigate is will the additional savings provided by immigrants be sufficient to maintain the aggregate pre-immigration capital to labour ratio (capital widening), or will it increase (capital deepening).

In regard to private savings, evidence on the saving behaviour of immigrants has demonstrated that the average immigrant does save at a higher rate than his/her Canadian counterpart (Shamsuddin, 1995, DeVoretz, 1989). On the other hand, as mentioned earlier, immigrants are found to be substitutes to capital. That is, they require less physical capital investment than Canadian-born workers do. While this latter evidence may not suggest that capital to labour ratio will increase or remain constant, it is relevant to the effect immigration may have on output per labour. That is, the variation of the capital to labour ratio, due to immigration, will not affect output per labour if immigrants are substitutes to capital. Combining these two empirical evidences may enable us to assume that immigrants might not negatively affect the effective<sup>12</sup> aggregate capital to labour ratio. Moreover, immigrants come with an initial endowment of capital that will add to the availability of funds for investment.

Furthermore, according to the life-cycle theory of saving, immigration should increase the domestic saving (through the public treasury) since they are concentrated in economically active age groups. It must be noted that these are all qualitative arguments that really do not settle the issue and that it is difficult to judge the response of investment flows to immigration in theory. That is, investment does depend on the availability of savings, but higher savings do not necessarily translate into higher productive investment.

---

<sup>12</sup> *Effective* aggregate capital to labour ratio here means in terms of the output capacity of the existing capital to labour ratio.

For investment to increase, there should be productive capital demand that makes use of these funds. Thus, while, on the one hand immigration may increase the domestic saving rate, on the other, part of these additional savings will finance social and housing investment. Consequently the private productive capital/labour ratio may actually decrease. There is no Canadian empirical evidence, to our knowledge, that has pronounced on the relationship between immigration and productive investment flows. Indirect evidence can be obtained from Shamsuddin's study. He asserts that immigrants have stronger preference for real assets (homes, automobiles), whereas Canadian born households present stronger predilection towards stocks and equities. "Thus although immigration has the potential to affect household saving positively, it may also stimulate a channelling of funds from business investment to real state investment". Australian evidence (Baker, 1988) also confirm our theoretical speculation of positive impact of immigration on the rate of investment. Our simulation experiments should settle the magnitude and direction of the impacts of immigration on different kinds of investment.

## 2.2. Income Distribution Impact

The impact of immigration on income distribution depends on the supply of relative quantities of the different factors of production. Given the initial endowment of immigrants (assuming immigrants have lower than average capital to labour ratio), the amount of capital available to each worker should decline in the short run. This decline in the capital to labour ratio causes wages to fall and the return to capital to rise. To clarify the point, let's look at figure 1, taken from Grubel (1992). Initially, the level of employed labour is at M and the wage is at W. Total output produced is represented in the figure by the area OAFM, where total income of labour is the area OWFM and total income to the capital owners is the area WAF. When immigrants come into Canada, they add to the existing labour force. This implies that labour employed increases from M to N, with a corresponding lower wage at W'. The new total output is the area OACN, which is greater than the total output when there is no immigration (OAFM). Total income of labour decreases to OW'CN while total income of capital owners increases to

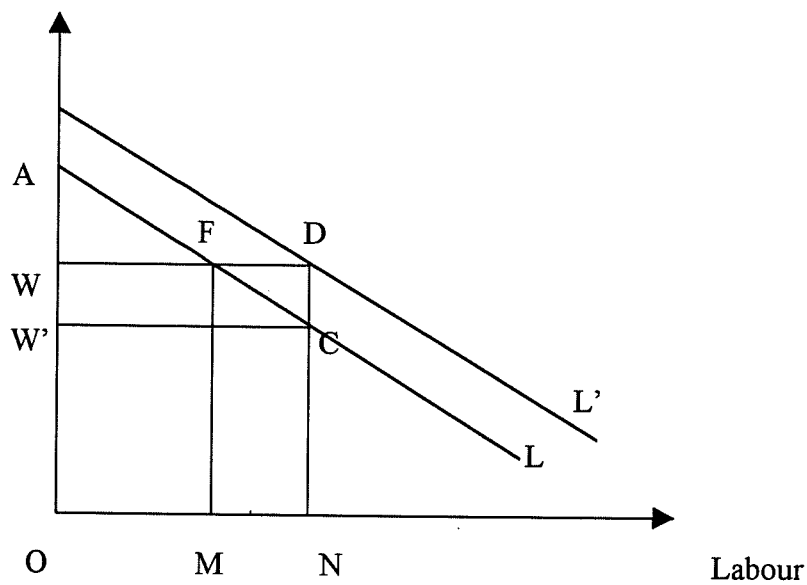
W'AC, which suggests there is a redistribution of income from workers to capital owners. The area  $W W' FC$  shows the gain of capital owners as a result of immigration. On the other hand, workers lose as the aggregate wage decreases significantly.

This redistribution of income is, however, a false issue in that there is not a net separation between classes. In fact workers own part of the national capital through mutual fund investments; and also corporate taxes on capital gain insures that part of the returns to capital goes to the society at large (Simon, 1989). The net gain of immigration (the gain to capital owners is larger than the loss to workers) is represented by the triangle FDC.

If we take into consideration that some immigrants bring with them their own funds, the decline in wages will be attenuated. Immigrant funds are incorporated into the diagram by shifting the productivity curve from  $L'$  to  $L''$ . This means that at every level of employment, marginal productivity is higher since the capital to labour will decline less. With immigration and higher employment, wages may actually remain at  $W$ , with total income of labour increasing. Not only does total income of labour increase, but total income of capital owners increases as well. Therefore, if immigrants are assumed to present the same capital to labor ratio as the original residents, there should not be any redistribution of income.

It should also be noted that with free international capital movement, an inflow of capital will occur to respond to the increased return to capital caused by immigrants (Grubel, 1992). Grubel points out that even "with unchanged technology, constant return to scale and infinitely elastic supply, immigration attracts capital in an amount sufficient to keep the rate of return to investment at its initial world level." This capital inflow will enable the wage rate not to decrease despite increased labor force, caused by immigration. However, if the foreign ownership of capital is substantial, it will negatively affect the average domestic income, as part of the national product will service the foreign capital (Marr and Percy 1989, pg. 76).

**Figure 1: Labour Productivity**



A further question that needs to be addressed by economic theory is how income is distributed between immigrants and the native population. Theoretically, with the initial endowments of the immigrants (more labour and less capital relative to natives' endowment) and if they do not participate in the ownership of domestic capital, then the distribution of income between immigrants and natives favours the latter group. This happens because the returns to capital will be increased through higher labour supply and scarcity of capital. If immigrants do not participate in the ownership of capital, the income of natives will be increased while that of immigrants will be decreasing.

### 2.3. Aggregate Demand Impact

Immigration affects all the components of aggregate demand. Private investment demand should increase with increased population through immigration. There are three different, although inter-related, channels through which immigration affects the aggregate investment demand. First, through increased housing requirement of the additional immigrant households. Second, through higher economies of agglomeration. These arise because larger markets allow wider choices and greater range of specialist services, which generate investment demand. Third, through higher rate of growth of the demand. This latter channel constitutes the most important of all three channels in an advanced economy such as Canada.

Consumption normally grows immediately as immigrants attempt to meet their necessary requirements. It is theoretically important to investigate the propensity to consume of immigrants relative to that of the native population. If immigrants present higher propensity to consume than the native population, then the multiplier will increase and the job creation potential of every level of income will increase. If, on the other hand they exhibit lower propensity to consume, then an opposite result will emerge.

The impact of immigrants on the aggregate demand through the government budget is ambiguous, as immigrants acquire facilities and services provided by government (positive effect), and at the same time pay taxes both as workers and as consumers (negative effect). The impact on the level of government expenditure will depend on the age distribution of immigrants, their position in the national income distribution, and the presence of economies of scale in the provision of public services. Immigrants' concentration in the economically active age groups will lead to a fall in the funds required to assist the children and the retired groups of the population; and to an increase in the availability of these funds. Also, both per capita health care and educational expenditure are expected to decline because of this particular age distribution of immigrants. Finally, government expenditure may decline because of the economy of scale provided by larger population. In fact in the case of pure public goods, additional population do not increase the government expenditure. Consequently the per capita expenditure for the society at large will diminish.

Income supplement transfers may, however, increase if immigrants are concentrated in the lower quartiles of domestic income distribution ladder. Simon (1989) notes that in Canada 22 per cent of immigrants live below the poverty line in the first year following their arrival. But following the second and the third year, only 5 and 4 per cent (compared with the 21 per cent among Canadian born population) were living below the poverty line, respectively. Consequently, the impact of immigrants on income supplement transfers would depend on their earning profile. Similarly, the taxes immigrants pay both as workers and consumers would depend on their earning profile.

Another component of the aggregate demand affected by immigration is the foreign trade balance. Exports are expected to rise, as part of the increase of output will be exported. Also, if export goods are labour intensive products, the increased labour supply brought about by immigration will reduce the relative prices of these goods and hence increase exports. The magnitude of this increase, however, will depend on the price elasticity of the foreign demand for export, on which immigration has no apparent impact. Similarly, part of the increase in aggregate demand will necessarily be met through higher imports. The overall impact of immigration on the trade balance is theoretically unclear since there exist numerous other channels through which it can be affected by immigration, i.e. domestic prices, the value of the national currency relative the currency of the trade partners, etc.

#### **2.4. Impact on Prices & Equilibrium Output**

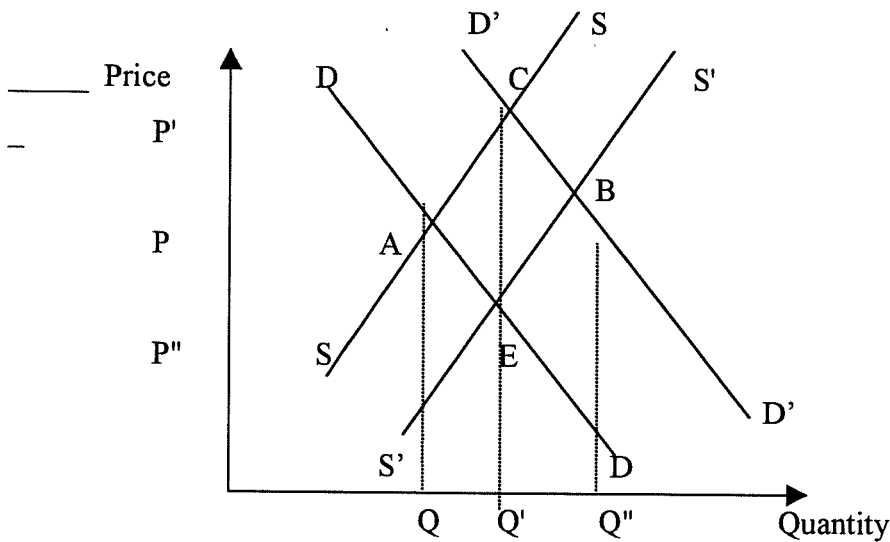
It has been so far argued that immigration leads to an increase in both aggregate demand and aggregate supply. The resulting equilibrium output is, however, undetermined and would depend on the behaviour of the prices (included interest rates and the exchange rate).

The impact of immigration on the aggregate price level is not obvious. On the one hand, immigration helps reduce labour shortage, decreasing prices and wages. On the other hand, it may increase demand more than supply, where it may add to inflationary pressures. Depending on which of these impacts is bigger, immigration may put either upward or downward pressure on inflation. Moreover, since higher rates of inflation

generally occur with lower rates of unemployment, it is to be expected that if immigration has increased unemployment then a deflation would result.

Although the extent to which demand and supply would change is undetermined, the direction they undertake is clear as indicated in figure 2. Let DD and SS be the original demand and supply curve before immigrants come in. The equilibrium price and quantity are P and Q respectively. If demand shifts more to the right than supply does,

Figure 2 : Demand and Supply Equilibrium



i.e. shifts to DD', price would increase to P'; if supply shifts more to the right than demand does, i.e. shifts to SS', price would decrease to P''. Since both demand and supply curves shift to the right, equilibrium output must increase, no matter which of the two curves shifts more, i.e.  $Q < Q'$  and  $Q < Q''$ .

The magnitude of the equilibrium output, induced by immigration, cannot be determined by theory alone. The quantification of the overall impact of immigration remains to be settled by an empirical investigation.

## 2.5. Immigration and Economic Growth: Impact on Productivity and Technology

Standard growth theory teaches us that the growth rate of aggregate output depends on an autonomous technical progress factor, and a weighted combination of capital and labour input growth. Furthermore the production function presents diminishing returns in both capital and labour.

$$Y = Af(K, L) \quad f_{kk} < 0 \quad \text{and} \quad f_{ll} < 0$$

In per capita terms, the per capita growth of production is determined by the technical progress factor and the growth of the capital to labour ratio (Solow, 1956). The capital formation depends positively on the flow of investment, and negatively on population growth and depreciation

$$\dot{k} = sf(k) - (n+\delta)k$$

where  $sf(k)$  is the amount of output used to create new capital,  $n$  is population growth, and  $\delta$  is the depreciation rate of existing capital. There are two sources of constraints to growth, stemming from population growth through immigration. First, population growth leads to capital dilution and a reduction in output per labour or productivity. Second, even if immigrants' savings restore the original capital to labour ratio (as argued above), the production function presents diminishing returns to both capital and labour; hence proportionately lower per capita growth rate should result as both these factors increase.

The negative impact of population increase (through immigration) on the growth rate of the economy is based on the assumption that technology is exogenous and constant. This assumption is criticised by Simon (1986) who recognises that more people do not necessarily dilute capital, if capital is considered fixed in the short term. However, he argues, there is another compensating impact of population which is ignored by the standard theory of economic growth: increased population stimulates technical progress in the long term.

Bringing this previously omitted element [endogenous technical progress] into the model means that the level of technology that is combined with labour and capital in the production function must be influenced by population directly or indirectly, rather than it being an exogenous function of time's passage as has been traditional in growth theory. (Pg. 3.)

Withers (1987) has launched a similar critique to the traditional theory of economic growth. This author holds that growth theories in general do not allow for a) scale economies; b) interdependence between immigration, investment and technology; and c) labour quality.

In terms of the production function, immigration might shift the autonomous factor through induced technological change or it might affect capital input via induced growth of the capital stock and it might be inadequate to represent immigrants in labour input only in terms of quantity and not quality. Finally in the standard production functions, constant return to scale is assumed. Yet immigration might be operating in an environment of non-constant returns. (Pg. 38.)

Recent developments in growth theory in the 1990s have endogenized technical progress and introduced different tools to conceptualise how technical progress is induced and generated in the production process. With the endogenisation of technical progress, the evils of diminishing returns are no longer there.

This theoretical innovation introduces into the model other factors of production such as knowledge, research and innovation. All factors that are influenced by people. This implies that with a growing population, the rate of output should be growing. This happens first because of sheer numbers since immigration may be an additional source of innovating minds; and second because innovation is increasing in the size of population, as the reward to innovate increases with the size of the market.

### **3. Literature Review**

The literature on the economics of immigration may be broadly divided into two main categories: 1) analysis of the economic experience of immigrants (microeconomic approach); 2) study of the aggregate economic impact of immigrants on the host country (macroeconomic outlook). While the microeconomics framework has received greater attention in the US, emphasis has been placed on the macroeconomic approach in Canada and Australia. Normally, however, the two research categories are complementary as the latter approach uses (or should use) the results of the former.

#### **3.1. Surveys & Microeconomic Investigations on Immigrant-Native Differences**

In Canada, a number of studies have addressed the economic behaviour of the immigrants as contrasted with that of the Canadian-born population. The differences concern both the supply behaviour of the immigrants - represented mainly by their labour market performance (participation rates, earnings, employment, etc), saving pattern and capital endowments - and their demand behaviour. The latter involves their propensity to consume different domestic goods (including housing) and to import, as well as the fiscal effect induced by immigrants' tax payment and their use of public consumption.

##### **3.1.1. Demand behaviour of Immigrants**

Marr (1987), using micro data, investigated the relationships between consumption propensities and expenditure allocation, on the one hand, and birthplace, age, family size, and family structure, on the other. The following table presents the consumption and saving pattern by place of birth and by arrival cohorts. He reported that the foreign-born households present higher propensities to consume from their income than natives do.

Furthermore, he found that the more recent the time of arrival of the immigrants, the higher these propensities implying that a process of assimilation is taking place.

**Table 3.1**

**Consumption and Saving Propensities by Place of Birth and  
by Arrival Cohorts**

Country of birth	Total expenditure as proportion of before-tax income	Total saving as proportion of Of before-tax income
Canada	0.83	-0.03
U.S., North & West Europe	0.79	0.01
South & East Europe	0.81	0.00
Rest of World	0.96	-0.19
Arrival in Canada		
Distant	0.79	0.04
Mid	0.86	-0.08
Recent	0.92	-0.10

Source: Marr, 1987

In addition, the allocation of consumption expenditure among different categories of consumption goods varies according to the place of birth. The observed time necessary for the convergence of the different propensities towards that of the Canadian born population is 5 years for the consumption of non-durable, 3 years for the durable, 2 years for the services, 5 years for expenditure on imports, and 6 years for housing.

As Marr asserts, the difference in consumption propensities is also partly softened by the interaction between the immigrant inflow and the economy. Immigration alters the behaviour of the native population. Thus, not only does the average consumption propensity of immigrants fall towards that of the Canadian-born, but the latter's propensity increases a little as well.

In another study, Marr (1989) confirms the above findings, but adds that once age and family size are controlled, these differences in consumption propensities and consumption expenditure allocation become minimal. The authors goes so far as to

suggest an immigration policy that compensates the natural decline in native age cohorts by admitting immigrants, with no consequent alteration in the consumption pattern of the population at large.

These findings bring us to the conclusion that if the model that is used as an instrument of measuring the impact of immigration incorporates detailed demographic characteristics of the population such as age, family structure and income, the impact on consumption demand of immigration can correctly be captured. In other words, no further "fine tuning" of the model is necessary to capture how immigration affects the aggregate consumption.

With regard to investment demand, immigrants impart a great influence on housing investment through higher housing demand as the number of households increases with immigration. Immigrants present different headship rates, ownership rates and dwelling type preferences. A crucial question is then whether these differences are important enough to change the aggregate housing demand in Canada. A study done by the Canadian Mortgage and Housing Corporation (CMHC) has shown the following.

- 1) On average, immigrants exhibit lower headship rates (the proportion of a given age group who are maintainers of household) than the Canadian born population. This difference, however, declines with the length of residence in Canada. The average number of people in a household is 2.94 for all immigrants, 3.30 for recent immigrants and 2.6 for non-immigrants. The Differences in headship rates between immigrants and non-immigrants is more pronounced in the younger and older age groups.
- 2) Immigrants have a higher ownership rate than non-immigrants (66% and 62% respectively). This difference is primarily due to the older age profile of immigrants compared to non-immigrants<sup>13</sup>. When age characteristics is controlled, only immigrants aged 45 years and over present higher ownership rates. Ownership rates of immigrants are initially lower than those of non-immigrants, after 10 to 15 years of residence in Canada, ownership rates of most immigrant groups equal those of the

---

<sup>13</sup> Immigrant is defined anyone not born in Canada; the children of immigrants are considered Canadian-born.

Canadian-born. After 15 years of residence, immigrants' ownership rates begin to exceed that of non-immigrants. Thus recent immigrants display lower ownership rates than the Canadian-born.

- 3) While immigrants present higher ownership rates, they are less likely than non-immigrant households to live in single detached dwellings and more likely to live in apartments and other multiple dwellings. These differences are more pronounced for recent immigrants.

How do these differences affect the housing demand in Canada? To investigate this, the CMHC incorporated the observed household headship rates, ownership rates and dwelling type preferences into the CMHC's Potential Housing Demand (PHD) Projection Model. They found that these differences cause little variation in the overall housing demand at a Canada-wide level. Lower headship would lead to lower housing demand, but over time, this is compensated by an increasing headship rates of immigrants coupled with higher ownership rates.

No literature was found on private productive investment demand of immigrants. Swan (1996) speculates that, from the prospective of economic theory, investment pattern is not likely to be significantly affected by immigration. Immigrants may affect the pattern of investment through their tastes, which are not likely to differ from those of the natives. Consequently, there is no incentive for economic analysts to inquire into the issue.

Another demand element of the economic behavioural difference of immigrants is related to how they influence the government budget. A recent study done by Abkari compared the net public treasury effect of average immigrant and Canadian-born households. His calculations were based on the following equation

$$NBin = (Ti - Ri) - (Tn - Rn) + aTn$$

Where  $Nbin$  is the net balance of transfers from an average immigrant household to an average native born household;  $Rn$  and  $Ri$  are the tax-paid services consumed by native

