Human Capital and the Brain Drain Phenomenon:

A Study of the Immigration and Emigration

of Canada's Knowledge Workers

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DECLARATION

I, Roy Della Savia hereby declare that: Human Capital and the Brain Drain Phenomenon: A Study of the Immigration and Emigration of Canada's Knowledge Workers, is my own work and that all primary and secondary sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Signature: 

Date: 22/05/2003

ABSTRACT

This research discusses the relationship between the migration of skilled professional and managerial workers from Canada to the United States, the so-called “brain drain,” and seeks to determine if and how the Canada-U.S. Free Trade Agreement (FTA) and the North American Free Trade Agreement (NAFTA) may have affected bilateral flows of permanent and non-permanent immigrants between the two countries. Classical economic theory suggests that trade and factor movements are substitutes, so that freer trade between Canada and the United States could be expected to reduce incentives for bilateral migration. On the other hand, the labor demands of multinational corporations in the emerging global marketplace require a greater degree of worker mobility than has heretofore existed. The research reviews available historic and longitudinal evidence related to political, social and economic effects of the FTA and the NAFTA. The conclusion is that both agreements contain certain factors which may actually ease the passage of workers from one country to the other, but that the primary reason for movement south by Canada’s knowledge workers is probably more closely connected to internal economic conditions within Canada than to external ones.

LIST OF ACRONYMS

CPS - Current Population Survey

FDI - Foreign Direct Investment

FTA - The Canada-U.S. Free Trade Agreement

GDP - Gross Domestic Product

NAFTA - The North American Free Trade Agreement

OECD - Organisation for Economic Cooperation and Development

RRC - Reverse Record Check

UBC – University of British Columbia

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Chapter 1: INTRODUCTION

The Problem

The rapid growth of international trade in Canada, in the wake of expansion of freer trade throughout the world over the past two decades, have made improved competitiveness a crucial objective for the Canadian government at all levels. In this context, a growing concern for many Canadians is that skilled workers with higher education credentials (knowledge workers) are moving south to the United States in increasing numbers. In fact, increased globalization and the emergence of knowledge- based economies have greatly increased the demand for skilled workers throughout the world. Canada is no exception, and the Canadian government is investing heavily in providing skills for the future work force. The retention of these workers is vital to the global success of Canadian firms. Under conditions of increasing international demand for skills and growing economic linkage between Canada and the United States, there is pressure for mobile workers to take advantage of other opportunities. Indeed, the growing concern is that Canada is currently losing key segments of its highly educated and productive workforce to the United States, the issue of the so-called "brain drain." This issue has received extensive media coverage in recent years. Anecdotal evidence seems to point to a large exodus of skilled labor from Canada, but the available data give mixed messages leading to a wide range of opinion about the

general subject. For example, in studies sponsored by the C.D. Howe institute in 1995, it is suggested that there is a growing shortage of skilled labor in Canada, and that graduates who moved to the U.S. are more likely to have Master's or Ph. D's and more likely in the health, engineering, or mathematics fields. On the other hand, in seeking to substantiate the existence of a brain drain, Roy, Henson and Lavoie (1996) stated that they could draw no conclusions about a shortage of skilled workers in Canada because so little was known about current or future skills imbalances. They also noted that employer-based surveys do not provide reliable estimates of market shortage situations. Gingras and Roy (1998) also concluded that there was no evidence of a broad-based shortage of skills.

Nevertheless, many observers have concluded that the preponderance of evidence leads to the general conclusion that during the 1990s Canada suffered a net loss of skilled workers to the United States in several economically important occupations, although the numbers involved have remained small in an historical sense and small relative to the supply of workers in these occupations. Compared with the general population, however, emigrants are over-represented among better-educated, higher-income earners and individuals of prime working age. Further, there was an upward trend during the 1990s in the number of people leaving Canada for the United States and other countries.

In any case, there are three issues central to the debate. How many people are moving to the U.S? Are they among the most highly skilled workers? And, why are they leaving Canada? Moreover, what is the bottom line in regard to the socioeconomic situation of Canada if there is such a "brain-drain?" In the latter category, a steady loss of highly educated and skilled workers is perceived by some observers to present a long-term problem for prospects of economic development and international business competition for Canada. This concern has been heightened by the view that a growing shortfall of human capital as a result of emigration is no longer being fully offset by a traditional immigration inflow into Canada nor by any other effective measures which could help to staunch the outward flow. Followed to a logical conclusion then, this line of thinking, and some ongoing confusion about what research data into the problem really means, suggests that there are as yet undetermined social dynamics at play which foreshadow a time when the a outflow of human capital will severely impact the Canadian economy at all levels.

To the casual observer, the two most salient factors that tend to draw Canada's knowledge workers south are more and better job opportunities, and higher wages. First, the larger U.S. economy offers more opportunities in key knowledge sectors, where Canadians may find work better-suited to their qualifications. When conditions are not right at home, skilled people begin to

consider moving elsewhere to ply their trade. In the case of health professions in Canada, for example, the outflow of workers to the United States reflects restructuring of the Canadian health care system and slow employment growth for health professionals in Canada. Additionally, the greater availability of research funding and more advanced research facilities in the United States may also be enticing Canadian scientists and engineers to head south. Thus, the concern that Canada is currently losing key segments of its highly educated and productive workforce to the United States is, in part at least, a realistic and valid one. Moreover, available evidence suggests that those workers who are emigrating are some of Canada's most qualified workers. Finally, although the two most obvious factors that tend to draw Canadian workers south are more and better job opportunities, and higher wages, higher Canadian taxes also apparently play a role for recent graduates and entry-level positions, and have an even larger effect on high-income positions. Are these the only factors, however? And if so, why are they perceived as being more influential today than they have been in the past?

In terms of economic determinants, one striking feature is prominent from statistical studies that relate to the brain drain phenomenon, and this is the extent to which interprovincial and interstate mobility of labor in Canada is many times higher than that between countries. Another interesting finding extrapolated from

the data appears to be that those born in Canada are more willing to move, either interprovincially or internationally, than are those born in the United States.

Helliwell (1998) provided a study in which interprovincial, interstate and Canada-U.S. population mobility was estimated on the basis of data from the Canadian and U.S. censuses. It was noted that in the Canadian census respondents report their current province of residence and their province or country of birth. The U.S. census collects similar data for state of residence and states or countries of birth. For each of the two countries, it is therefore possible to estimate the relative likelihood of cumulative internal and international migration, after adjusting for the separate influences of distance, size and per capita incomes as determinants of migration. Results showed that for both countries there is a sharply higher probability that a migrant to a state or province comes from another part of the same country rather than from the other country. Based on all cumulative migration up to the 1990-91censuses in the two countries, a resident of a Canadian province was 100 times more likely to have come from another province than from the United States, after adjusting for economic size and distance. The corresponding results for residents of the United States shows them to be seven times more likely to have migrated from another state than from a Canadian province of similar economic size and distance. This suggests that internal migration is much more likely than international migration, and also shows

that Canadians have traditionally been much more likely to migrate to the United States than vice versa.

One explanation for the greater likelihood of finding Canadian-born in the United States is that the Canadian-born are more mobile than the U.S.-born, whether moving within their country of birth or moving to the other country. Another reason for the greater flows of southbound migrants is that the 49th parallel provides a membrane through which northbound information travels much more readily than southbound flows. The average Canadian has all the U.S. channels on his or her TV set, along with much U.S. information and programming on the Canadian channels. In the U.S. media, and on the U.S. cable systems, there is almost nothing about Canada. Thus, Canadians regard the United States as known territory, while most residents of the United States have no reason to ever think what it might mean to live in Canada. Since information and familiarity spur migration, this asymmetry of information may help to explain migration patterns.

The greater familiarity of Canadians with the United States and its job opportunities may also provide part of the reason why Canadian migrants to the United States earn incomes that exceed the U.S. average by more than is true for U.S. migrants to Canada. For both countries, however, international migration remains far less likely than internal migration. Among those who do migrate, whether domestically or abroad, there is a preponderance of the highly educated,

partly because they are more likely to have skills in demand, but also because they are more likely to have contacts in and knowledge about the possible places to move.

To the extent that migration of the highly skilled may be triggered by different factors, survey data suggests that job opportunities and challenges are even more important for the highly educated. It is also true that for many such workers, particularly in health care, education, and government-supported fundamental research, the 1990s have seen large cuts in government spending induced by budget pressures. As federal and provincial finances are returning to balance, both levels of government are starting to rebuild their diminished capacities to provide health care, higher education and research. In addition to this likely restoration of financial support, job opportunities for new entrants to the knowledge professions, especially those employed by universities, will be enhanced by the large bulge of retirements in the next ten years. It is noteworthy that the coming retirement surge is the echo of the massive hiring by universities in the 1970s (larger in Canada than in the United States), which itself was largely responsible for ending the earlier and much larger exodus of highly educated Canadians in the 1960s.

Purpose of the Study

This paper examines available empirical evidence about the loss of knowledge workers from Canada to the United States, and about the gain of knowledge workers in Canada from the rest of the world. The evidence available leads to the general conclusion that during the 1990s Canada suffered a net loss of skilled workers to the United States in several economically important occupations, although the numbers involved have remained small in an historical sense and small relative to the supply of workers in these occupations. Compared with the general population, however, emigrants are over- represented among better-educated, higher-income earners and individuals of prime working age. Further, there was an upward trend during the 1990s in the total numbers of people leaving Canada for the United States and other countries.

However, while losses of highly skilled workers to the United States accelerated during the 1990s, so too did the influx of highly skilled workers into Canada from the rest of the world. This is particularly true of high-technology industries where immigrant workers entering Canada outnumber the outflow to the United States by a wide margin. Indeed, immigrant high-technology workers represented an important part of employment expansion in these industries in the 1990s. Evidence also suggests that the labor market does not discern a quality difference between immigrant and native-born high-technology workers, as

estimated lifetime earnings of immigrant versus Canadian-born computer scientists are nearly identical. Emigrants to the United States are more than twice as likely to hold a university degree than are immigrants to Canada. However, because of the overall greater number of immigrants, there are four times as many university graduates entering Canada from the rest of the world as there are university degree holders of all levels leaving Canada for the United States. The number of master's and doctoral graduates alone entering Canada from the rest of the world is equal to the number of university graduates at all levels leaving Canada for the United States.

The real question becomes then, just what primary dynamics are and could be at play when it comes to prompting Canada's knowledge workers to move south? We can rightly say that higher wages, better opportunities and lower taxes are always of interest to highly skilled workers, or for that matter, all workers, but what is really at the heart of the current trend of movement among Canada's skilled workforce? It is the hypothesis of this study that the primary dynamic contributing to increased emigration southwards of Canada's most skilled and educated workers is the introduction of the North American Free Trade Agreement of 1994 (NAFTA), and that the movement southward has become much more prominent since its implementation. The corollary to this hypothesis is that this increase in

emigration is not being offset by other factors, including the immigration of skilled workers from abroad.

In the late 1980s and early 1990s, a massive wave of plant closures and layoffs hit Canada. Tens of thousands of workers permanently lost what had once been secure and decent jobs. NAFTA has added to the high Canadian unemployment rate and job insecurity. Similar to the United States, after NAFTA, Canada lost jobs as its trade deficit with Mexico grew from $2.9 billion to $4.3 billion. Also, like the United States, Canadian workers' pay has not kept up with inflation and wages have been much slower to rise when compared to gains in worker productivity.

NAFTA has also contributed to undermining Canada's strong social programs, particularly unemployment insurance and national health care. The Canadian Manufacturers Association and the Canadian Chamber of Commerce are trying to cut Canada's social programs while blaming cuts on international competition. Rather than maintain Canada's "high road" social safety net, they want to reduce social welfare benefits by forcing Canadian workers to lower their expectations.

In truth, however, some critics say that NAFTA has actually put the need for Canadian economic development and expansion on a fast track. The normal push and pull factors that determine mobility for Canada’s knowledge workers should

therefore be equally heightened so long as there are differences in regional equality, taxes, employment opportunities and remuneration. The connection between the two, however, is not entirely clear, nor is the long-term prognosis for how current emigration/immigration differentials do or will impact the Canadian economy. Accordingly, this study examines the depth of the “brain drain” problem as it relates to NAFTA and seeks to verify or dismiss the contention that NAFTA has had an overall negative effect on the outflow of human capital from Canada.

Interestingly, in this respect, in order to promote trade in goods and services, Chapter 16 of the NAFTA facilitates the cross-border movement of business persons who are citizens of member countries to the NAFTA. The original idea was to ease restrictions on business travel back and forth between participating countries, but this easing of restrictions may also have had the effect of increasing a cross-border migration of workers.

Traditionally, most people leaving Canada for the United States applied for permanent immigration. Temporary visas had limitations, such as restrictions on the number of renewals possible. However, under NAFTA, Canadian workers in qualifying professional occupations can readily gain entry into the United States, needing only to show proof of their qualifications and a job offer from an employer in the United States. Further, while the maximum validity for NAFTA visas is one year, there is no limit on the number of renewals. Hence, under NAFTA there may

be more people remaining in the United States for an extended period of time without converting to permanent resident status. One might expect that a large increase in temporary migration, if it were a precursor to staying on in the United States, would eventually lead to a noticeable increase in permanent migration to the United States. The stability of the data on permanent emigration, 1997 being the most recent year for which data are available, suggests there have been no such conversions on a large scale.

For these reasons, it is important to examine both permanent and temporary migration when estimating the magnitude and characteristics of outflow from Canada to the United States. The U.S. Immigration and Naturalization Service (INS) provides reliable information on permanent migration from Canada to the United States. However, its data on temporary migration, while meeting the administrative purposes for which they were designed, do not provide a reliable count of people leaving Canada to live in the United States on a temporary basis.

The literature on this possible "fallout" aspect of the treaty has not been fully investigated, but there is enough data to indicate that further investigation is warranted. DeVoretz (1992) also notes that in the 1990s, the United States instituted two major immigration policy measures which both led to changes in the skill content and size of Canadian emigration flows to the United States. First, the 1990 *United States Immigration Act* increased the number of employment-based

slots (“E” and “H” visas), which meant highly skilled Canadians no longer had to line up in the overcrowded family reunification entry category. Next, the mobility provisions of, at first, the Canada-US Free Trade Agreement (1989) and then North American Free Trade Agreement (1993), which inaugurated the “TN” visas for Canadians with a Bachelor’s degree or higher, altered the filter that Canadians faced when contemplating temporary emigration to the US. In addition to these two immigration policy measures, the “L” visa, which allowed intracompany transfers to the United States by Canadian-based companies, kicked into effect with a vengeance in the post-NAFTA era. This dramatic transformation of the way the U.S. immigration policy regime affected Canada could mean that reference to the pre- 1989 era for evidence of a Canadian “brain exchange or drain” is largely irrelevant.

In any case, given the substantial taxpayer subsidy inherent in the Canadian educational system, and the long-term economic growth and productivity consequences of this one-way movement to the United States, important policy issues arise. These include the tradeoff of an accessible, subsidized post-secondary Canadian educational system against the loss of productive, highly subsidized immigrants to the United States. There is also the question of how best to address the short-run or public finance issues: by reducing selected educational subsidies for potential émigrés or by imposing an exit tax on emigrants, or perhaps

both? In addition, should Canada try to replace skilled workers with immigrants, with their attendant productivity and administrative costs, or should it instead bribe highly skilled workers to stay or to return home, as was done in the 1970s? Finally, how does the short-run loss in reduced tax revenues compare to the resulting long-run economic growth gained by using tax rates to persuade the “best and the brightest” to return?

Rationale

There is an obvious "push" of emigrants out of Canada as the numbers show that workers moving to the U.S. has increased steadily, especially since 1994. This push has been attributed to both political and economic factors with the economic factors usually stated as the major reasons. In various studies conducted during the period prior to and since 1994, for example, respondents voiced four major reasons for moving: 1) No suitable work for their specialty areas; 2) a desire for a more prosperous life in another country; and 3) high rates of local taxation. The "pull" to the U.S. was attributed to: 1) expectations of a better life; 2) proximity of the U.S. to Canada; 3) a perception of greater economic opportunity; and 4) higher income potentials. Such reasons might be expected to be cited, as they are fairly obvious. However, the full ramifications of a person’s opting to emigrate or immigrate may not be as transparent as one might expect.

Accordingly, it is important for government to understand the dynamics of migration in order to design and implement effective long-term development goals. Migration to other places to secure better economic status has always been viewed as a natural activity for rational individuals. There are key determinants, however, which can account for greater mobility of certain groups of individuals. Better educated segments of a population can be expected to exhibit a greater mobility, because of a broader range of employment alternatives. On the other hand, a higher propensity to move may also be explained by greater differentials of quality between one's current employment and that expected in the destination locus. Therefore, all other things being equal, a less educated labor segment in a given population will often exhibit a greater incentive to move, but that is not the same as having the actual ability to relocate. Accordingly, if mobility is associated with the cost of information and a capability of coping with constraints, then it is the representatives of the better educated segment of the workforce for whom relocation will be most feasible.

Worker mobility has long been observed to play a critical role in implementing the goals pursued by economic systems. In this regard, the ultimate objective is the efficient allocation of scarce resources and the maximization of each person's utility. Therefore, if individuals are perceived as human resources, the labor market would then be expected to function so as to secure free movement

and exchange of the labor force across entire regions, thereby matching the resources to their best employment opportunities, for the benefit of both the individuals and their employers.

Mobility often comes at cost, however. On the one hand, labor market might be far from homogeneous. Different varieties of human capital, depending on such things as education, experience, and other parameters, might enjoy potential access to some niches, while being effectively sealed off from the others. In that case, migration across the segments is largely determined by the cost of transforming these parameters, which may involve reeducation and other qualitative augmenting. On the other hand, information regarding employment opportunities can be imperfect and/or asymmetric, in which case search is costly and employment optimization cannot be conducted indefinitely. Insider knowledge or networking possibilities may facilitate job search for some and slow it down for others. These circumstances effectively impose a gap on the employment opportunities for high-income/high-wealth categories as opposed to those belonging to the lower and mid class.

Furthermore, depending on ties with a former employer and familiar surroundings, such as friends, family, infrastructure and culture, relocation may be more or less difficult to implement. A highly-experienced employee who has dedicated a long time to a single job, may well have developed assets, such as

personal reputation and retirement benefits, that are only of high value in a particular location. Upon transferring to another area then, their value may deteriorate, which is one common feature of “specific” assets, whose value is contingent upon geography, position, project, or timing.

Scope

In order to get at the heart of the question, this study examines literature on the general question of Canada’s “brain drain,” and delves into extant longitudinal studies which appear to provide meaningful insight into the nature and causation of the phenomenon. Both sides of the issue, whether there is such a brain drain or not, are investigated. First, we present the broad outlines of the controversy, drawing from current literature and media reports. Second, we explore historic and current literature that appears to provide some insight into how predictions about the impact of worker mobility on economic systems are derived. The objective here is to isolate and identify “push-pull” factors which prompt and sustain worker mobility. Third, we take a look at demographic data relating to both immigration and emigration in Canada, focusing primarily on statistical data provided by a number of governmental and independent studies on the subject. The objective here is to establish some type of historical baseline to see whether or not there have been any significant demographic shifts since 1994, the year of the introduction of the NAFTA treaty. Fourth, we explore and discuss newly emergent

factors, such as the advent of information technology and globalization in an effort to better identify market dynamics which have heretofore been largely ignored in statistical studies. Fifth, we formulate a measurement methodology, based on the statistical data examined, which will delineate and define both the depth and nature of the perceived problems associated with Canada's "brain drain." The objective here is to provide an instrument which will clarify the broad ramifications of the data, and furnish greater insight into the real and imagined parameters of the problem. Sixth, we undertake an analysis and evaluation of the findings derived from the data and draw some conclusions about how well or how poorly extant demographic data supports the hypothesis. Finally, we comment on the evaluative process, and offer some suggestions for the direction of future studies of this type.

Definition of Frequently Used Terms

1. Brain Drain - A term referring to the emigration of skilled and highly educated workers from their home country to another country; the term also connotes the commensurate loss of a country's most valuable segment of human capital.

2. Immigration - A term referring to an inflow of foreigners into a country for the purpose of securing permanent residence (Black 750).

3. Knowledge Workers. For the purposes of this study, this term shall refer to those engaged in one of the learned professions, the information technology industry, or other occupations requiring a high level of training and proficiency.

4. Emigration - According to Black's Law Dictionary, emigration means "The act of removing from one country to another, with intention to not return. It is to be distinguished from 'expatriation,' which means the abandonment of one's country and renunciation of one's citizenship in it, while emigration denotes merely the removal of person and property to another country" (522-523).

5. NAFTA - The North American Free Trade Agreement

6. FTA - The Canada-U.S. Free Trade Agreement

7. Push-Pull Factors - A migration theory that suggests that circumstances at the place of origin, such as poverty and unemployment, repel or push people out of that place to other places that exert a positive attraction or pull , such as a high standard of living or job opportunities.

8. Migration - A "generic" term which is used here to indicate the mass movement of populations within geographic locales.

9. Net Migration - The net effect of immigration and emigration on an area's population in a given time period, expressed as an increase or decrease.

10. Permanent Emigrants - people who have left Canada with no intention of returning, and those who had resided outside Canada for at least two years but whose intentions about returning are unknown.

11. Rate of Natural Increase - The rate at which a population is increasing or decreasing in a given year due to a surplus or deficit of births over deaths, expressed as a percentage of the base population.

12. Temporary Emigrants - persons who have resided outside Canada for at least six months with the intention of returning, or have resided outside Canada for no more than two years if their intentions are unknown.

Chapter 2: REVIEW OF THE LITERATURE

Mobility and Human Migration

World population grows as a result of net migration is the difference between the number of people entering a geographic area (immigrants) and those leaving (emigrants). Over time, migration contributes more than just the initial number of people moving into an area, because the children and grandchildren born to the immigrant population add several times the original number to the population base. There is also an increase in the number of deaths as a result of in-migration. Most Americans are immigrants or descendants of immigrants who arrived here over the past 200 years. Only a small fraction of the population is related to the American Indians who were here when the first European settlers arrived in the 1600s. Australia and Brazil are other countries whose current populations consist primarily of descendants of persons who immigrated there during the past two centuries.

International migration is at an all-time high in terms of absolute numbers. About 145 million people lived outside their native countries in the mid-1990s, and the number is increasing by anywhere from 2 million to 4 million each year. In the mid-1990s, the largest immigration flows were from Latin America and Asia into North America, and from Eastern Europe, the countries of the former Soviet Union,

and North Africa into Northern and Western Europe. The Middle East draws migrants from Africa and Asia and hosts millions of refugees from within the region. There is considerable migration within Asia, Africa, and Latin America.

Most people move for economic reasons, but some migrate to escape political or religious persecution or simply to fulfill a personal dream. Some experts divide the many reasons people leave their homes for a new one into push and pull factors. Push factors might be widespread unemployment, lack of farmland, famine, or war at home. The Great Depression (1929–1939) is a good example of a push factor, as hard times encouraged more residents to leave the United States than move in. In the 1980s and 1990s, hundreds of thousands of Africans were pushed out of their homelands to neighboring countries because of famine and civil war.

Factors that attract migrants include a booming economy, favorable immigration laws, or free agricultural land in the area to which the migrant is moving. The labor shortage in Japan is pulling record numbers of legal and illegal immigrants to fill the low-status, low- paying, or dangerous jobs that Japanese natives reject. The United Nations estimates that to keep a working population of 87 million through 2050, Japan would have to accept 609,000 immigrants a year. Between 1990 and 1999, the number of legal foreigners increased from 1.1 million

to 1.6 million. Estimates of illegal migrants in Japan range from 150,000 to 300,000.

The majority of migrants to the United States in the past 200 years were European. During the first decade of this century nearly 9 million immigrants entered this country, and more than 90 percent were from Europe (see chart, "Regional origins of immigrants to the United States, selected years,"). By mid-century, just half of the migrants were from Europe. The total number of immigrants fell to around 1 million in the 1940s. In the 1980s the number of migrants increased to levels similar to those at the turn of the century. But 84 percent of these migrants were from Latin America and Asia, and just 10 percent were from Europe. The volume of legal immigration and the prevalence of migrants from Asia and Latin America will continue in the new century.

The origins of immigrants change over time, as do their numbers and the effect that they have on U.S. population growth. According to one estimate, about 42 percent of the U.S. population in 1900 resulted from immigration during the preceding century. Immigration was an even greater factor in growth between 1900 and 1950, when 20 million people entered the country. Natural increase added an average of 1 percent of the population increase per year during that period. At that rate the population would have doubled in about 70 years. But it took only 50 years to double. Migration stepped up the doubling by 20 years. The volume of legal

migration has fluctuated since the 1930s. Immigration has accounted for an increasing portion of population growth as American women began having fewer children. Today one-third of the U.S. population growth is from net migration. The U.S. Census Bureau projects that the U.S. population will reach 403,687,000 by 2050. Of this projected growth, 36 percent may result from immigration, with 46,691,756 new immigrants being added in the next 50 years. Of the three components of population change, migration is the most difficult component to predict and is most affected by government policies and government policies. Because nations can control their borders, they may regulate the flow of legal immigrants. The oil-producing countries in the Middle East offered financial incentives to attract immigrants, just as the United States and Australia once offered free land. In 1990, Japan permitted employment rights and residence for ethnic Japanese from Latin America. In 1998, 660,477 immigrants were admitted legally to the United States. Many foreigners also enter the country illegally each year. The exact number of persons migrating illegally to the United States is unknown, but estimates range from 100,000 to 500,000 per year.

In today's rapidly expanding world economy, the rule appears to be that geographic mobility of the global workforce has become an essential ingredient for economic success. Nowhere is this more obvious than in the flow of knowledge workers from third world countries to the major industrial nations of the West. For

example, according to one study, of the 5 million people who migrated to another country from 1975 to 1980, two thirds went to the US, Canada, or Australia (Ehrenberg and Smith, 1999). This tendency for skilled workers to travel abroad in increasing numbers could reveal the relative importance of current economic factors among the forces underlying international migration.

According to U.S. census data, immigrants constituted 7.9 percent of the population and 9.3 percent of the labor force over the period of 1991-1993 (Byerly & Deardorff, 1995). Within the United States, just over 2.5 percent of all those employed in 1996-1997, moved between states, and nearly half of them to a different (nonadjacent) region. About 70 to 85 percent of movers cite economic over any other reasons for their relocation.

In seeking to determine the direction of such migratory flows, human capital theory predicts that migration will direct resources away from areas with relatively poorer earning possibilities and into regions affording superior employment opportunities (Massey, 1993). When it comes to South-North type migration (between regions with highly asymmetric developmental statuses), this prediction clearly finds support. However, North-North (among regions of comparable and superior opportunities) or South-South type mobility (between the poorer regions) should exhibit some peculiar patterns not readily accounted for by the simple reasons surmised previously (Bellante, 1979).

Empirical literature observes that the “push” factors turn out to be stronger determinants as compared to the “pull” causes. In other words, while the labor force is definitely strongly attracted in directions of superior employment and earning opportunities, immigrants do not necessarily come from the poorer regions. One might expect that it is not only the absolute superiority of earning opportunities, but also their relative probabilistic qualities (the likelihood of actually landing better employment) that affects relocation choice on the margin. One way of assessing such likelihoods would be to look at the unemployment rates in the specific locations. However, along the lines of the aforementioned segmentation principle, specific professions should target specific niches. Due to this fact, as well as because the number of people moving with job offer at hand far exceeding that of people moving to look for a job, no significant relationship has been found between unemployment and in-migration. Furthermore, even though the poorest regions would impose the highest propensity to move on their populace, they also feature a labor force of the lowest class, with the lowest income and inferior education and skills, which provides for the lowest mobility. To draw a tentative bottom line, above and beyond the conventional question of where people move, the other issue of complementary importance is who tends to move, accounting for the ever-greater role of demography or personal characteristics of migrants.

Age appears to be the single most important factor in driving the migratory pattern in Canada, and indeed, in most countries around the world. Young adults in their 20s have shown a 12 percent regular migration rate within the country (Statistics Canada, 1995). By age 32, the rate of migration declines to about 8 percent, and sags to about 4 percent by age 47. Among the explanations for this is the fact that age is a major factor of human capital deterioration. Moreover, the second most important constraint on migration is the psychic costs that are also a direct function of age. The latter has to do not only with the alleged sentimentality of the elderly, but also with the aspect of specificity of assets, such as community and interpersonal ties as a function of time period in residence. Of course, the age dimension is intimately intertwined with, and should properly be studied in isolation from, the marital and children statuses which both impose additional constraints on migratory propensity and ability.

Education could be regarded as by far the better predictor of who will likely move within a certain age group, other things being equal. According to the US Bureau of Census, more and better education does indeed render individuals more likely to move into superior employment environments (Byerly & Deardorff, 1995). Such education might reveal or signal lower specificity of the individual's human capital, which opens up wider and better opportunities for employment across segments as well as geographically.

Distance also contributes to the cost of migration in two major ways. For one thing, it is easier and less costly to acquire information on employment opportunities closer to home or in adjacent regions. Networking ties also tend to deteriorate with geographic distance. For another, the transportation cost is also a function of distance, which thus affects the psychic costs of not meeting with family and friends for a long period of time. However, several important caveats are due here to highlight the important dimensions of migration oftentimes overlooked by literature and more importantly by the conventional census/survey practices.

Migration from rural areas to urban locations and back, or the so-called circular migration, is one important, and often underestimated, source of demographic information. Whereas the common approach has been to study permanent switch of residence from rural areas to urban centers, especially exhibited by the migratory flows originating from low-income locations, for a whole family, one profitable way of looking at the actual relocation patterns would be to study “mixed strategies,” whereby part of the family shifts permanently to the city, with the remaining part residing in the rural locus of origin. While the migrant will tend to support the rural half upon finding a job, the rural dwellers would tend to help him in transition period while unemployed. On the other hand, higher quality of transportation could be studied, at least formally, as a proxy for lower distance. Better commuting possibilities are one realization of such a solution to the distance

problem, whereby the circular migration could be analyzed as a regularly occurring, oscillatory pattern, on a lowest (marginal) level, qualifying it as migration.

More importantly, this dimension of transportation quality and/or distance now permits a splitting of the two dimensions of migration, whereby the employment or occupational mobility need no longer be viewed as complimentary to residential decision, and these two aspects of choice are thus not synchronous as they used to be. Therefore, one tentative prediction that could be inferred based on the above would be as follows: The higher the distance and the lower the quality of transportation, the more likely migration would be permanent if at all. Otherwise, it might well be oscillatory or circular, thus affording better opportunities for both the factors and the recipient regions without actually affecting the latter's demographic structures.

One final dimension of the distance factor amounts to measuring distance other than geographic. Indeed, people have exhibited a tendency to migrate in directions where their friends or relatives have previously moved. That could be viewed as pertinent to psychic costs, largely derivative of personal or cultural complementarities. Such complementarities do impose constraints on the maximum allowed distance in the broader, non-geographic sense, and may well account for the role of interpersonal and cultural causes possibly affecting spatial

mobility. On the other hand, it might also suggest some interesting implications concerning the clustering and concentration of human resources and factors of production at large, while at the same time rendering the purely geographic distance per se of secondary importance.

All of the determinants mentioned thus far are primarily related to domestic migration. Although do they carry over on an international level, global mobility has been subject to many additional and heterogeneous constraints, and moreover has exhibited highly specific dimensions of its own. Thus, the relative distribution of earnings between the sending and the recipient regions allow us to predict what skills will be most rewarded, likely employed, and thus reveal the most mobility expected. For instance, some countries with more sophisticated social safety nets will tend to exhibit more compressed earnings gap between the skilled and unskilled labor, unlike in the US where the educational differentials are more pronounced. The skilled and highly educated labor in these countries will therefore face higher incentives to migrate to the US where their differentiation actually provides them with a competitive edge. Moreover, since the US economy represents a full-blown scope of sectors, it also suggests better, in average or expected terms, employment to all parameters of human capital. However, while migrants from the economically advanced regions with more compressed social security will tend to be positively selected with respect to skill, the less-developed

regions will provide all of its labor stock with significant incentive to seek better employment. Therefore, as a model example, the US economy will receive disproportionately unskilled labor from countries with less equal earnings distributions.

Although most individuals who migrate to a country like the US primarily do so in the search to improve their well-being, the latter may not confine to better employment opportunities only. What sets the overall quality of life captures other options, such as the cultural and societal institutional framework, public goods, overall social security, and ethnic comfort to name but a few. When societal institution start playing a major role in the individual's choice, which might as well be function of one's age or status, religious or political association, and so forth, migration might shift away from its economic constituent and closer to the political component. Again, along the lines suggested before, the distance factor, in the broader sense, is in play, with the choice aimed at reducing this distance at the lowest cost. Political background in status terms alone might not be sufficient to force into switch of environments, however. What might likely drive such a choice is the political uncertainty or volatility in the country of origin. Because return migration is not an option for political migrants, they will more likely invest in human capital whose parameters are specific to the host country, while the economic migrants will tend to have an incentive to preserve the parameters valued in their

home region. Since their investment will primarily be focused and more concentrated in time) on their human capital, political migrants might and do show to outperform the natives in job search and earnings growth rate, as well as longer-term social status.

Studies in migration can be viewed as an important part of what is called the “modern economic geography" looking into the underlying principles of the allocation of productive resources, including the historical emergence of urban and rural centers. One critical area in which our findings on migration of human capital could come in handy is the so-called economies of agglomeration. It has long been maintained, in particular, that the genesis of large metropolitan areas can be explained by the scale economies accruing to concentrated capital. If certain production or operation processes display increasing returns to scale, then the maximum output and efficiency could materialize via geographic or temporal concentration. However, since human capital could engage in complimentary relationships with other factors, spatial concentration of capital will also trigger that of labor. Of course, such benefits could only be realized if the human capital is (a) mobile enough over a short run, (b) largely nonspecific. (Note that specificity could stem from complementarities with factors or institutions in the present, or status quo, locations). Over and above the concentration of intra-firm activities, positive

externalities frequently occur across firms as well, whether it be in terms of common transportation facilities, marketing channels, or institutional infrastructure.

Lucas (1998) suggests some findings on patterns and consequences of internal migration. Although these observations were originally proposed for the lower-income or less developed economies, they could, all else equal, apply as well to the less developed regions in the otherwise advanced countries and could be used in projecting the effect of social stratification on the patterns of mobility. Evidently, basic trends tend to second those in the advanced societies, in that the majority of migrants are young adults in their 20s to 30s, and educated rural inhabitants have a higher probability of migrating even though, the proportion of rural dwellers with education is rather low. Although the wage differentials do matter the most when it comes to migrating decisions, there is insufficient evidence for the underdeveloped economies and their labor markets of actually offering high probabilities of employment in the first place.

One alternate explanation, according to the Harris-Todaro model, would be to expect people to move from rural areas to urban centers in order to try to find a job since employment information could be qualitatively superior in the adjacent locations (Preston, 2000). In contrast, tax incentives have not been found to significantly affect the migration decisions, which might imply that individuals are more sensitive to the employment probabilities than to residual ratios as applied to

their disposable incomes. Sensitivity to infrastructure factors, such as availability of better schooling, clean water, or health security, has remained largely unobserved or overlooked for the less developed societies. Property rights issue has been found to be significant with respect to the basic rights affecting political freedoms and criminal situation. Given such agglomeration externalities, spillovers, and scale economies in infrastructure provisions, the general presumption is that human capital exhibits a higher mobility than do other factors.

One important consequence of migration is the predicted convergence of wages across regions and countries. For instance, the famous Heckscher-Ohlin-Samuelson theorem argues that, as a long-run result of free trade in commodities based on comparative advantage, the scarcities of, and prices for, underlying factors will converge across the trading regions, without actual exchange of these factors (Preston, 2000). However, such indirect convergence would only be possible for the so-called tradable commodities and services whose production is underlain by general factors, while non- tradables will require explicit exchange (migration) of their underlying specific factors, for even partial convergence to occur. Moreover, wage convergence would depend on the actual skill mix, long-term shifts in productivity, and the actual wage-setting process. Finally, while respective convergence could be expected across regions, there's no prior reason to claim a similar convergence of income across social strata.

Permanent emigration of high-quality human capital is of special importance for any economy, as it exercise a long-run impact on its productivity and standard of living. This phenomenon has been studied in the literature as the “brain drain” issue. One should note, however, that brain drain does not capture the migratory flows of the relatively unskilled labor, or temporary migration of highly educated persons who seek better education opportunities abroad or somehow have no firm plans to enter the domestic active labor force anyway .

Statistics Canada (1999) reports that about 1.5 percent of young persons who graduated from the higher education institutions in Canada in 1995 moved to the U.S. Although this proportion might not appear very high in absolute terms, the reference base constitutes the human resources of the highest quality. In fact, the percentage of Ph.D. migrants is higher than that of master’s graduates (12 percent as compared to 3 percent respectively). In a sense, that could second the maintained tendency for the upper-class (higher-income or professional) representatives to be more mobile, as shown by the previously analyzed studies. The statistics show a distribution of the migration pattern, whereby the weak stay ratio ex post (over a five-year stay period) constituted about 7 out of 10, with only 3 of 10 intending to return to Canada at some point in the future. It is further reported that economic (work-related) reasons account for about 57 percent of the incentive, with 23 and 17 percent relocating for educational and marriage purposes

respectively. Better opportunities, in absolute and probabilistic terms, and higher expected wages prevailed over the tax incentives. One caveat that might undermine somewhat the 1995 migratory pattern is the profound changes occurring in Canada's healthcare system at the time, and obviously affecting its labor market.

The pattern of the Canadian out-migration to the US labor market exhibits a particular geographic concentration, with Texas, California, New York, and Florida accounting for some 45 percent of the destination, particularly for Ph.D. graduates. Ontario (57 percent) and Quebec (11 percent) were the primary origins accounting for the most out-migration. In light of these figures, and as a promising direction for further research, it could be profitable to construct and solve a transition (Markov) matrix with initial and directional probabilistic states. Identifying the high-probability directions (sticky states) with highest propensities to stay (once entered) could provide some useful insights into the geography and demography of concentration and its stability; for example, where and why migration and mobility is most and least pronounced.

On the whole, the structure of the US labor force with Ph.D. degrees, immigrants constitute some 29 percent of those conducting R and D in the industry, business, and academia. About 22 percent of foreign S and E doctoral recipients remain in the US for postdoctoral study, and 17 percent accept employment. The

weak stay ratio was on the order of 63 percent, with the confirmed ex post plans claiming about 40 percent. This again could be explained along the lines of a full-scope economy approach, whereby human capital moves to whatever locations promise the best and fullest possible utilization for its parameters.

However, to see whether those who originally planned on staying eventually did remain in US residence over a prolonged period of time, one would need to take a look at the ex ante-ex post stay propensity gap, and its distribution over time. One can see, in particular, no significant evidence for high net return rates for scientists and engineers over a 10 to 20 years' time span. However, for this particular group of specialists, possibilities for networking with colleagues in their home environments. have shown to be particularly high. Another prospective dimension of research would be to arrive at duration of stay that is optimal to the host economy's long-run productivity.

There is an extensive empirical literature researching into the factors and demography of internal migration. Treyz et al. (1993) derives a net migration equation and estimates it using time-series data for 51 regions over the period 1971-1988. This study finds that the dynamic response of net migration is significantly sensitive to amenity differentials, relative employment opportunities, and industry compositions. This attests to the probability that interregional migration cannot be restrained over a prolonged time span: Even if it is socially

costly, the private benefits may accrue to the migrants and reflect the fact that migration is a ‘natural’ and historically observed propensity. Frey (1996) suggests that, over and above the factors contributing to the gap if any between the migration patterns of professionals versus lower-class workforce, an important distinction need be spotted to ethnic origin, with domestic migrants tending to favor areas not attracting immigrants. Massey (1994) obtains that the geographic concentration of poor blacks should properly be attributed to the residential segregation of African Americans in urban housing markets, rather than caused by the out movement of non- poor blacks or net movement of blacks into poverty. Boehm (1991) argued that the driving forces behind migration do differ from those underlying intra-urban mobility, which is routinely affected by the tenure (housing/renting) availability. Although this study does not specifically address human smuggling and related issues of mobility, Nicholson (1990) suggests an important qualification to the conventional research practices drawing on census data. The latter tend to omit a considerable amount of movement due to aggregation, and might thus prove little more than mere artifacts of the actual data.

Wilson (1988) studies migration patterns both within and between metropolitan and non- metropolitan areas, and finds that socioeconomic transformations of the periphery since the Great Depression have reduced differences in migration patterns between the periphery and core regions. This

study maintains that, while migrants have persistently exhibited higher educational attainment relative to nonimmigrants, this gap tends to be fully explained by variation in regional socioeconomic development, being lower or nil at origin if the origin is lower or similar to destination in terms of socioeconomic development. Wardwell and Gilchrist (1980) reveal that the common trend of migration going from rural areas to urban centers actually reversed itself since the early 1970s, with more people moving out of the large centers and into suburb areas. Several important implications could be inferred along these lines. First, the higher-income societies can project similar trends for the upper strata within a society, whereby: (a) The higher-income individuals tend to switch away from the concentrated urban areas (perhaps, due to the income effect making determinants other than superior earning opportunities prevail at certain levels of income); (b) The higher-income individuals display a higher propensity for non-permanent migration (circular mobility depending on the quality of transportation which allows to split the two once-complementary components of choice: employment and tenure availability.

Finally, Fassmann and Munz (1992) focusing on migration trends within Western Europe arrive at some distinct geographic patterns linking sending countries to specific recipient regions, which contingencies they attribute to historical, linguistic, cultural, and economic determinants, as well as internal political constraints. These sources of differentiation (except for the latter two),

however, could hardly prove as significant in explaining migration patterns within the essentially non-heterogeneous North American cultural space, let alone that within the constituent countries at study.

Farber (1999) spots several robust trends on the US labor market in recent years, including: 1) Long-term employment relationships are common; that can to a large extent be explained by the significant specificity of human resources, or by unique match as one such variety. 2) Most new jobs end early, despite the considerable proportion of long-term relationships; that only seconds the previous fact that search for optimal complementarities is costly. Alternatively, it parallels the trend whereby most startups or new projects prove to be a failure. 3) The probability of job change, which in essence reduces to one component of mobility, declines with tenure; this empirical finding proves conceptually to be but a reasonable implication from the previous two, in that tenure tends to be both a function of employment time and a factor of specificity. However, during the first several months, job mobility is high, since the probability of unemployment actually increases for newly minted hirees.

A recent population census conducted by the US Bureau of Census reveals several more tendencies, including reversals of some previous regularities (Byerly, & Deardorff, 1995): a) Interestingly, during the 1990s, the combined minority population grew at about 13 times the rate of the non-Hispanic whites, which some

view as a shift toward a true cultural diversity. At the same time, the immigrants who over that period arrived at an average rate of 1 million annually tended to concentrate in just 10 of the nation's metropolitan areas. While "immigrant magnets" were represented predominantly by urban centers, the tendency for natives (most pronounced for the upper classes) was to shift increasingly to suburbs and otherwise non-metropolitan areas. b) The tendency among the African Americans in the beginning of the last century to move out of the Southern states. due to unfavorable employment prospects, has been reversed, thus reinforcing the geography of racial concentration. c) Besides the lower propensity for the Baby Boomers to move as compared with the Generation X representatives, the more mobile former tend to concentrate around a few "retirement magnets." d) The more educated tend to move longer distances, while the less well educated poorer families tend to stay put or move locally. e) In general, unlike the long-present stereotype perception of the American nation as comprised of people always on the move to their optimal location at best holds as a propensity that rarely materializes other than on a local scale. f) While historically the US demography has been affected by immigrant influx of predominantly European origin, by the late 1990s there occurred a dramatic shift, with the Latin territories accounting for the most contribution to the growth in the US foreign-born population. The latter tends to cluster around the eight states:

California, New York, Florida, Texas, New Jersey, Illinois, Massachusetts, and Arizona. This fact could be of self-reinforcing nature and primarily be explained by economies of concentration and psychic costs, with newly arriving immigrants benefiting the most within the already established immigrant communities, either culturally or in terms of opportunities.

Coupled with the problem of out-migration is the fact that for the first time in its history, Canada is facing a population decline; beginning as early as nine years from now, demographers predict, unless women start having more children or tens of thousands more immigrants are brought to prop the drooping growth rate. The first census figures of the new millennium by *Statistics Canada*, showed that the country's population reached 30,007,094 in 2001, the year the nationwide enumeration was conducted. The poll, conducted every five years, showed what many demographers have long predicted; Canada's population growth rate has slowed to an all-time low. The country's population grew by 1,160,333, a 4 percent increase since the 1996 census, matching the lowest five- year growth rate in Canadian history. And for the first time in 100 years, Canada is growing more slowly than the United States. The current stall in growth has to do with lifestyle decisions of adults in their childbearing years combined with the aging of the first baby boomers. Even to keep the population stable will require more immigrants because Canada's fertility rate is just 1.5 children, the average number of children

a woman will have over her lifetime, well below the rate of 2.1 children per woman needed to sustain population. Forty-five years ago, the average Canadian woman had four children over her lifetime. Canada's sluggish growth rate, while ahead of developed European countries, is far behind that of the United States, which had a 5.4 percent growth rate between 1995 and 2000. Mexico grew at 8.5 percent.

Declining birth rates are a worldwide phenomenon, with developed countries leading the population crash. Many countries, including Russia, Japan, and Germany, are having, or will soon have real population declines. Economists and demographers say the dropping birth rate is a trend that will continue and Canada will face labor shortages within five years unless young immigrants are brought here to fill jobs. Between 1981 and 1986, the growth rate also dipped to 4 percent but demographers attributed that decline to a global recession, felt particularly hard in Canada, which in turn may have scared off immigrants because fewer than half a million settled in Canada during that period. That Canada's growth rate has come to a screeching halt now is no surprise. It is the result of a series of demographic shifts that began during the Depression, when people began leaving their farms and small towns for the city. The urbanization trend caused birth rates to plummet because cities offered more job opportunities to women and dissipated the need for large families, namely, a ready-made work force to work the farm. Traditionally, Canada has countered its dropping birth rate

by boosting immigration. But in the past two decades, the immigrants Canada selected have been more educated and urbanized. Hence, when they arrived in Canada, they too had fewer children.

The final demographic trend to sink Canada's growth rate is the brain drain, which began in the last decade of the 20th century. During the 1990s, almost half a million Canadians left the country, largely to pursue careers elsewhere. The slow growth rate means Canada's elderly population will continue to increase. By 2035, the percentage of Canadians 65 and older is expected to double to 25 per cent from 12 percent. Canadians can expect to see the first labor shortages within five to 15 years, economists predict, beginning with skilled technical and trades workers. Next, teachers, healthcare workers, information-technology experts and academics will be in short supply. That will cause the unemployment rate to drop, wages to rise, and certain in-demand workers, such as computer experts and teachers, will have greater bargaining power to negotiate wages and working conditions.

In Europe, many observers feel that the labor market for skilled professional personnel is becoming increasingly globalized in terms of both supply and the demand. For example, an OECD report (Salt, 1997) pointed out that overseas students account for an ever-greater proportion of the university population in most industrialized countries, and international mobility schemes for researchers are

available at most universities. Multinational companies to draw more than ever on personnel with high qualifications from around the world to enhance and ensure a high-quality performance. Such a “brain exchange” implies a two-way flow of expertise between a sending country and a receiving country. Yet, where the net flow is heavily biased in one direction, the terms "brain gain" or "brain drain" is used. A further term, ‘brain waste’, describes the waste of skills that occurs when highly skilled workers migrate into forms of employment not requiring the application of the skills and experience applied in the former job. Johnson and Regets (1998) introduced a new concept into the debate, namely ‘brain circulation’. This refers to the cycle of moving abroad to study, then taking a job abroad, and later returning home to take advantage of a good opportunity. The authors believe this form of migration will increase in the future, especially if economic disparities between countries continue to diminish. Such circular migration has been observed amongst Malaysians who had studied in Australia, for example. The OECD study carried out in 1997 stated that "despite the importance of migration by the highly skilled to the development and management of international economy, knowledge of the patterns and processes of their movement is poor". A typology which accommodates the diversity of this group, and its subcategories, is still lacking and there is no agreed concept or definition of the highly skilled.

The flows of skilled personnel are influenced and determined by a variety of factors. Firstly, on the supply side, science is becoming more internationalized than ever. Participation in international education and training, including the various international exchange schemes and fellowships, has stimulated the interest of young scientists in working abroad and has helped give domestic graduates a more international perspective (Stein, 1996). Smaller countries, such as Sweden, Holland, and Ireland, in particular, are seeking to produce more graduates with international experience suitable for work abroad, in order to cope with their growing international businesses activities. Secondly, on the demand side, call for highly skilled personnel with international experience is on the rise. Local shortages of certain types of expertise are among main motives for recruitment from abroad, especially, employers seeking top quality candidates (Stein, 1996). Immigration incentive policies are also a factor in many countries where such policies exist.

Also, according to the OECD report (Salt, 1997) the overall volume of European migration to the US has been more or less steady over the last few years. The number of immigrants to the US from Europe in 1994, 1995, 1996 totaled 62,658, 44,870 and 46,776 respectively. In 1994 the numbers were higher than in 1995 and 1996 due to changes in US immigration law that allowed many students to stay on. In any case, emigration varies across Europe. US INS sources

show that The UK topped European countries in the number of professionals migrating to the US (2,934), followed by Germany (1,501), and France (688). Of these immigrants, around 25 percent went to California, making the largest single group, around 10 percent went to New York state, and around 8 percent went to Massachusetts. Some 7,638 EU professionals were granted permanent US visas in 1996. These included executives, architects, engineers, surveyors and mapping scientists, mathematicians and computer scientists, natural scientists, doctors, nurses, and pre- and post-secondary teachers. The broadest group of professional EU immigrants to the US is made up of those who have executive and managerial occupations (4324 persons). These often originate from temporarily intra-corporate transfers that turn later into long term and permanent ones.

About 50 percent of all Europeans completing a Ph.D. in the US stay on for longer periods afterwards, and many of them stay permanently. This also could be reflected in the National Science Foundation (NSF, 1995) data on European doctorate holders. The data show that in 1995 there were around 17,000 Europeans who had remained in the US after having completed their Ph.D. Of these around 11,000 had become naturalized citizens, and about 3,900 of them had become permanent residents. These include Ph.D. holders in all fields. In science and engineering, 8,760 of Ph.D. students graduating in the period between

1988-95 were Europeans. The US Department of Labor statistics show that over half of these are still in the US even 5 years after graduation (Johnson and Regets, 1998). European doctoral graduates have a much higher stay rate in the US than their Korean and Japanese counterparts. The difference between Japan and Europe in the propensity to stay is large; only 8 percent of Japanese Ph.D. graduates stay. Graduates from the UK have the highest stay-rate in the US. Whereas, most German graduates go back (75 percent), only around 30 percent of UK graduates do. Greece lies somewhere in the middle between Germany and UK with a return rate of approximately 60 percent. However, there are also large variations between fields of study. If one takes the UK as an example, 73 percent of engineering graduates stay compared to 65 percent of those from the Life sciences, and 60 percent in Physical sciences. Additionally, it is perhaps interesting to note that in 1996 1000 of the Ph.D. graduates who started their own businesses in the US were Europeans.

Also, according to INS sources, Despite the US being the main destination of European migrants they tend to be attracted by just a few places. California, New York state, and Massachusetts remain the most favorite destinations for European scientists and engineers and other highly skilled personnel. Similarly, in a study on brain drain from France to the US, it was found that the States of California, Massachusetts, and New York attracted most French post-doctorates

to the US. These places seem to have certain specific dynamics that give them advantage over other centers in attracting top scientists and engineers, and thus hosting top research.

The key difference between the American and European experience resides in scientific capability. It is true that European research institutes may perform better in some fields than the US, but they lack the magnet power that can transform them into pivotal points in their fields. European universities, for example, attract fewer international students than US universities do despite the fact that tuition is free in many European universities (European S&T Indicators Report, 1997).

The presence of centers of excellence in certain locations and their absence in others represent two major pull and push factors. The US seems to have many such centers, combined with flexible and open career structures, a strong entrepreneurial culture, and high living standards and quality of life. For instance, when in 1996 the German Research Society sponsored 1028 German fellows to go abroad, 641 (which was about 60 percent of the total) chose the US as a destination. Similarly, in Europe, Switzerland, a country that hosts major research and academic centers, such as CERN, the IBM Lab near Zurich, and the Federal Institutes of Technology in Basel, Lausanne, and Zurich, and which enjoys living standards which are among the highest in Europe, is also successful in attracting

Ph.D. candidates from other European countries (European S&T Indicators Report, 1997). This scientific pull, in turn, has a knock-on effect that drives all sorts of other related activities in the location in question, thus, attracting even more scientific activities. The inflows of doctoral candidates, postdoctoral researchers, and senior scientists provide the receiving countries with a pool of knowledge that places these countries in an advantageous position with regard to their competitors. Zucker, Darby, and Armstrong (1994) report that for an average firm, 5 articles co-authored by an academic star and the firms' scientists result in about 5 more products in development, 3.5 more products on the market, and 860 employees.

The IT sector in the US is widely believed to be suffering from staff shortages. As a result, it is feared to be draining other countries. However, more recently this has been challenged by some studies in the US, which have accused firms in this sector of preferring foreign engineers recruited from developing countries who are willing to accept lower wages than their native counterparts. In a Workshop organized by the Sloan Foundation in the US dealing with the issue of "Migration of Foreign Scientists and Engineers to the US" in 1997, the following remarks were made. Professor Paul Ong of UCLA (University of California in Los Angeles) found that immigrant engineers were paid up to 30 percent less than their native peers. Furthermore, an investigation carried out by Norman Matloff of UCLA

found that only 2 percent of 120,000 annual employment applications to Microsoft are accepted, hardly an indicative of the claimed shortage.

In the same workshop, another study carried out in the US by Robert Zacher of the Harvard Smithsonian Observatory was presented. The study found that the US is now training 2 Ph.D. scientists for every available job. The Immigration and Naturalization Services too did not think the IT industry lobby will succeed this time in increasing its quotas of foreign workers or to relax any further immigration policies. The mood in the US towards this issue seems to be changing. The demand for foreign skilled personnel is associated with the search for cheaper labor and not a response to shortages in supply. Immigration policies of this type, however, usually target cheaper labor, drawn from countries with lower living standards. The push and pull factors for the international mobility of skills between advanced countries revolve around competing for excellence. Individuals search for excellent career opportunities, and organizations are looking for top quality individuals. It is where supply and demand meet that excellence is produced and maintained.

Developing and developed countries feel the impact of labor market changes on the mobility of highly-skilled labor in different ways. For developing countries, it might be argued that their balance of payments has benefited more by sending people abroad from where they can send home substantial amounts of

cash. In Europe, however, this is not usually the case and the negative effects of the migration of highly-skilled personnel is not outweighed by any cash they may send back, given the smaller differentials. Brain drain fears in Europe focus on the so-called "star scientists" who are the brightest and best and whose talents can have many spillover benefits for their host countries. For example, in the past, European researchers in the US have always been an important source of input to the their host country, in particular many US Nobel prizes winners came from Europe. Also, the fact they are often recruited on a competitive basis tends to ensure they are of above-average quality. The majority are also young, between 20 and 40 years old, thus, in their most productive years. Moreover, the pull factors that attract them tend to be different from those that attract scientists from developing countries.

In the context of European emigration, "excellence" and "chain-effects" are central to the issue. The quality of the recruits from Europe might have a positive chain-effect on their employers' ability to attract more high-quality staff. This mechanism is observed for instance among mature students recruited by American universities (Lambert, 1992). Universities that recruit top performing academics tend to attract top students too. The fact that significant numbers of top European scientists are abroad could pose a serious challenge for Europe in certain emerging sectors such as the biosciences. For instance, it is believed that

historically research on the contraceptive pill moved from Europe to the US as a result of European scientists emigrating during the postwar era. A study by Zucker, Darby and Brewer (1996) on the rise of the biotech industry in the US, commented that "we conclude that the growth and diffusion of intellectual human capital was the main determinant of where and when the American biotechnology industry developed .....Intellectual human capital tended to flourish around great universities."

Once abroad Europe's scientists often find it difficult to return. The private sector could play a bigger role in absorbing European repatriates and in encouraging them back. The public sector alone cannot absorb all these talents. In the US the private sector employs the greatest proportion of Ph.D. graduates, approximately 30 percent, after the academic sector (NSF, 1995). The private sector can play a very useful role in joint ventures with the public sector whereby research and engineering centers of excellence could be set up across Europe. This would inevitably change the situation from an eventual "brain drain" to what some have referred to as a "brain circulation" (Johnson and Regets, 1998).

NAFTA and North American Migratory Patterns

It has been 12 years since the Canada-U.S. Free Trade Agreement was implemented and seven years since it was renegotiated, extended to Mexico, and renamed NAFTA, the North American Free Trade Agreement. And NAFTA is now

the template for the Free Trade Area of the Americas initiative (FTAA), for which presidents and prime ministers from the hemisphere met in Quebec City in April 2001 to set a course for its completion by 2005. According to information supplied by various studies conducted by *Statistics Canada*, since 1989, when the FTA went into effect, Canadian trade with the U.S. has expanded dramatically. Canada's exports are now equivalent to 40 percent of its gross domestic product, up from 25 percent in 1989 (Internet # 2). More than half of Canadian manufacturing output now flows south of the border, and Canadian producers account for less than half of domestic demand. This north-south trade boom has been mirrored by a relative decline in trade within Canada. Trade has also become more concentrated with the U.S., from 74 percent to 85 percent of exports, and less concentrated with the rest of the world. Two-way investment flows have also increased greatly. Both Canadian foreign direct investment and portfolio flows to the U.S. grew much faster than did U.S. flows to Canada during this period.

Growth performance in the 1990s was worse than in any other decade of the last century except the 1930s. Average per capita income fell steadily in the first seven years of the decade and only regained 1989 levels by 1999. By comparison, per capita income in the U.S. grew 14 percent during this period (Sharpe, 2000). Additionally, Canada has become a noticeably more unequal society in the free trade era. Real incomes declined for the large majority of

Canadians in the 1990s; they increased only for the top fifth. Employment became more insecure and the social safety net frayed.

Thus, while productivity has grown rapidly in some sectors, wages have not, a trend mirroring the delinking that has taken place in the U.S. But the overall productivity gap with the U.S. has not narrowed as free trade proponents predicted; rather, it seems to have widened. Successive waves of corporate restructuring, such as bankruptcies, mergers, takeovers, and downsizing, have been accompanied by public sector restructuring, such as downsizing, deregulation, privatization, and off-loading of state responsibilities. Public sector spending and employment have declined sharply, and publicly owned enterprises in strategic sectors such as energy and transportation have been transferred *en masse* to the private sector.

FTA and NAFTA boosters did not promise vague social adjustments, however; they sold the agreements based on rising productivity and rising incomes. By this standard, the treaties have clearly not delivered, and their proponents can only offer the weak defense that things would have been worse in the absence of the agreements. Workers and policy makers in the FTAA countries may want to take the Canadian experience into account before buying into these unproved promises.

The Canadian Labor Market

As was noted above, *Statistics Canada* data indicates that exports to the U.S. have grown rapidly during the FTA/NAFTA era. Imports from the U.S. have also grown but not as quickly, resulting in a growing trade surplus. The average annual trade surplus was $19.7 billion (in Canadian dollars) during the 1990s, more than double the $9.4 billion average in the 1980s. Canada's current account surplus with the U.S., which includes net payments to U.S. investors, was also positive although much lower, averaging $6 billion annually. Here too, though, it was a lot higher than in the 1980s when the bilateral current account was roughly in balance. Manufacturing employment bore the brunt of corporate restructuring, most severely in the first wave (1989-93), falling by 414,000 or 20 percent of the workforce. The number of manufacturing establishments fell by 19 percent during 1988-95. High-tariff sectors were especially hard hit. Leather experienced a 48 percent drop in employment, clothing 31 percent, primary textiles 32 percent, and furniture 39 percent. But employment was also slashed in medium-tariff sectors such as machinery (32 percent) and electrical and electronic products (28 percent). By the end of the decade manufacturing employment was still 6 percent below its 1989 level. Employment in clothing, for example, was still 26 percent below 1989, and electrical/electronics was down 19 percent. Wages were flat or falling even in the so-called winning export sectors. Unemployment in the 1990s averaged 9.6

percent compared to the U.S. rate of 5.8 percent, which is a doubling of the gap compared to the 1980s (Sharpe, 2000). This level of unemployment was higher than in any other decade since the 1930s. While average worker earnings were stagnant, casualized (or nonstandard) employment exploded, as people struggled to cope during the prolonged slump and restructuring. Paid full-time employment growth for most of the decade was almost nonexistent (Jackson and Robinson, 2000). The absolute number of full-time jobs did not recover its 1989 level until 1998. Self-employment skyrocketed, accounting for 43 percent of new job creation between 1989 and 1999. Part-time employment accounted for another 37 percent of net employment growth during 1989-99. More than half of this growth was involuntary, due to the inability of people (mainly women) to find full-time work. Temporary work grew from 5 percent to 12 percent of total employment during the first half of the decade. Labor force participation rates dropped sharply, and at the end of the decade they were still well below their 1989 rates.

Evidence that the trade expansion and economic integration under NAFTA have had adverse employment effects in Canada comes from the government itself, in the form of a little-known study commissioned by Industry Canada. The study, authored by Dungan and Murphy (1999), found that, while business sector exports grew quickly, import growth also kept pace. At the same time, the import

content per unit of exports also grew markedly, while the domestic content per unit of exports fell.

What did this mean for jobs? Employment, direct and indirect, in export industries rose from 19.6 percent of total business sector employment in 1989 to 28.3 percent in 1997. However, the rapid rise in imports displaced or destroyed even more employment. The job-displacing effect of imports rose steadily from an equivalent of 21.1 percent of total business employment in 1989 to 32.7 percent in 1997. The authors concluded: “imports are displacing ‘relatively’ more jobs than exports are adding” (Dungan and Murphy, 1999).

What did this mean in terms of actual jobs created and destroyed? It is a simple matter to derive these numbers from Dungan and Murphy’s data. The result is striking. Between 1989 and 1997, 870,700 export jobs were created, but during the same period 1,147,100 jobs were destroyed by imports. Thus, Canada’s trade boom resulted in a net destruction of 276,000 jobs. With this evidence, one can say fairly convincingly that the conventional wisdom propagated by the business and political elites, that the trade expansion under NAFTA has meant a jobs bonanza for Canada, is false. On the contrary, trade expansion caused, at least in the first eight years of free trade, a major net *destruction* of jobs. The study also found that the labor productivity of the jobs displaced by imports was moderately lower than that of exports, though the productivity of these displaced jobs was still

higher than the average productivity level for the business sector as a whole. This the authors saw as beneficial for the economy as whole. However, the positive spin on the study's findings is premised on the existence of macroeconomics policies whose priority is

creating full employment conditions and on the expectation, that displaced workers will find other jobs, and that those jobs will be at higher levels of productivity and income.

There are actually three problems with these assumptions. First, it is not clear that these displaced workers are, by and large, finding higher productivity jobs elsewhere in the economy. In fact, to the extent that they are finding jobs outside the tradable sector, the jobs they find are likely at lower levels of productivity. Second, workers both in the tradable sectors and in the economy generally have not seen productivity growth translate into income gains. Third, and most importantly, macroeconomics policy in the 1990s has not focused on employment creation. Rather, policy makers have focused on ultra low inflation and wage control to enhance business competitiveness under NAFTA.

Unemployment since the grim 1990s has lately fallen to around 7 percent, but this is still far above the 5.4 percent average unemployment rate for the entire three decades from 1950 to 1980. As for incomes, market income collapsed for low-income earners and inequality widened, most strikingly during the first half of

the decade. Market incomes of the bottom 10 percent of families with children fell by 84 percent during 1990-96, and those of the next 10 percent fell 31 percent. But the restructuring and the massive labor market failure was offset by public transfers, keeping the overall distribution of income after taxes and transfers stable for a while. The consequent accumulation of fiscal deficits became politically unpalatable, though, and the government's ensuing "war on the deficit" provided the rationale for the social cuts that resulted in a widening of overall income inequality in the latter half of the decade, the first such widening in the postwar era.

Effects of the Brain Drain

During the 1990s, the Canadian economy experienced a rapid increase in the demand for skilled knowledge workers. Virtually all job creation occurred in knowledge-based occupations in professional, managerial, and technical areas. The employment rate among highly educated individuals is much higher than among less educated people, and this gap is widening. Between 1989 and 1998, knowledge-based occupations gained 780,000 workers, while employment in most non-knowledge-based occupations declined (*Statistics Canada*, 2000). The employment rate of people with Grade 8 education or less fell from 60 percent in 1989 to less than 50 percent by 1998. On the other hand, the employment rate of people with a university education held steady at about 87 percent, even during the recession of the early 1990s. Partly in response to this increase in demand for

higher levels of skill and education in the labor force, Canada has made huge additions to the stock of human capital. Both the incidence and average duration of initial education have increased to the point where Canada has one of the most educated populations in the world. The students who flow out of the Canadian education systems and into the labor market are relatively highly qualified when compared with other countries' or with previous Canadian cohorts. Analysis performed by Human Resources Development Canada suggests that Canada does not suffer from any large- scale skill shortages at the aggregate level (Gingras and Roy, 1998). However, this success comes at a cost, however. In 1995, Canada spent 7 percent of its gross domestic product (GDP) on education, well above the mean of 5.6 percent for OECD countries. Thus, despite a positive picture at the aggregate level, it is clear that imbalances between the supply of and demand for skill exist in particular industries and occupations. For example, the Software Human Resources Council of Canada estimated a shortage of 20,000 computer programmers (Parsons, 1996). This was paralleled by an estimate of 190,000 vacancies in the information technology sector in the United States.

In 1998, the C.D. Howe Institute published a report on the Canadian "brain Drain" which was prepared by economists Don DeVoretz and Sam Laryea. The report shows that in 1993 and 1994 the number of managers, doctors, scientists, and nurses emigrating to the US represented 14 to 40 per cent of the 1991

graduating classes in those disciplines. It finds that the number emigrating has been increasing in the 1990s and estimates the net cost to Canada in terms of the value of education embodied in the emigrants at $6.6 billion over the period 1982-1996, including a net $3.7 billion worth of publicly funded post-secondary education.

Quantifying the size of the brain drain “crisis” has largely been the domain of journalists and of industry and professional groups with strong vested interests in the existence of a brain drain. Few numbers on the size of the brain drain are from academic studies, which are usually considered the source of “scientific” or “objective” information. Reflecting this view of academic work, the C.D. Howe study has been extremely popular in the media, which has been promoting the brain drain problem for some time. A 1997 Statistics Canada study showing that Canada is in fact a “brain gainer” has been less popular in the media. The 1997 Statistics Canada study shows that while there is an outflow of Canadian brain power to the US, Canada was a net gainer of skilled workers through migration. While Canada lost skilled workers to the US, this was more than made up for it with inflows of skilled workers from other countries. Devoretz’s and Laryea’s C.D. Howe study takes issue with the *Statistics Canada’s* “balance of bodies approach to measuring the brain drain. In particular, they argue that highly skilled immigrants do not fully replace highly skilled Canadian emigrants. Immigrants take time to get up to speed

in their new home, if earnings measure productivity. They also conclude that the brain drain accelerated after the implementation of the FTA and NAFTA. Devoretz's and Laryea's study has been embraced in the Canadian print media as hard evidence of the brain drain.

An alternate source of data, with an alternate viewpoint regarding the impact of the brain drain, is available from records of the current addresses of most of the living graduates of the University of British Columbia (Heliwell and Heliwell, 1998). As previously mentioned, there is considerable debate over the exact number of skilled Canadians who have left for positions in the US and elsewhere. In their 1998 study, DeVoretz and Laryea argue that the attenuation of visa regulations under the North American Free Trade Act (NAFTA) caused the permanent migration of Canadians between the years 1990-96 to triple from their previous rates in the non-NAFTA years 1982-89. Under the old regulations, Canadian migrants were obligated to secure sponsorship from an American employer, and were then required to wait until the papers cleared. With the new regulations, Canadian migrants may obtain TN-1 temporary visas quickly and queue for a permanent status in the US while in that country.

The strongest responses to the conclusions of the DeVoretz and Laryea study come from UBC economics professor John Helliwell (1998). Both studies argue that the proportion of skilled Canadians leaving for the US in the 1990's has

actually *declined* since the 1960's. They further assert that the large inflow of recent immigrants to Canada has compensated for the small outflow of skilled workers. Continuing their investigation into the number of recent post-secondary graduates who have left for the US, Professor Helliwell and *Statistics Canada* have thus provided two of the more insightful papers in this area. Similar to their conclusions above, they argue that the number of Canadian graduates leaving for the US is small in absolute terms even in the nursing and engineering professions, and moreover, that these numbers are proportionately less than the graduates who left Canada during the 1950's and 1960's.

Although the exact number of skilled workers who have left BC and Canada to work abroad is uncertain, there is agreement that the labor market in the US has positive attributes that the market in Canada lacks. Typically, the reasons cited for a skilled Canadian worker moving to the US focus on salary and tax differentials between the two countries. However, as recent studies have shown, this is not always the sole reason for leaving, nor is it always the most compelling.

Career advancement and training issues rank high as motivating factors for the departure of skilled workers. For example, this is often the case for individuals working in the high-tech sector. Compensation is important for Canada's skilled professionals, as it is for skilled workers everywhere, but it seems that non-monetary factors such as the vitality of one's work environment, or the access one

has to new job and career training opportunities are just as important.

Even if the group of workers who are leaving for better opportunities elsewhere is small relative to the pool of workers remaining behind in Canada, the migration comes at a cost to the rest of Canadian society. In tangible terms, the cost of losing skilled individuals includes the unfulfilled returns on subsidies used in educating these professionals if they received their schooling in Canada, the costs of replacing them with new professionals, and the costs of lost on-the-job productivity. The most intangible cost, and the one that is most difficult to estimate, however, is that of losing future leaders. If, for example, Canadian universities fail to recruit the best academic minds, that loss of talent will not only negatively affect students in the post-secondary system, but will also translate into a cost borne by all individuals in current and future generations.

In the case of Canada's, and in particular, BC's post-secondary institutions, the largest cycle of faculty hiring since the 1960's will be beginning within this decade. Between the years 2000 to 2009, 1,092 faculty members will reach retirement age. Furthermore, given current attrition rates, an equal number are expected to leave for other reasons. In total, 2,185 of BC's current 3,023 faculty members will need to be replaced in this decade. Replacing these faculty members will be a difficult task. Replacing them with candidates of equivalent or greater ability will be even more demanding given that British Columbia's universities are

financially disadvantaged compared to their competitors in the US, and Alberta and Ontario.

At the start of the new millennium, BC's universities faced a major hurdle as individuals in the baby boom cohort of senior faculty members and administrators began to retire. Only by retaining existing faculty members and senior administrators and replacing retirees with the best available academic talent, will the future demands of BC's growing post-secondary student body be met. Replacing these faculty members and administrators will be a difficult task given the fact that BC's universities are competing in an international setting in order to attract the best candidates. The greatest competition will be from resource-rich American institutions. The salary difference between BC and American universities, for example, is significant. According to 1998/99 statistics published in the *Chronicle of Higher Education*, a full professor teaching at a private institution in the US draws on average $150,000 per year (Cdn), while a full professor at a public institution in the US earns $120,000, or at least 20 percent more than his or her counterparts in Canada.

Aside from higher salaries, US institutions also offer well-endowed research facilities and funding. For senior faculty members, access to an adequate research support network can be as important as salary considerations for returning to or accepting a post. Unfortunately, the research funding gap between BC and

American institutions is widening due to the erosion of Canada's federal budgets. In certain fields like medicine and biotechnology, the Canadian government's allocation of research money lags far behind its US counterpart.

The federal government, however, has responded to this research gap in recent budgets. In 1997, in conjunction with provincial governments and the private sector, the federal government introduced a one billion-dollar fund for research in Canadian institutions and hospitals. In the recent Budget 2000, the federal government contributed another $900 million to the Canadian Foundation for Innovation to be used in the coming three years, along with $900 million to establish and sustain 2,000 new research chairs across Canada. The funding is intended to stabilize and update the existing research infrastructure in order to ensure that Canadian scholars continue their work in Canada. Salaries and the research environment are thus two of the leading factors influencing the career decisions of academic candidates. Other issues, however, also play a role, including an institution's location, its links with other sectors and nonacademic organizations, the region's quality of life, and cost of living. Although definitions of a "good location" and "high quality-of-life" are somewhat subjective, British Columbia, and particularly the Lower Mainland and Vancouver Island, is renowned internationally as being an ideal place to live. The high cost of living, particularly in

Greater Vancouver, however, has, in recent years, served as a counterbalance to this positive reputation.

In terms of links outside the academic community, partnerships with nonacademic institutions, such as those in the private sector, can assist faculty in their research projects. Examples of this are evident in the partnerships some institutions have forged with private sector biomedical, geological, and mineral, and agricultural firms. Aside from providing research support, these linkages to community organizations and companies can also translate into financial opportunities for faculty members and students. Private sector consulting contracts, for example, often provide a complementary earning stream for professors in business schools and economics departments. On a larger scale, links to outside organizations are useful for establishing student cooperative work programs, and for promoting the development of innovative pedagogies.

Tax Issues

Some observers have attributed the brain drain to the US to Canada's higher taxes. A number of political, business and academic leaders have expressed opinions on this issue. Business leaders have argued that high taxes are driving Canada's best engineers and entrepreneurs out of the country. These claims are contradicted by people who favor government spending and may see reduced taxes as a threat to that spending. The federal Liberal party, citing a report

by *Statistics Canada* (2000), has argued that the Canadian brain drain is small and largely unrelated to taxes. Meanwhile, the Canadian Association of University Teachers has argued that the perception that Canada's finest brains are draining south to the United States is a myth being pushed as part of a right- wing tax-cutting agenda.

Actually, by examining a sample of Canadians living in Canada and another sample of Canadians living in the US, it is possible to estimate how much people in each group would have earned and been taxed had they lived in the other country. In fact, those who have the most to gain in tax-savings are the most likely to choose to live in the US, which corroborates the claim that tax differences contribute toward Canada's brain drain. On the other hand, the responsiveness to taxation levels is quite small: Lower taxes would decrease the southward flow of people, but not by much. Statistics Canada estimates that up to 10,000 Canadians with university degrees in all fields move to the United States each year. This number includes some individuals who may, in fact, return to Canada at a later date, as well as highly qualified Canadians who are temporarily employed in the United States and who have been resident there for at least six months. Any sensible brain drain estimate should also include emigration to the rest of the world, which Statistics Canada estimates to be roughly twice the number of departures for the United States (Fellegi, 1999). Relative to the number of new

Canadian university graduates (about 128,000 a year) and the total number of immigrants with university degrees entering Canada, the number of university educated leavers to all destinations does not seem large. It is nonetheless significant since two important subsets of Canada's highly skilled workers appear to be moving south; those with university degrees in the natural and physical sciences, mathematics, and engineering, and workers in the so-called high-tech industries. Their choice is motivated by two generally accepted facts. First, the amount of research and development involving a high number of science and engineering workers that occurs in Canada is considerably smaller relative to the size of the economy than it is in many other advanced countries. Second, Canada's disappointing productivity relative to its main competitor, the United States, over the past decade or so stems in considerable part from the strong US advantage in a few key high-tech industries that rely heavily on R&D activities and hence on workers with specialized science and engineering knowledge (Sharpe, 1999).

The most recent body of work on the subject strongly suggests that economic growth relies increasingly on the ability to employ scientific and technological knowledge in productive ways. As Lavoie and Finnie (1998) note, the fact that "scientific and technological activities are bread-and-butter for achieving economic growth" has been well documented. The corollary is that the

presence of workers who possess the ability to develop, absorb, or diffuse new ways of doing things has a positive effect on an economy's overall ability to generate growing incomes.

It is this ability to use its knowledge productively, which depends, in turn, on such factors as good management and entrepreneurial activity, that allows an economy to compete without low wages or a reliance on natural resources. The activity of knowledge workers, managers, and entrepreneurs provides the general social benefit of raising the productivity and income of the overall population above and beyond these individuals' own remuneration. Indeed, such social benefits have always been a key argument in favor of public funding for higher education and research efforts.

Thus, education, knowledge, and technological entrepreneurship have become increasingly important to the Canadian economy in recent years. The natural resources that traditionally have been Canada's source of wealth provided a declining share of Canadians' incomes in the 1990s, but significant "education premiums," higher wages, better employment opportunities, or both, for those with more education, are found in the Canadian and other labor markets. Even though those premiums have fallen somewhat in Canada in recent years for younger graduates, the pool of educated workers has grown significantly with the coming of age of the most highly educated generation in Canadian history. Thus, the

availability of knowledge workers is essential in both Canada and the United States.

The difference between Canada and the United States regarding the number of science and engineering university graduates widens considerably if one considers quality as well as quantity. The United States is well ahead in terms of those with an advanced degree. Relative to its population of postgraduation age, the United States has approximately 18 percent more individuals with master's degrees in science and engineering fields, and 22 percent more with doctorates, than Canada does. The US lead exists across most science and engineering fields. There are many reasons why this lag in workers with advanced degrees is worrisome for Canada. Universities depend on this highly-educated group for their teaching and research activities, and hence they play a vital role in the formation of science and engineering personnel and in spreading the benefits of scientific knowledge throughout various industries and to the Canadian public at large. The education premium, which exists for university-educated individuals generally, is substantially higher still for those with advanced degrees. In short, when discussing Canada's ability to generate high living standards in the new knowledge-based labor market, one must now look beyond the number of individuals with a single university degree in a relevant field. But Canada is proportionately well ahead of the United States in the number of individuals with

university degrees in forestry, mining engineering, resources, and environmental engineering, whereas the United States has a large lead over Canada in aerospace, electrical, and industrial engineers. Such specialization patterns are to be expected, given Canada's comparative advantage in natural resources, but this advantage is becoming less important in world markets. Canada's future growth prospects depend less on its immobile natural endowments and more on knowledge- intensive, geographically mobile activities, and Canadians should be concerned about the extent to which degree-holding patterns reflect Canada's relative weakness when it comes to graduating or retaining individuals with skills that are in increasingly high demand. For example, the United States has 50 percent more electrical and computer engineers per capita than does Canada. This statistic alone is telling, given the continuing spread of information and communications technologies across virtually all economic activities.

The change in the availability of university-educated scientific workers in any country over a given period can be defined as: the number of new graduates during the year in the relevant fields, less the number of foreign students graduating, plus the permanent inflow of highly skilled workers from abroad during the year and the change in the number of foreign highly skilled individuals temporarily residing in the country, minus the number of highly skilled individuals who retire from the work force or emigrate permanently to other countries, and any

increase in the number who take up temporary employment in foreign countries. Unfortunately, there are no consistently defined statistics on these movements of knowledge workers even within Canada or the United States, let alone between the two countries.

The United States is probably better than Canada at retaining its scientists and engineers, as it does its population generally, and recently has also seemed to attract more temporary workers than its northern neighbor. This premise is derived partly from estimates of emigration and temporary movements among highly qualified personnel, which are far less reliable than immigration data but give a solid idea at least of the orders of magnitude. And although the flow of temporary workers is by nature volatile, over the years a growing number of Canadian temporary This seems to be a reasonable conclusion since US emigration, as well as being much lower than Canada's overall, is overwhelmingly made up of those not born in the United States. Moreover, of those about half return to countries with much lower income per capita than the United States (Ahmed and Robinson, 1994). Those returning to low-income countries are, on balance, unlikely to have accumulated significant human capital in the United States.

The high-tech industries do not employ *all* the highly skilled, well-paid scientists and engineers, of course, but such a high proportion of their employees

come from those disciplines that high-tech industries naturally attract attention when the brain drain issue is discussed. Indeed, one recent US study (Hecker, 1999) defines an industry as “high-tech” if, within the industry, both the number of employees engaged in R&D and the number employed in all technology-oriented occupations account for a proportion of total employment in that industry that is at least twice the average for the economy as a whole. Canadian employment growth in these industries, taken as a group, has actually exceeded that in the United States since 1983. Today, the share of total employment accounted for by all high-tech industries, including high-tech services, is similar in Canada to that in the United States. This suggests that, in principle, Canada offers a favorable environment to this knowledge intensive group of industries.

If one looks a little more closely, however, some important distinctions emerge. In the manufacturing sector, for example, Canada’s high-tech operations employ a much lower share of nonproduction workers than their US counterparts. This gap between production and nonproduction employees, which has widened over the past 15 years *is* not attributable to a different weighting among these industries in Canada; it exists across almost all high-tech manufacturing industries. Furthermore, while the share of nonproduction workers in US high-tech industries is 11 percentage points higher than in the average manufacturing industry and has not changed much over the years.

Many analysts and commentators have argued that concerns about a few thousand highly skilled individuals departing Canada annually for the United States are overblown. After all, they point out, the rate at which highly educated Canadians are moving south, and the total number of them now living in the United States, is smaller now (relative to the total Canadian population) than historically has been the case, although it is worth noting that the 1990s saw a reversal of a three decades-long downward trend in this area. Skeptics of the seriousness of the brain drain also note that, even when departures for other countries are included. as they should, when the comparison is with all sources of immigration, more well-educated people are coming to Canada than are leaving it, by a ratio of about two to one. But these facts based on broad numbers hardly refute Canada's relative difficulty in attracting and retaining the most highly skilled individuals, for at least three reasons. First, Canada traditionally has depended on high levels of immigration for its economic development. Thus, historical comparisons should be made of both the inflow and the outflow of migrants. Although net total inward migration was healthy during the 1990s, such levels are not unprecedented. Immigration is a volatile phenomenon: the most recent year's figures suggest that the high inbound numbers of the 1989–97 might not be sustained. Second, Canada's stock of knowledge workers would be higher if, in addition to attracting immigrants, it did a better job of retaining the highly skilled and educated who are

already in place. If knowledge, as opposed to more traditional factors such as natural resources or an abundance of savings, has become the primary factor for economic growth, Canada may need to be more concerned about the departure of a given number of knowledge workers and managers than it has been in the past. Third, in the knowledge-based economy, teamwork, which requires a close sharing connection between team leaders and other members of the team, is at a premium.

Based on the research of various authors, Rouilleault (2000) describes four new organizational requirements brought about by the spread of information and communications technologies: close cooperation between professionals in different disciplines; close cooperation between the project team and future users; cooperation around simulation tools of future work; and project management as key to organizational learning and employee training. It would thus appear that, despite the increasing ability of knowledge workers to communicate at a distance, countervailing factors that heighten the importance of team work ensure that a concentrated pool of skilled individuals remains critical to the growth of knowledge-dependent industries in a given region, a phenomenon analyzed in detail by Krugman (1991). In this context, it is indeed worrisome that Canada appears to have difficulty attracting individuals who are team leaders at the most productive phases of their careers, and may even be losing a number, though perhaps not a

quantitatively overwhelming number, of such people, since coworkers, employers, and even customers and suppliers tend to gravitate toward these “assemblers of knowledge.” Leaders in fields as diverse as academia and communications equipment have indicated that they believe this is happening (Pearce, 1999).

Some observers seem to feel that, if the only motivating factor behind relocation was Canada’s high personal taxes, many more people would likely seek employment opportunities in the United States that offer at least similar pay and then take advantage of the lower tax rates that prevail south of the border. This is not occurring, however, no doubt due in part to the fact that, leaving aside the substantial personal and monetary costs of moving, many Canadians regard their high-income tax levels as worth the benefits of the public goods their taxes pay for. All those who publicly worry about the brain drain acknowledge this context, despite efforts on the other side of the debate to portray such analysis as pursuing a self-serving, tax-cutting agenda at the expense of public benefits. For many Canadians, however, the measure of social protection they would have to sacrifice in exchange for lower taxes on moving to the United States is not at all clear. It may be that Canadians who move are able to find employment and other conditions that help offset the loss of public services they enjoyed in Canada. For example, a higher proportion of those who leave Canada for the United States obtain employer-provided health insurance than do other groups of immigrants or

even many categories of native-born Americans. Canadians living in the United States are also well ahead of other immigrant groups in employer-provided pension plan coverage.

Critics of the tax differential explanation for the brain drain are surely right that the “lack of good jobs” in Canada also figures as an explanation but this hardly settles the issue with respect to taxes. It is clear, for example, from the experience of other countries with well-educated populations but poor economic performance that factors other than the simple availability of “brains” are at play in generating a high standard of living. These include an environment that not only supports private and public R&D efforts, but also rewards the innovative and successful use of the knowledge that highly skilled individuals possess. This last factor is likely more important than is usually acknowledged. Canada has apparently not suffered unduly from the perceived brain drain since its net international balance on the sale of research, patents, and so forth has improved over the years, but the evidence suggests that better use could be made of this knowledge base to sustain economic activity. Taxing individuals at the highest marginal rate just when their careers in research or project management are taking flight or imposing relatively high business or capital gains taxes on the fruit of these workers’ innovative activity cannot help but contribute to driving some of Canada’s most innovative and successful knowledge workers to create wealth abroad rather than in this country.

However, a review of corporate income taxes is also required to ensure that Canada's intellectual capital benefits all Canadians.

Clearly then, the 10,000 or so highly qualified brains who leave Canada each year for the United States may not seem like a very large drain, especially since the inflow of university educated individuals from all foreign sources is estimated to be four times as large. But in the broad context of both the total pool of graduates, particularly in science and engineering, and the Canada-US competition for their skills, the southward brain flow is more worrisome than the statistics at first suggest. We now live in a world in which the presence of "brains" in an economy seems to make a significant difference to productivity and income growth. The proportion of individuals with advanced science and engineering degrees is considerably higher in the United States than in Canada; the United States retains its scientific population within its borders better than does Canada, and high-tech industries in the United States employ as many more people in managerial, sales, and research functions relative to the total number of employees than do similar industries in Canada. These are all functions that tend to be related to higher incomes than are production jobs. Although Canada attracts proportionately more immigrants, recently even in the science and engineering fields, than its southern neighbor, Canadians cannot be complacent about the number who move south. Evidence suggests that those who go include more than

the expected share of the country's best and brightest, and it is the US economy, not Canada's, that benefits from their contribution. People generally relocate to take advantage of better opportunities, not necessarily because of differences in personal tax rates. But employment opportunities at home in innovative activities by Canada's most productive brains also depends on a supportive tax system.

Helliwell (1998) argues that because the INS data can count people more than once as they renew short-term visas, such data should not be used to estimate Canadian emigration. *Statistics Canada* (2000) published a report that used three alternative methods to estimate emigration and concluded that between 22,000 and 35,000 Canadians move to the US each year. By contrast, Canada receives about 6,500 immigrants from the US per year. Helliwell's work, (1998), which is based both on the US Current Population Survey, and on records of University of British Columbia graduates, corroborated Statistics Canada's estimates.

In a 1998 study, *Statistics Canada* tried to put the size of Canada's brain drain into context. It found that the brain drain is small relative to the brain drain of the late 1950s and early 1960s in most knowledge occupations the drain is small relative to the total number of individuals working in those occupations the drain is small relative to the supply of individuals entering the highly-skilled professions, and it is substantially smaller than the brain gain from the rest of the world.

A 1999 report by *Statistics Canada* based on an extensive survey of 1995 graduates of post-secondary institutions reported that 1.5 per cent of such graduates had moved to the US by March 1999, and that 18 per cent of those who had left had in fact returned to Canada by that date. The most highly-educated graduates were the most likely to move. The study also found evidence that those who move tend to be among the brightest students within their education programs. Forty four percent indicated they were in the top 10 percent of their graduating class, while 80 per cent reported being in the top 25 per cent. Movers also tended to have won more scholarships when they had been in school. Asked about their primary reasons for moving, 57 percent reported work-related reasons, mainly the higher salaries and greater availability of jobs in the US. Very few interviewees cited lower taxes as a reason for moving, although as the report indicates, tax differences may be implicit in the "higher salaries" response. The main conclusions of this report are that the brain drain is relatively small, but that those who move tend to be among the highest achievers. Moreover, job pared to the historical outflow and is more than offset by a brain gain from the rest of the world.

DeVoretz and Samuel Laryea (1998) concluded that the rate of emigration is substantial. On the other hand, three studies from *Statistics Canada* (one each in 1998, 1999 and 2000) and the article by UBC's John Helliwell, mentioned earlier,

found more modest levels of emigration. The former studies rely heavily on US immigration data, published by the US Immigration and Naturalization Service (INS), that track how many people are granted permanent or temporary visas in the US. These numbers are substantial. In 1997, for example, the total emigration of Canadian workers who could be described as being “highly-skilled,” amounted to 98,000 people.

In the US, the highest marginal tax rates only apply to taxpayers with earnings in excess of about $US 250,000, whereas the highest basic Canadian marginal rate begins at around $C 60,000. Moreover, Canadian marginal rates run as high as 40 per cent at levels of income as low as

C$30,000 a year. Clearly then, there are big differences between Canadian and US taxes, both in effective rates and in the types of individuals that qualify for favorable tax treatment.

Canadian income tax rates are much higher than US rates. For example, Canadian taxpayers may deduct contributions up to the lesser of 18 per cent of earned income or $13,500. Meanwhile, in the US deductible contributions to an IRA are limited to at most $2,000 per person and are only available to low-income taxpayers. In 1996, deductible contributions to retirement plans amounted to 4.3 per cent of total income in Canada and 0.2 per cent of AGI in the US. Taxpayers who either cannot or choose not to contribute much to retirement plans clearly

have more to gain from moving to the US than those who contribute the maximum deductible amount. Homeowners who direct their investments toward home equity rather than a registered retirement plan may fit this profile. Taxpayers who come from high-tax provinces in Canada, such as Quebec and British Columbia, or taxpayers who move to no-tax states, such as Texas, stand to gain more from moving than other taxpayers.

The Canada-US tax rate differences also vary across income levels. The biggest differences lie in the $50,000 to $150,000 range. Canadian taxpayers in that range would have the most tax saving to gain from a move to the US. In sum, there is substantial variation amongst taxpayers in how much tax saving they can realize by moving to the US. Besides featuring generally lower tax rates, the US tax system also targets its tax breaks differently than Canada's does. A legion of factors affect the size of a household's tax savings if it moves from Canada to the US. Some of the more important are: 1). The ability to file joint returns - The US allows married couples to file joint tax returns; Canada does not. Under the US system married couples move up to higher tax brackets at higher income levels than single individuals. As a result, taxpayers who marry partners who earn little income can gain a significant tax savings, while corresponding Canadian taxpayers gain very little tax savings. 2). Deduction of mortgage interest and real estate taxes - US taxpayers may claim mortgage interest and real estate tax

expenses on their home as itemized deductions, whereas Canadian taxpayers cannot. In 1996, US deductions for mortgage interest amounted to 4.9 per cent of adjusted gross income (AGI), while deductions for real estate taxes amounted to 1.6 per cent of AGI. Homeowners, particularly those with debt, may therefore have more to gain from a move to the US than renters. 3). Retirement plan contributions - Canada offers much more generous deductions, such as personal deductions or credits based on known family characteristics.

Other Factors

Based on all cumulative migration up to the 1990-91 censuses in the two countries, a resident of a Canadian province was 100 times more likely to have come from another province than from the United States, after adjusting for economic size and distance. The corresponding results for residents of the United States shows them to be seven times more likely to have migrated from another state than from a Canadian province of similar economic size and distance. This reveals that internal migration is much more likely than international migration, and also shows that Canadians have traditionally been much more likely to migrate to the United States than vice versa. One explanation for the greater likelihood of finding Canadian-born in the United States is that the Canadian-born are more mobile than the U.S.-born, whether moving within their country of birth or moving to the other country. The reasons for this are unclear, but 1970s Canadian-born

migrants to the United States had average incomes 40 percent above U.S. averages in 1980, while the gap for U.S.-born migrants to Canada was 15 percent. A study by Borjas (1992) also shows that in 1980, recent migrants from Canada to the United States had, on average 2.0 years more schooling and 18 percent higher earnings than the native U.S. population, as well as a lower unemployment rate. CPS data echo these results for more recent migrants, and also show them to be much less likely than are other U.S. residents to be in receipt of welfare and other social safety net payments.

Another reason for the greater flows of southbound migrants is that the 49th parallel provides a membrane through which northbound information travels much more readily than southbound flows. The average Canadian has all the U.S. channels on his or her TV set, along with much U.S. information and programming on the Canadian channels. In the U.S. media, and on the U.S. cable systems, there is almost nothing about Canada. Thus, Canadians regard the United States as known territory, while most residents of the United States have no reason to ever think what it might mean to live in Canada. Since information and familiarity spur migration, this asymmetry of information may help to explain migration patterns. The greater familiarity of Canadians with the United States and its job opportunities may also provide part of the reason why Canadian migrants to the United States earn incomes than exceed the U.S. average by more than is true for U.S. migrants

to Canada.

For both countries, however, international migration remains far less likely than is internal migration. Among those who do migrate, whether domestically or abroad, there is a preponderance of the highly educated, partly because they are more likely to have skills in demand, but also because they are more likely to have contacts in and knowledge about the possible places to move. Studies of Canadian emigration, based on aggregate data mainly for the 1960s, confirm the importance of economic factors, with employment opportunities, as measured by the inverse. Helliwell (1999) made use of the inverse unemployment rate for the United States, to reflect the increasing importance of the unemployment rate, when viewed as a measure of job vacancies, as the unemployment rate gets closer to zero.

In the light of the importance of relative unemployment rates, and especially of employment prospects in the target of migration, the 1980s and 1990s, and especially the first half of the 1990s, should have been a time of high migration from Canada to the United States. The unemployment rate gap between the two countries reached 4 percent in the first half of the 1990s, driven mainly by a reduction in the U.S. rate, indicative of growing job opportunities in the United States. It is possible, using the earlier research on the economic determinants of emigration, to estimate what the effects of differing macroeconomics

circumstances contributed to migration from Canada to the United States during the first half of the 1990s. If we use one percentage point of reduction of the U.S. unemployment rate, averaged for each of the years 1990 through 1996, as a conservative measure of the stronger macroeconomics performance, and hence job creation, in the United States, the implied additional emigration to the United States would have been about 10,000 per year. This estimate is based on migration behavior in previous decades, and is subject to a large margin of error, but does signal that migration from Canada to the United States in the 1990s has been surprisingly small, when seen in the light of what was a widening gap between job opportunities in Canada and those in the the United States. At the end of the century, as unemployment rates in the two countries move closer together, the job opportunities gap is lessening, and the incentives to migrate south are correspondingly lower.

To the extent that migration of the highly skilled may be triggered by different factors, survey data reported by Grubel and Scott (1977) suggests that job opportunities and challenges are even more important for the highly educated. It is also true that for many such workers, particularly in health care, education, and government-supported fundamental research, the 1990s have seen large cuts in government spending induced by budget pressures. As federal and provincial finances are returning to balance, both levels of government are starting to rebuild

their diminished capacities to provide health care, higher education, and research. In addition to this likely restoration of financial support, job opportunities for new entrants to the knowledge professions, especially those employed by universities, will be enhanced by the large bulge of retirements in the next ten years. It is noteworthy that the coming retirement surge is the echo of the massive hiring by universities in the 1970s (larger in Canada than in the United States), which itself was largely responsible for ending the earlier and much larger exodus of highly educated Canadians in the 1960s.

Finally, it needs emphasizing that since international migration is such a rare event, relative to either domestic migration or staying near one's roots, it probably requires a substantial accumulation of push and pull factors. In addition, given the importance of networks of contacts and information, which serve to keep people near home, as well as to let them follow pathways blazed by others, migration is likely to be characterized by bunching, by waves, and to lead to very uneven patterns. Why else would so many people from the same rural village in Europe be found decades later in the same census tract of suburban Toronto? Three implications of this unevenness and discontinuity are worth emphasizing. First, they make migratory flows, especially in their geographic and timing details, very difficult to predict. Second, they make anecdotes and small surveys a problematic source of evidence about the size and nature of migratory flows. Third,

the fact that international migration is such an important and unusual decision for individuals and families probably leads them to compare, to the extent they are able, the whole character of life and society in their old and potential new countries. Where the push factors are strong and immediate, as with some refugees fleeing for their lives, details about their place of refuge may matter little, a matter to be sorted out and possibly adjusted by subsequent moves.

International tax competition, especially for capital income, raises the possibility, more tangentially related to brain drain issues, that incomes once saved will be transferred to a tax haven or other low-tax jurisdiction. The implied pressures on national tax systems, and the policy issues thereby raised, are the focus of the recent Mintz report on business taxation in Canada, and of the subsequent panel discussion published in the Canadian Tax Journal. Analysis by *Statistics Canada* shows an increasing trend of emigrating tax files during the 1990s, from 14,450 in 1990 to 26,600 in 1997, averaging 21,300. This includes retirees as well as those currently employed, and covers moves to to all countries.

Some observers appear to believe that the increasing frequency of temporary movements under the FTA/NAFTA provisions may encourage more short-term migration aimed at maximizing take-home pay, leaving open future choices about where families will be raised and roots planted. As Kesselman (1998) points out, the fact that geography and political jurisdiction frequently

coexist was used as the basis for Tiebout's model explaining how political jurisdictions can offer quite different packages of services and tax rates, with individuals voting with their feet to find the package most suiting their tastes and values. When the choice is among countries, rather than among municipalities, mobility is much less, the fiscal and social packages can be, and are, much more different, but the basic point remains that those who move face not only different tax rates but different patterns and types of public services. However, as the studies in Corak (1998) demonstrate, it is important, especially for migrants who intend to stay, to think not just about current tax rates and public expenditures, but what those policies will look like in future decades and for future generations.

Well-off, countries differ not only in the size and efficiency of their public services and transfer payments, and in their average tax rates, but in the distribution of those costs and benefits among different groups of taxpayers and beneficiaries. How do these packages of taxes and services look to those deciding whether to live and work in Canada or the United States? In recent discussions of the brain drain, much emphasis has been placed on bilateral comparisons of income tax rates between Canadian and U.S. cities. These calculations, because they can be easily made, are both natural and compelling. They are problematic, however, since income tax rates vary greatly among states in the United States, income taxes are variable proportions of total taxes, and the balance between

taxes paid and services received differs greatly between the two countries, and among individuals in different economic and social circumstances. Overall, health care and social safety net policies absorb about the same share of GDP in the two countries and hence, one might infer, these policies and their financing would not need to have a big effect on migration decisions. But as the studies in Card and Freeman (1993) show, the structure and financing of the two systems differ substantially, as do their efficiency and coverage. Although the total of the health and other social safety net policies costs about 16 percent of GDP in both countries, this is the total of a health care system that costs 4 percent more of GDP in the United States than in Canada, and other social safety net policies that, at least in the early 1980s, cost almost three times as much in Canada as in the United States and would, if Canadian rules had been applied to the U.S. population, have cut U.S. poverty rates by more than half (Blank and Hanratty, 1993).

For a brain drain migrant, not planning to need social safety nets, and likely to be covered by employer-provided health insurance, the lower tax rates in many U.S. jurisdictions could provide a net fiscal incentive to move. Since these studies were undertaken, social safety nets have been under increasing pressure from increased demands and decreasing finance in both countries, the pretax and posttax distributions of income have become more unequal in the United States,

as compared to those. Globerman (1998), while noting the lack of an upward trend in permanent migration to the United States, argues that the greater inequality of the pretax and post-tax incomes in the United States is likely to increase the incentives for the highly-paid to move from Canada to the United States. Borjas (1992) finds a similar effect of income inequality on overall migration patterns to the United States. The theory behind this, outlined first by Roy (1952), is that countries with more egalitarian distributions of income are likely to offer lower returns to those at the top end of the distributions of income and education, so that skilled migrants are more likely to be drawn to countries with unequal distributions of income.

Allen (1998) argues that on average the higher personal incomes of those with higher educations lead them to pay Canadian taxes that are higher by enough to repay the existing levels of tax support for higher education. This repayment does not take place for emigrants in Canada, and the education premium in wage rates has risen in the United States relative to Canada. All of these factors may have increased the net attraction of migration among the better educated.

Beyond the overall package of taxes and public services, special attention has been given, especially in the context of brain drain discussions, to the structure of education finance. Grubel and Scott (1977), Bhagwati and Martington (1976), and DeVoretz and Laryea (1998), among others, have all considered the fact that

brain drain migrants take with them their own stocks of taxpayer-supported educational capital, and have considered or advocated some means of recouping some or all of these costs by means of an exit tax or an educational loan that is forgiven only for those who remain to work where they acquired their subsidized education. The issue has special relevance for the issue of the brain drain between Canada and the United States, since Canadian tax rates are higher than those in the United States, and education, and especially higher education, receives more of its support from taxes in Canada than in the United States. The issue then arises as to whether international mobility of the highly educated is now high enough to threaten this difference in the financing of education between the two countries. The DeVoretz and Laryea proposal to tax emigrants for the value of the tax-supported education they are taking with them is one reaction to this. Others have suggested that the current pattern is likely to be sustainable, perhaps supported by a continuation of the current move towards higher university fees in the more expensive professional schools, and that is the basis for the exit tax proposals. Emery (1998) argues that the taxpayer subsidies are especially high only in second-entry professional programs and business schools, so he prefers, instead of an education-based exit tax, an extension of current moves in several provinces to higher tuition fees in such courses.

There is a final set of policies influencing the brain drain by means of the

entry rules for the countries receiving immigrants. Such policies are generally intended to combine some skill-based selection with other criteria based more on humanitarian grounds, including especially refugee status. Changes in U.S. and Canadian policies have followed somewhat parallel paths, with country preferences or quotas being replaced by systems with more reliance on domestic need for the migrants' skills. Removal of Western Hemisphere preference made it harder for Canadians in general to migrate to the United States, while the increasing reliance of education and skills has left considerable room to move for the highly skilled, who, as has been seen, were already the ones most likely to migrate.

What can be concluded from the empirical studies of current and earlier international movements of the highly skilled? First, the highly skilled are much more mobile than are those with less education. Second, the data show that even the highly skilled are, by at least an order of magnitude, far more mobile within their country of origin than between countries. In many disciplines, especially for the higher levels of qualification, international experience is a valuable or necessary part of the training. Those exposed to international training and experience are probably more likely to migrate than are others who have not made as many foreign contacts. Third, the evidence shows that international migratory

flows of the highly skilled are greater when there are large gaps in job opportunities or living standards between the sending and the receiving countries.

These three general conclusions help to explain the main facts of the current migrations between Canada and the United States, and to suggest why the current migration figures are so high. This result is often attributed to immigration rules that favor the highly skilled, and such an influence is clearly in evidence in some periods. However, the higher mobility of the more educated shows up also in studies of interprovincial migration, where the decisions are entirely in the hands of the migrants. The fact that Ph. Ds produced in Canada are likely to seek and find employment nearby is shown by analysis of the place of residence of UBC Ph. Ds of different vintages. As the annual number of Ph. Ds produced has grown rapidly over the past twenty-five years, the number employed and living in British Columbia has grown even faster (Helliwell, 1993).

The increased size and stature of graduate programs in Canadian universities will also have increased at least the gross number of highly trained migrants from Canada to the United States, since Canadian programs now attract high-level candidates from around the world, including the United States, and these foreign students may be more likely than Canadian-born students to search for and accept positions outside Canada upon receipt of their graduate degrees.

The re-export of foreign-born graduates may represent a large part of the total emigration. The 1995 National Graduates Survey is smaller than thirty years ago, suggesting that; first, the greater mobility of the highly educated helps to explain their over-weighting in migratory flows between Canada and the United States and; second, that the much smaller size of the 1990s-brain drain from Canada to the United States, compared to the 1960s, can be explained as the net result of four main factors with offsetting effects. The two dominant factors, both of which tend to make the 1990s flows smaller than those in the 1950s and 60s, are the reduced income gap between the two countries and the fact that the availability of higher education has increased greatly in Canada over the same period.

In 1960, per capita GDP in Canada was 30 percent below that in the United States, while by 1990 the gap was less than one-third as great. In the 1960s, the availability of graduate studies in Canada was far less than in the United States, and in many disciplines the standard career track for academics involved obtaining a Ph.D. in another country, most often the United States. The change between the 1960s and the 1990s in this regard is quite dramatic. This shows that in science and engineering the proportion of foreign- born students is as high as the proportion of graduates who are living and working in other countries, suggesting that any loss of Canadian-born graduates emigrating is at least offset by foreign students in Canadian universities who subsequently settle in Canada.

The two offsetting factors include the widening gap in employment opportunities between Canada and the United States in the 1990s, relative to the 1970s and 1980s, and the generally lower costs of international travel and communications. The former factor is most important for medical professionals and academics, who have faced a situation of increasing supply combined with declining employment opportunities, usually driven by fiscal retrenchment. These factors have been evident to some extent in all countries, but are much more important in Canada than in the United States. For example, Murphy, Riddell and Romer (1998) have documented a rising skill premium in the United States compared to Canada, and are able to explain this in terms of larger Canadian increases in the supply of skills. The main conclusion to be drawn from this paper's review of the brain drain data is that the 1990s movements of educated Canadians to the United States are surprisingly small, when viewed relative to past movements of educated Canadians to the United States, current perceptions, and past and current immigration to Canada from other countries. In the light of the 1990s increases in the educational pay premium in the United States, the increasing relative supply of Canadians with higher education, and the lower unemployment rates in the United States, earlier research suggests that there should have been a large increase in migration to the United States during the 1990s.

Although there clearly have been increased movements of goods, services, and temporary workers between the two countries in the wake of the FTA, the number of long- term migrants has been remarkably small. The number of 1990s migrants to the United States who were still there in early 1998 has averaged 12,00 per year, of whom 8,000 are employed and have university degrees. This number is already small relative to previous history, and might reasonably be expected to decline further as the unemployment rate gap continues to narrow between the two countries. In those areas where the movements have been significant and widely noted, as with nurses, and some high technology workers.

The Canadian bulge is likely to be larger than that in the United States for two reasons. The more concentrated growth of Canadian universities produced a greater bulge in the numbers of those approaching 65, while the absence of mandatory retirement in the United States will be likely to smooth the echo effect in new hiring. Two examples might include the high proportion of immigrant doctors in Canadian northern locations, and evidence that immigration to Australia in the 1960s helped to match job vacancies with willing workers, and hence to reduce frictional unemployment. In university-based researchers, the movements are likely to be reduced as the relative supply situation becomes more similar in the two countries, driven by some combination of reduced fiscal pressures in Canada, reduced excess demand in the United States, and a forthcoming

retirement bulge in Canada. Since the actual flows are modest, the lessons for policy changes are correspondingly muted. In short, the modest scale of the movements means that it would be a mistake to use the brain drain as a spur for changes to taxes and expenditures that do not otherwise pass the tests of economic and political logic. Migration acts to partially mediate international differences in the balance between the demand for and supply of specialized skills. This is just one more channel in the international transmission of macroeconomics conditions from one country to another, thereby moderating the unemployment effects of domestic shocks while increasing the exposure to shocks originating in other countries. Since international migration is so small relative to domestic migration, and since all migration is a relatively rare event, the quantitative effect of migration on the transmission of macroeconomics disturbances is small, even where immigration policies are specifically targeted to help meet pressing job vacancies. There is some evidence that the availability of a pool of skilled and willing immigrants may have helped to fill job vacancies, and hence to lessen inflationary bottlenecks, in occupations or locations that are less favored by domestic residents.

In terms of current brain drain discussions, the rapid and sustained U.S. employment growth in the 1990s, coupled with a rising education premium, provided a broader range of better paying job opportunities for many educated

Canadians. The possible downside to this is that the benefits of higher and more equally distributed standards of health and education extend beyond the returns accruing to those in better states of health and knowledge, since both health and education appear to raise several intangible features of community health sometimes referred to as social capital. For example, Helliwell and Putnam (1998) use U.S. survey data to confirm a robust linkage between education and measures of trust and community participation, and Knack and Keefer (1997) have found some evidence that these measures of social capital in turn have positive effects on aggregate economic performance.

Research by Coe and Helpman (1995) shows that R & D in the OECD countries has important domestic and international spillovers, while calculations in Helliwell (1998) show that the Coe and Helpman estimates imply strong border effects for R&D. Thus, research done in Canada has a much large effect on domestic productivity than does the same amount of research spending taking place in the United States, suggesting that those who have pulled up their roots and set them down elsewhere may be harder to bring back when the domestic needs are greater. The burden of the data examined in this paper, however, is that the numbers involved are small enough, relative to either existing stocks of skills, or the scale of current training, that they are not likely to have a large or long-lasting effect on the availability of skills in Canada.

Given the costs of migration, any brain drain of the highly skilled increases the incentive to provide a stable and sustainable environment for the training and employment of all workers, but especially those in fields where there are positive national spillovers from domestic employment. The foremost include health, education, and research and development, where governments appear as major employers and financial backers. While there are incentives to take education where it is cheap and then work where wages are high, it should be noted that in the education of Ph. Ds, where post-degree mobility seems to be highest, the financing patterns are quite similar in Canada and the United States, and there may not be much taxpayer subsidy involved. The reason for this is that almost all Ph.D. students work as teachers and researchers during their Ph.D. programs, and generally produce high value output for very low wages in both capacities. Thus, it might be argued that Ph.D. programs are cost-effective ways of achieving R & D and education simultaneously, regardless of where the finished Ph. Ds are subsequently employed.

The Influence of NAFTA

Scott (2000) points out the North American Free Trade Agreement (NAFTA) eliminated 766,030 actual and potential U.S. jobs between 1994 and 2000 because of the rapid growth in the net U.S. export deficit with Mexico and Canada. The loss of these real and potential jobs is just the most visible tip of NAFTA's

impact on the U.S. economy. In fact, NAFTA has also contributed to rising income inequality, suppressed real wages for production workers, weakened collective bargaining powers and ability to organize unions, and reduced fringe benefits.

NAFTA's impact in the U.S., however, often has been obscured by the boom and bust cycle that has driven domestic consumption, investment, and speculation in the mid- and late 1990s. Between 1994, when NAFTA was implemented, and 2000, total employment rose rapidly in the U.S., causing overall unemployment to fall to record low levels. Unemployment, however, began to rise early in 2001, and, if job growth dries up in the near future, the underlying problems caused by U.S. trade patterns will become much more apparent, especially in the manufacturing sector. The U.S. manufacturing sector has already lost 759,000 jobs since April 1998 (Bernstein 2001). If, as expected, U.S. trade deficits continue to rise with Mexico and Canada while job creation slows, then the job losses suffered by U.S. workers will be much larger and more apparent than if U.S. NAFTA trade were balanced or in surplus.

NAFTA supporters have frequently touted the benefits of exports while remaining silent on the impacts of rapid import growth (Scott 2000). But any evaluation of the impact of trade on the domestic economy must include both imports and exports. If the United States exports 1,000 cars to Mexico, many American workers are employed in their production. If, however, the U.S. imports

1,000 foreign-made cars rather than building them domestically, then a similar number of Americans who would have otherwise been employed in the auto industry will have to find other work. Ignoring imports and counting only exports is like trying to balance a checkbook by counting only deposits but not withdrawals.

The U.S. has experienced steadily growing global trade deficits for nearly three decades, and these deficits have accelerated rapidly since NAFTA took effect. Although gross U.S. exports to its NAFTA partners have increased dramatically, with real growth of 147 percent to Mexico and 66 percent to Canada, these increases have been overshadowed by the larger growth in imports, which have gone up by 248 percent from Mexico and 79 percent from Canada. As a result, the $16.6 billion U.S. net export deficit with these countries in 1993 increased by 378 percent to $62.8 billion by 2000. As a result, NAFTA has led to job losses in all 50 states and the District of Columbia.

The growing U.S. trade deficit has been facilitated by substantial currency devaluations in Mexico and Canada, which have made both countries' exports to the United States cheaper while making imports from the United States more expensive in those markets. These devalued currencies have also encouraged investors in Canada and Mexico to build new and expanded production capacity to export even more goods to the U.S. market. The Canada-U.S. Free Trade Agreement, a precursor to NAFTA, took effect in 1989. Initially, the Canadian dollar

rose 4.1 percent in real terms between 1989 and 1991, as Canada's Central Bank tightened interest rates. During this period, Canada maintained short-term interest rates that averaged 2.25 percentage points above those in the U.S. (1989 to 1994), which caused the initial appreciation in its currency. Canada then began to reduce real interest rates in the mid-1990s. Between 1995 and 2000, short-term interest rates in Canada were 0.75 percentage points below U.S. rates, a net swing of 3.0 percentage points. The Canadian dollar began to depreciate in the mid-1990s, as interest rates were reduced, relative to the U.S. Overall, between 1989 and 2000, the Canadian dollar lost 27 percent of its real value against the U.S. dollar.

NAFTA and the devaluation of currencies in Mexico and Canada resulted in a surge of foreign direct investment (FDI). Between 1993 and 1999, FDI in Mexico increased by 169 percent. It grew rapidly between 1993 and 1997, following the peso crisis, and then declined slightly afterwards, because of the steady appreciation of Mexico's real exchange rate between 1995 and 2000. FDI in Canada more than quadrupled between 1993 and 1999, an increase of 429 percent, largely as a result of the falling value of the Canadian dollar in this period. Inflows of FDI, along with bank loans and other types of foreign financing, have funded the construction of thousands of Mexican and Canadian factories that produce goods for export to the United States. Canada and Mexico have absorbed more than $151 billion in FDI from all sources since 1993. One result is that the

U.S. absorbed an astounding 96 percent of Mexico's total exports in 1999. The growth of imports to the U.S. from these factories has contributed substantially to the growing U.S. trade deficit and the related job losses. The growth of foreign production capacity has also played a major role in the rapid growth in exports to the U.S.

All 50 states and the District of Columbia have experienced a net loss of jobs under NAFTA Exports from every state have been offset by faster-rising imports. Net job loss figures range from a low of 395 in Alaska to a high of 82,354 in California. Other hard-hit states include Michigan, New York, Texas, Ohio, Illinois, Pennsylvania, North Carolina, Indiana, Florida, Tennessee, and Georgia, each with more than 20,000 jobs lost. These states all have high concentrations of industries, such as motor vehicles, textiles and apparel, computers, and electrical appliances, where a large number of plants have moved to Mexico. While job losses in most states are modest relative to the size of the economy, it is important to remember that the promise of new jobs was the principal justification for NAFTA. According to its promoters, the new jobs would compensate for the increased environmental degradation, economic instability, and public health dangers that NAFTA brings (Lee, 1995). If NAFTA does not deliver net new jobs, it cannot provide enough benefits to offset the costs it imposes on the American public.

NAFTA has also contributed to growing income inequality and to the declining wages of U.S. production workers, who make up about 70 percent of the workforce. NAFTA, however, is but one contributor to a larger globalization process that has led to growing structural trade deficits and has shaped the U.S. economy and society over the last few decades. Rapid growth in U.S. trade and foreign investment, as a share of U.S. gross domestic product, has played a large role in the growth of inequality in income distribution in the last 20 years. NAFTA has continued and accelerated international economic integration, and thus contributed to the growing tradeoffs this integration requires.

The growth in U.S. trade and trade deficits has put downward pressure on the wages of "unskilled" (non-college-educated) workers in the U.S., especially those with no more than a high school degree. This group represents 72.7 percent of the total U.S. workforce and includes most middle- and low-wage workers. These U.S. workers bear the brunt of the costs and pressures of globalization (Mishel, Berstein and Scott, 2001). A large and growing body of research has demonstrated that expanding trade has reduced the price of import-competing products and thus reduced the real wages of workers engaged in producing those goods. Trade, however, is also expected to increase the wages of the workers producing exports, but growing trade deficits have meant that the number of workers hurt by imports has exceeded the number who have benefited through

increased exports. Because the United States tends to import goods that make intensive use of less- skilled and less-educated workers in production, it is not surprising to find that the increasing openness of the U.S. economy to trade has reduced the wages of less-skilled workers relative to other workers in the United States.

Globalization has reduced the wages of “unskilled” workers for at least three reasons. First, the steady growth in U.S. trade deficits over the past two decades has eliminated millions of manufacturing jobs and job opportunities in this country. Most displaced workers find jobs in other sectors where wages are much lower, which in turn leads to lower average wages for all U.S. workers. Recent surveys have shown that, even when displaced workers are able to find new jobs in the U.S., they face a reduction in wages, with earnings declining by an average of over 13 percent (Mishel, Berstein and Scott, 2001). These displaced workers’ new jobs are likely to be in the service industry, the source of 99 percent of net new jobs created in the United States since 1989, and a sector in which average compensation is only 77 percent of the manufacturing sector’s average (Mishel, Berstein and Scott, 2001). This competition also extends to export sectors, where pressures to cut product prices are often intense. Second, the effects of growing U.S. trade and trade deficits on wages go beyond just those workers exposed directly to foreign competition. As the trade deficit limits jobs in the manufacturing

sector, the new supply of workers to the service sector depresses the wages of those already holding service jobs. Finally, the increased import competition and capital mobility resulting from globalization has increased the "threat effects" in bargaining between employers and workers, further contributing to stagnant and falling wages in the U.S. (Bronfenbrenner, 1997). Employers' credible threats to relocate plants, to outsource portions of their operations, and to purchase intermediate goods and services directly from foreign producers can have a substantial impact on workers' bargaining positions. The use of these kinds of threats is widespread. A *Wall Street Journal* survey in 1992 reported that one-fourth of almost 500 American corporate executives polled admitted that they were "very likely" or "somewhat likely" to use NAFTA as a bargaining chip to hold down wages (Tonelson, 2000). A unique study of union organizing drives in 1993-95 found that over 50 percent of all employers made threats to close all or part of their plants during organizing drives (Bronfenbrenner, 1997). This study also found that strike threats in National Labor Relations Board union- certification elections nearly doubled following the implementation of the NAFTA agreement, and that threat rates were substantially higher in mobile industries in which employers can credibly threaten to shut down or move their operations in response to union activity.

Bronfenbrenner updated her earlier study with a new survey of threat effects in 1998- 99, five years after NAFTA took effect (Bronfenbrenner, 2000). The

updated study found that most employers continue to threaten to close all or part of their operations during organizing drives, despite the fact that, in the last five years, unions have shifted their organizing activity away from industries most affected by trade deficits and capital flight. According to the updated study, the threat rate increased from 62 to 68 percent in mobile industries such as manufacturing, communications, and wholesale distribution. Meanwhile, in 18 percent of campaigns with threats, the employer directly threatened to move to another country, usually Mexico, if the union succeeded in winning the election.

The new study also found that these threats were simply one more extremely effective tactic in employers' diverse arsenal for thwarting worker efforts to unionize. At 38 percent, the election win rate associated with organizing campaigns in which employers made threats was significantly lower than the 51 percent win rate where there were no threats. Win rates were lowest when threats were made during organizing campaigns involving more mobile industries, such as manufacturing, communications, and wholesale distribution. Among this last group, companies targeted for organizing are much likelier than they were in 1993-95 to be subsidiaries of large multinational parent companies with foreign operations, customers, and suppliers. The 30 percent win rate for organizing campaigns with these global multinational companies suggests that the existence of other sites in Latin America, Asia, or Africa serves as an unspoken threat of

plant closing for many U.S. workers. Bronfenbrenner (2000) described the impact of these threats in testimony to the U.S. Trade Deficit Review Commission,

Under the cover of NAFTA and other trade agreements, employers use the threat of plant closure and capital flight at the bargaining table, in organizing drives, and in wage negotiations with individual workers. What they say to workers, either directly or indirectly, is if you ask for too much or don't give concessions or try to organize, strike, or fight for good jobs with good benefits, we'll close, we'll move across the border just like other plants have done before.

In the context of ongoing U.S. trade deficits and rising levels of trade liberalization, the pervasiveness of employer threats to close or relocate plants may conceivably have a greater impact on real wage growth for production workers than does actual import competition. There are no empirical studies of the effects of such threats on U.S. wages, so such costs simply have been ignored by other studies of NAFTA.

It would seem then, that the impact of the North American Free Trade Agreement (NAFTA) depends on where the observer is located on the corporate ladder. According to a February, 2001 article from the *Wall Street Journal*, a corporate observer, Franklin Vargo of the National Association of Manufacturers, said that NAFTA was a brilliant success (*WSJI*, 2001). Vargo thus suggested that NAFTA has promoted the growth of exports that Americans hoped it would. On

the other hand, a labor spokesman said, that NAFTA has been a failure. He further commented that American employers have used the threat of moving production to Mexico to break unions, to ratchet down wages and to take away benefits. (*WSJI*, 2001).

The North American Free Trade Agreement (NAFTA) is an agreement between Canada, Mexico, and the United States which creates one of the world's largest free-trade zones. The pact builds on a free-trade agreement between the United States and Canada, which initially became effective in 1989 and NAFTA took effect in January 1994. The potentials to be realized through a completely free trade zone in North America are enormous. Canada has traditionally been the United States' largest trading partner, and trade levels with Mexico have also historically increased. Under NAFTA, tariffs on most goods produced and sold in North America are to be gradually eliminated over 10 years. NAFTA also establishes rights and obligations regarding trade in services, intellectual property, and international investment. These provisions could serve as models for future global and regional trade agreements which provides further incentive for the enterprise envisioned herein.

The North American Free Trade Agreement was fueled in large part by the success of the European Community in eliminating tariffs in order to stimulate trade among its members. A Canadian-U.S. free-trade agreement was concluded in

1988, and NAFTA basically extended this agreement's provisions to Mexico. NAFTA was negotiated by the administrations of U.S. president George Bush, Canadian Prime Minister Brian Mulroney, and Mexican president Carlos Salinas de Gortari. Preliminary agreement on the pact was reached in August, 1992, and the three leaders signed it in December, 1992. NAFTA's main provisions called for the gradual reduction of tariffs, customs duties, and other trade barriers between the three members, with some tariffs being removed immediately and others over periods of as long as 15 years. The provisions of NAFTA will help to ensure eventual duty-free access for a vast range of manufactured goods and commodities traded between the signatories. Other provisions were designed to give U.S. and Canadian companies greater access to Mexican markets in banking, insurance, advertising, telecommunications, and trucking. The increase in trade as a result of the creation of the free-trade zone pursuant to NAFTA has been dramatic; however, there has been an historic trade relationship between the two countries which has proven mutually beneficial. According to one source, “NAFTA generated extensive opposition in the United States because of concerns that it would result in a loss of U.S. jobs. Opponents feared the job losses would result from increased Mexican imports and from a shift in U.S. production to Mexican plants” (Schott, 1999). Evidence of the failure of the NAFTA model of economic integration continues to mount. In the aftermath of the Mexican peso crisis, the

International Monetary Fund and the U.S. Treasury insisted that Mexico maintain its commitments under NAFTA by continuing to liberalize trade and investment regimes and by maintaining high interest rates in order to shore up the peso. Higher interest rates, decreased purchasing power of consumers, and increased competition with imported goods have had a devastating impact on small and medium-scale producers and retail businesses. Additionally, some two million Mexicans have lost their jobs, and though such macroeconomics indicators as GDP growth have turned positive in the last few years, the standard of living of most Mexicans has shown little or no improvement. The number of Mexicans pushed into the informal sector and working for less than minimum wage, without benefits, or less than full time has increased dramatically, while the purchasing power of the basic minimum wage has dropped by 24 percent since NAFTA's inception. In a desperate effort to attract foreign investment, the Mexican government has also initiated legal reforms to relax already poorly enforced environmental regulations. On the U.S. side of the border, official U.S. statistics show that more than 170,000 people have been certified under the NAFTA Trade Adjustment Assistance program as having lost their jobs because of the agreement (Hansen- Kuhn, 1998).

Freeman (2000) maintains that during the last decade of the 20th century that "real wages have remained stable but unemployment levels for unskilled

workers have dramatically increased" (343). The author cites examples from the literature to support his assertions that the effects of globalization are leading to a greater disparity in earnings among less-skilled workers; the rich are getting richer and the poor are getting poorer in America. In the 1980s and 1990s, by contrast, most of the third world has embraced the global economy; whereas many in the advanced world worry over the possible adverse effects of trade. "The new debate focuses on one issue: where in a global economy, the wages or employment of low-skill workers in advances countries have been (or will be) determined by the global supply of less-skilled labor, rather than by domestic labor market conditions" (Freeman, 344). In fact, these migration patterns are influenced by and can also influence a country's domestic allocation of resources in several ways. For example, if existing economic systems are insufficient to meet the needs of knowledge workers for employment and standards of living, the outflow of these workers only serves to further reduce existing standards, because these migrants will generally include the most qualified workers, especially those with technical and professional skills. Moreover, the attraction of working abroad can be so strong that many people will choose schools and subjects in order to enhance their potential for migration, regardless of the domestic demand. Therefore, domestic spending for educational systems in these countries have become geared to meet

the needs of other societies while their own domestic employment needs are neglected (Szyliowicz, 2002).

The key issues in this debate are focused on whether the wages of skilled and unskilled workers in advanced countries can remain above those of comparable workers in less-developed countries in a global economy. In other words, will jobs go where the invisible hand says the work can be done for the least amount? The other side of the debate involves the arguments of those who reject the notion that the traded goods sector can determine labor outcomes in an entire economy or who stress that the deleterious effects of trade on demand for the less skilled are sufficiently modest to be offset readily through redistributive social policies funded by the gains from trade. Freeman (2000) maintains the powerful forces involved in the redistribution of jobs through globalization will not be sufficient to dominate an entire domestic economy, nor will this redistribution of jobs generate enough additional revenue from trade to provide job training, counseling, and other social services for the workers in America who see their jobs headed to Mexico and elsewhere. The question could thus be described as being one of distribution of wealth and power (Freeman, 135). It is in this context of changing patterns of wealth creation and distribution that Freeman makes his assertions that as the global playing field becomes more level through increased international trade, “it will impoverish less-skilled Americans and western

Europeans in the future," as the effects of NAFTA and increased global trade with others, "make greater waves in the world economy" (Freeman, 344).

In his chapter, "The Politics of Trade," Mark Brawley (1998) says that "The politics of trade are characterized by distributional questions. Which countries benefit from trade? Does it matter whether one country benefits more than another? Who gains from trade within each country? Who is hurt by trade?" (145). Following the money is certainly not a new method of figuring out who is benefiting from what, but Brawley's assessment is certainly timely in view of a new trade environment which is developing throughout the world by virtue of NAFTA, the European Union, and Permanent Normal Trade status with China. Other regions of the world are creating free trade zones as well, and the bottom- line effects of democracy and capitalism are spreading. Adam Smith said that free trade is mutually beneficial, and Brawley (1998) says: "Comparative advantage refers to an actor's ability to product a good or service more efficiently than other actors. Since we are interested in explaining international trade, the actors in this case are countries. If one country can manufacture paper more efficiently (that is, use fewer inputs such as capital and labor to product a unit of paper, therefore producing paper more cheaply), it can shift all its resources into producing that good; if each country does the same, more of each good gets produced at a lower cost in terms of inputs consumed. There are more goods to go around (via trade), overall

consumption increases; and therefore, everyone_benefits" (145). Therefore, it would appear that the logical consequence of the comparative advantage theory in a global economy would be to look where the jobs went because of new trade. Developing countries such as Mexico which are willing and capable of providing labor and/or raw materials cheaper will continue to be more competitive until their standard of living reaches the level of the countries providing the markets for the products.

According to analyst James Cockcroft (1998), "NAFTA augured an even more abundant supply of cheap Mexican labor, whether exploited in Mexican maquiladoras or as immigrants to the United States" (84). This exploitation of Mexican workers and domination by the powerful U.S. resulted in Mexican critics emphasizing that, "NAFTA would be dominated by the United States, where the GDP was eleven times bigger than Canada's and twenty times larger than Mexico's. . .. Critics charged 'free trade' was a cloak word for 'trade war' (between the EEC, the United States, and Japan) and a 'free labor' pool of cheap Mexican labor for U.S. and Canada-based transnational corporations" (114).

Transnational corporations are organizations which have their base in one country, ". . . but draw much of their income, raw materials, and operating capital from several other countries, through ownership of foreign subsidiaries, joint ventures with foreign governments or investors, and a host of other means"

(Cockcroft, 49). Some NAFTA critics asked, “Could this be another ‘big business scam?’” Cockcroft,114). Other analysts point out that, “There is little evidence that a hemisphere-wide trade agreement based on the NAFTA . . . model would establish a solid foundation for economic relationships that foster sustainable development and economic progress in member countries” (Hansen- Kuhn, 1998). The NAFTA experience has demonstrated that the benefits of trade will not automatically trickle down to the population as a whole. Instead, trade agreements must be specifically designed to serve as tools for development that benefits everyone, not just those at the top (Hansen-Kuhn, 1998).

Clearly then, most analysts basically agree that the FTA and NAFTA have had a significant impact on Canadian trade patterns. Both exports and imports have risen sharply as a share of GDP, and trade has become even more geographically concentrated. Exports have risen from 26 percent of GDP in 1988 to 38 percent in 1996, matched by an almost equally large increase in the import share of GDP from 26 to 35 percent. The Canadian merchandise trade surplus with the US moved in a narrow range between 1988 and 1992, in the early FTA period, and then rose very rapidly, from $15 Billion to $40 Billion. Exports to the US rose from 75 to 81 percent of total exports over the same period, while imports from the US rose from 69 to 75 percent of the total.

There have also been some changes in the broad structure of Canada-US

trade under the FTA and NAFTA. Resource based goods as a share of Canadian merchandise exports have diminished slightly in importance from 34 to 31 percent of the total, while the share of machinery and equipment in exports has risen from 16 to 23 percent, 1988 to 1996. This has been driven by exports of telecommunications equipment, a traditional area of Canadian strength, and by growing exports of office machinery and software. Canada's small "high technology" sector has been the major beneficiary of the FTA. However, Canada remains a very large net importer of machinery and equipment, exporting 80 percent of the value of imports in 1996. The export to import ratio would likely fall if depressed Canadian industrial investment recovered strongly.

A detailed analysis of changes in the pattern of trade by Schwanen (1996) shows that the growth of trade has been particularly strong in sectors liberalized by the agreement, and that the growth of trade with the US has been greater than would have been expected given slower growth in the US than in other markets, and the greater depreciation of the Canadian dollar against other currencies. While overall exports to the US grew by 99 percent, 1988 to 1995, exports in liberalized sectors grew by 139 percent. As a result of the FTA, the US market share in Canada increased significantly in sectors liberalized by the agreement, notably clothing, furniture, processed foods, steel, and chemicals. Canadian exports to the US have grown particularly strongly in liberalized sectors also. A US Congressional

Research Service Report, similarly concludes that the FTA has had an important independent impact on trade flows. If anything, the impact of the FTA on trade has probably exceeded expectations, indicating that corporations reconsidered production strategies in a new light after the agreement was concluded, rather than making marginal adjustments.

Shifts in trade in response to the FTA in combination with exchange rate movements and domestic economic conditions resulted in a major restructuring of the manufacturing sector. There was a massive wave of plant closures and mass layoffs in industrial Canada, particularly Ontario and Quebec, in 1989 through 1992. Over this short period, about one in five manufacturing jobs were lost. Since 1992 there has been a modest recovery in payroll employment in manufacturing. Job losses were often in US companies which operated production facilities in the US and decided to rationalize higher cost operations in Canada. Other jobs were directly lost to competition from imports.

University of Toronto economist Daniel Trefler (1997) has calculated that employment in sectors with tariff protection of more than 10 percent fell by 17 percent from 1988 to 1996 and that 138,000 of 290,000 manufacturing jobs lost between 1988 and 1996 can be attributed directly to the FTA rather than to other factors. These protected sectors, such as clothing and textiles, have restructured mainly by shrinkage. There has been limited productivity but not jobs gains even

in the smaller sector which has survived. Conversely, there was rapid growth of output and productivity in sectors which had more modest tariff protection before the FTA.

Between 1988 and 1995, there was a very sharp 18.7 percent fall in the number of manufacturing establishments in Canada. 7,544 establishments closed with the most severe declines in clothing furniture, printing, and publishing. The fact that the number of establishments shrank more than the fall in employment indicates that restructuring resulted in increased concentration of production. This appears to have taken place mainly in medium sized plants, since the number of large (more than 500 worker) manufacturing establishments fell from 436 to 365 (Statistics Canada, 2000).

Under the FTA, cross-border trade in services with the US has also grown, though less rapidly than merchandise trade. Such trade accounts for only 14 percent of the value of merchandise trade. Canada's traditional deficit in the trade of services with the US widened from $4.6 Billion in 1988 to a high of $10.7 Billion in 1992, and has since gradually shrunk to $9 Billion. Canada currently exports $2 of services to the US for every $3 which is exported. There have been significant FTA and NAFTA related impacts on Canadian transportation industries, notably cross border trucking. Competitive pressures have greatly increased in all transportation industries.

While poor Canadian productivity performance undoubtedly reflects depressed domestic conditions, it has been low considering the closure of many low productivity firms, which should have raised growth through a concentration effect, and considering that free trade gave Canadian manufacturers access to a faster growing market. The 1996 OECD Country Review of Canada expresses surprise and concern that the expected impacts of structural reform, including free trade, have yet to appear, and the same tone of puzzlement is present in the recent Conference Board of Canada report on Canadian Economic Performance. Comments are made on the negative effects of the rapidity of needed adjustments, begging the question of whether more gradual liberalization would have resulted in better performance.

Poor productivity performance likely reflects relatively poor levels of manufacturing investment. Measured in nominal dollars, investment in construction of new manufacturing facilities was more than $4 Billion in 1989 and 1990 but, after a sharp fall, has been consistently below $3 Billion per year even in the 1992 to 1996 recovery. Investment in manufacturing plant and equipment has been stronger, but only regained the nominal dollar level of 1989 in 1996. Measured as a share of GDP, nonresidential investment has fallen from 12 percent in the late 1980s to the 10 percent level in the 1990s, with much of the investment effort focused in the trade and financial sectors. Canadian manufacturers'

historically poor record of investment in research and development and in skills has not appreciably increased.

While there is no doubt that exports, manufacturing exports in particular, have led the weak recovery, there is very limited evidence that free trade has produced a structurally stronger manufacturing sector. To be sure, some sectors have invested significantly and have grown on the basis of exports but the overall competitive position of the manufacturing sector vis-à-vis the US has been maintained only through depreciation of the exchange rate. The Conference Board of Canada has calculated that 80 percent of the improvement in Canada's competitive position in the US in the recovery has been based on exchange rate depreciation, with the remainder coming from slower nominal wage growth than in the US.

The FTA and NAFTA have not resulted in a significant inflow of net new foreign direct investment into Canada. Overall, foreign direct investment inflows from the US have about matched outflows since 1989. US FDI in Canada increased by $47 Billion or 61 percent, 1988 to 1996, while Canadian FDI in the US increased by $42 Billion or 82 percent. Most of the inward flow to Canada represents reinvestment of earnings in the modernization of plant and equipment, while outflows represent new investments by Canadian companies in the US or elsewhere. While there has not been FDI disinvestment in net dollar terms, the

ratio of Canadian FDI in the US to US FDI in Canada has risen from .67 to .75. The US has been a more attractive locale for new Canadian corporate investment than Canada has been for US corporations. There have been very few new "greenfield" manufacturing investments in Canada by US corporations under the FTA and NAFTA but many major Canadian manufacturing corporations have established new facilities in the US and, increasingly, in Mexico. Canadian FDI in Mexico doubled between 1993 and 1994 to $1 Billion, and rose to $1.3 Billion in 1996.

Aside from the direct impact on jobs, critics originally forecast that the FTA and NAFTA would increase the bargaining power of capital vis-à-vis labor, resulting in slower growth of wages, possible deunionization, and a downward harmonization of standards. There is mounting evidence that this has indeed been the case, and that the FTA and NAFTA are, therefore, contributing to the dismal overall labor market trends described above. Wages have grown significantly more slowly in relation to productivity in the manufacturing sector than in the business sector as a whole. Between 1989 and 1995, real wages in manufacturing rose by an average of just 0.2 percent in both manufacturing and the business sector as a whole, even though productivity growth in manufacturing averaged 2 percent per year compared to 0.8 percent in the business sector as a whole. This suggests that competition from the US and now Mexico has a significant impact

upon the growth of wages in relation to productivity, since the manufacturing sector is much more directly exposed to competitive pressure from the US and Mexico than is the business sector as a whole. There is some evidence of a growing gap between productivity and real wage growth in manufacturing which could be attributed to the FTA and NAFTA. Real wage growth as a proportion of real productivity growth in manufacturing has clearly fallen, though this has also been true for the business sector. It is difficult to determine trends in that workers are highly resistant to wage cuts, and concessions made in collective bargaining have taken the form of rollbacks on other issue such as benefits and work rules. Despite reasonably strong productivity growth in US manufacturing, real wages of US manufacturing workers have barely increased in the 1990s.

Strikingly, workers in those manufacturing sectors identified as "winners" under free trade have not benefitted in the form of higher wages. Trefler found "no link" between wage growth and export or productivity growth in different manufacturing sectors, and Schwanen found no link to more rapid wage growth in sectors with fast growing exports. Between 1988 and 1997 (January) average hourly earnings of hourly paid workers increased quite uniformly across the manufacturing sector, and rose no higher in the fast-growing electrical machinery sector than in manufacturing as a whole, Again, this suggests that competitive pressures have eroded the bargaining power of labor.

Erosion of worker bargaining power has resulted in a redistribution of income from labor to capital. In the post FTA period, corporate profits plunged in the recession, and then recovered strongly. Profits as a share of GDP have still not recovered to pre- recession levels, but this reflects the still depressed domestic economy. Statistics Canada (2000) has reported that profitability for large corporations has returned to the peak levels of the 1980s and rates of return are very high in auto, electrical machinery and equipment, pulp and paper, and other winning sectors. In short, the income gains from the growing export sector have mainly been appropriated by shareholders.

Between 1988 and 1995, production worker wages as a share of value added in direct manufacturing activity fell from 31.2 to 27.2 percent and total salaries and wages in manufacturing as a share of value-added also fell, from 43.0 to 37.4 percent. The decline in labor's share of value-added has not been as significant in successful and profitable export sectors such as transportation equipment as in the manufacturing sector as a whole.

Leading Canadian industrial relations note that some degree of union avoidance has always characterized Canadian management practices. What gives them a new flavor is the growing ability of employers to stay nonunion in greenfield sites. But perhaps the strongest weapon that employers have used with success against unions and workers in the 1980s is the threat of closure. In response to

increasing competition as a result of the Free Trade Agreement (FTA) with the United States and lower tariffs in general, a number of employers began to wind up their branch plant operations in Canada. Even as these plants closed, other employers have missed no opportunity to point to these cases to win concessions or to defeat organizing campaigns. Despite management resistance the Canadian labor movement as a whole is far from weakened in the way that the US labor movement found itself circa 1980.

Accordingly, Canadian employers have extensively used the argument of international competitiveness vis-à-vis the US and Mexico to press governments for changes in labor laws and regulations and social programs. For example, the Canadian Manufacturers Association has proposed that all policies should be subject to a "competitiveness test," In this view, government now plays a more pervasive role in the economy than ever before. Tax rates and their coverage; tax expenditures and support programs; public spending for social programs and public infrastructure; regulation and administrative measures of many kinds all have a significant impact on the economic system of the country.

Thus, while labor laws and employment standards have tilted in both directions since the FTA came into effect, the recent trend, notably in Ontario, Alberta and Manitoba, has been to severely limit the effective right of workers to organize, and to roll back even basic employment standards. While employer

acceptance of the legitimacy of collective bargaining and employment standards has always been tenuous, the depth of opposition to unionization has grown and this reflects, at least in part, the greatly increased pressures of international competition. The shift against the bargaining power of organized labor attributable in part to the FTA is a major factor behind the overall labor market trends described above, notably casualization of work and increased polarization of incomes and working-time.

Chapter 3: METHODOLOGY

Introduction

Research literature shows that the push-pull factors which can be used to predict “brain-drain” migration include: age, education, geographic proximity, regional inequality, remuneration levels, socialization differentials, economies of agglomeration, as well as recent trends and statistics. A meta-analysis of the existing research will thus be used to prove or disprove the research hypothesis that the emigration of Canada’s knowledge workers has become more prominent since the North American Free Trade Agreement of 1994.

Approach

For purposes of gauging the overall effects of the NAFTA treaty on the emigration of Canadian knowledge workers, this study utilizes extant longitudinal data acquired from a number of sources to provide a statistical basis for analysis. These data include material derived primarily from Canadian demographic information sources, especially *Statistics Canada*, and including the Reverse Record Check (RRC) and Canadian personal tax data. A broad variety of independent studies and data obtained from the U.S. Bureau of the Census are also used in the study, such as the Current Population Survey (CPS). Other pertinent commentaries are used for expansion of the information obtained from these sources.

The CPS is a monthly survey of U.S. labor market conditions, carried out by the Bureau of the Census on behalf of the Bureau of Labor Statistics. Since 1994, a supplementary survey is conducted in March, profiling the characteristics of foreign-born people residing in the United States. This survey provides an estimate of the number of Canadian-born people who entered the United States during the 1990s and were still living there each year from 1994 to 1999. The CPS includes people whose usual place of residence for a period of six months or longer is the United States, and as such does not include people in the United States for shorter durations.

The RRC is the means by which *Statistics Canada* estimates coverage in the Canadian Census of Population. The 1996 RRC included a sample of people residing in Canada at the time of the 1991 Census, as well as a sample of people entering Canada since the 1991 Census. Sampled individuals were contacted to establish where they had resided at the time of the 1996 Census. A by-product of the RRC is an estimate of people who were living in Canada at the time of the 1991 Census or who entered Canada between 1991 and 1996, and who were residing in the United States at the time of the 1996 Census. The survey identifies, through a direct question, whether those who moved to the United States did so on a temporary or permanent basis. Permanent movers are people who, at the time of the census, had left Canada with no intention of returning, as well as those who

had resided outside Canada for at least two years but whose intentions about returning were unknown. Temporary movers are people who, at the time of the census, had resided outside Canada for at least six months with the intention of returning, or had resided outside Canada for no more than two years if their intentions were unknown.

Personal tax data is also helpful in tracking worker migratory patterns. All people receiving income from Canadian sources are required to file a Canadian tax return, including people leaving Canada during the tax year in question. For those moving from Canada, the date of departure, but not the destination, is captured on the tax form. For an income profile of movers in 1996, the most recent year for which such data are available, one needs to examine those who also filed tax returns in 1995 to capture a full year's income. About 96 percent of 1996 movers filed tax returns in 1995, hence this group is quite representative of 1996 movers.

The CPS data indicate a significant increase in the number of the Canadian-born who were living in the United States in 1998 and 1999 and who entered during the 1990s, but these estimates are based on very small samples and subject to a high degree of sampling error. However, the implied annual flow based on these two years of CPS data is virtually the same as that based on CPS data for the entire 1994 to 1999 period.

According to the RRC, an estimated 178,000 people left Canada between 1991 and 1996 and were residing in the United States in 1996. Of these, 126,000 people expected to remain permanently in the United States, and an estimated 52,000 expected to return to Canada. The implied annual average emigration of people continuing to reside in the United States from 1991 to 1996 may be estimated at around 35,000, of which 70 percent expected to be permanent.

Emigration was 30 percent higher than in the period from 1986 to 1991 as estimated from the previous RRC. Between the periods, permanent migration increased by 15 percent, while temporary migration doubled. The RRC also reveals that between the two time periods, the share of emigrants to the United States remained constant, at half of all permanent emigrants and a third of all temporary emigrants. Over the same period, there was a noticeable shift from Europe to Asia in the destination of emigration. Among permanent emigrants, the Asian share increased from 9 percent to 19 percent while the European share dropped from 32 percent to 19 percent. Among temporary emigrants, the Asian share increased from 20 percent to 31 percent and the European share dropped from 26 percent to 17 percent.

Canadian tax data provide estimates of the number of tax filers leaving Canada to all destinations during the 1990s. As these data are based on all tax filers and are therefore not subject to sampling errors, they provide a reliable trend

over time in emigration of tax filers from Canada to all countries. It is worth noting, however, that tax filers need to identify themselves as movers, and there may be reasons, financial and otherwise, that could prompt filers not to make this declaration. The data indicate that the number of tax filers who left Canada, whether permanently or temporarily, has increased steadily in recent years.

Limitations and Validity

In characterizing the design employed in this study, one could say that the effort falls into the general category of experimental or quasi-experimental analysis. Both types of designs are used when the researcher is interested in testing cause-and-effect relationships. However, the basic problem with either approach is a weakened confidence in making causal assertions. Because of the lack of some controls in the research situation, such designs are subject to contamination by threats to internal validity. Nevertheless, due to the very depth of statistical data available for analysis, and the fact that the primary goal here is to ascertain a possible cause-effect link between Canada's loss of knowledge workers and the NAFTA, the general design approach appears appropriate for the task.

Another consideration in the methodology selected, is the employment of longitudinal data as a manner in which to derive clarification of the hypothesis. In this respect, there has been an increasing emphasis by government planners on

the use of longitudinal data to address policy issues. This growth reflects a recognition of the unique contribution longitudinal data can make to the understanding of complex social policy issues. The special capability of longitudinal data-sets is that the statuses of the same set of population elements, at different points in time, can be compared and interrelated statistically using techniques such as regression, to give an understanding of processes at the individual level. With some designs, it may be possible to draw conclusions about the relative contributions of particular causal factors to particular outcomes, on a firmer basis than can be achieved using single or repeated surveys of independent samples of the same population. Policy interest often focuses on events, exposures and outcomes occurring to individuals, or possibly households, benefit units or even small areas, over time and in identifying the effects of policy interventions against that background. Broadly, there are two main ways of collecting longitudinal data:

1). Retrospective studies - ask respondents to provide information, sometimes extending back over their whole life course, through recollection. The advantages of this approach, compared with prospective follow-up studies, are that it is less expensive and there are no problems of attrition between rounds of data collection. The disadvantages of the retrospective approach, however, are considerable. Clearly, the reconstruction of events, and still more the

reconstruction of exact circumstances, timings, motives and feelings, is highly susceptible to recall inaccuracy and bias: the extent of which is likely to vary between different respondent sub-groups. Moreover, recent events may cloud the interpretation of previous events (rationalization and other retrospection biases). In many cases these problems would be substantial enough to undermine the findings of the research.

2). Prospective studies - involve following the same group of respondents on a number of occasions, such as through panel studies of the general population, or cohort studies of a particular age group. The clear advantage of this approach is that it is less susceptible to the types of bias apparent in retrospective studies. Note however, that even those longitudinal surveys that use follow-up, generally also use retrospective recall to a considerable extent, since this is the only way of filling out the record of occurrences since the last contact was made. The idea of catching each individual actually at the point of making key decisions is a fallacy. On the other hand, more detail can be obtained in a succession of several interviews than by one interview, which has to cover the whole life course in one session. The disadvantages of prospective studies are that they are subject to attrition through failures to contact and refusals to participate further, which rapidly gives scope for major bias. Moreover, they are also costly and time-consuming to conduct and to be successful and timely, need to focus on their original aims, which

can make them inflexible for the purposes of addressing emerging policy questions.

Another important consideration in using longitudinal data is that the evidence of any change takes a long time to accumulate, and therefore it may take a considerable length of time for the answers to policy questions to be provided. The advantages of this approach include cost benefits, since the data are already routinely collected as a matter of course, high coverage of the population in question and therefore, robustness of the sample.

The disadvantages are that administrative data alone is often restricted in its scope for answering complex questions, since it is collected for a specific purpose. In addition, there may be legal and ethical problems involved in accessing such data. Administrative databases tend to exist for a sub-group of the population, rather than for the population as a whole. Finally, while linking administrative data with survey data can be highly fruitful, it is also extremely time-consuming; subject to obstacles such as data protection laws; and is error-prone. For example, if there is no unique individual identifier available on each data source, then the linking of data for an individual can be extremely problematic; for example, name and address details may be recorded differently in different data sources.

Research based on longitudinal data can make a unique contribution to addressing complex policy questions, which are often related to longitudinal

processes themselves; for example, mobility in the labor market, and the impact of government initiatives on attitudes. Increasingly, policy-makers are becoming aware that social issues, such as social exclusion, are related to a complex and linked series of variables over an individual's life course. As such, they need to be investigated holistically, and with long- term emphasis, in order to be adequately addressed. Second, and related to the first point, is that analysis of longitudinal data may allow the relative causal influence of different factors to be teased out and compared in a way that would not be possible with cross-sectional research.

Longitudinal research provides the opportunity to separate out age or maturation effects, from cohort effects. For example, measurement of political attitudes at a certain time may show that younger people are more disaffected from work and society than their elders. Only by measuring the attitudes of these people at a later date will it be possible to establish whether this political disillusionment is related to age or to their generation. Fourth, longitudinal research is increasingly seen as a useful component when planning *evaluations*. Using longitudinal data in an 'experimental' paradigm allows the impact of an intervention, as with a government training program, to be assessed, and even quantified, in comparison with the effect of no intervention.

Finally, longitudinal methods also provide a means of collecting data for cross- sectional analysis, with the result that longitudinal surveys are often used

as a vehicle for including questions of current policy interest, rather than because they are necessarily part of a long-term longitudinal research design. This can lead to overloading, over- complication and contention between the cross-sectional and longitudinal content and analysis requirements, and therefore often leads to long delays in producing longitudinal results.

Additional Data Sources

The *Report on the Demographic Situation in Canada* (Dumas and Bélanger, 1995) and the *Annual Demographic Statistics* (Statistics Canada, 1995), both annual publications, present the basic data on natural increase and net international migration as components of population change, for Canada and the provinces. The numbers indicate that over the period 1901 to 1991, the total immigration of some 10,600,000 and emigration of some 5,700,000 produced a net gain of 4,900,000, representing 21.6 percent of the population growth over the period. The contribution of net international migration to population growth varies considerably over history. For instance, in the period 1901-11, net migration amounted to 44.1 percent of population growth, while in the period 1881-1891 net migration reduced the growth by some 28.7 percent. In the period 1981- 91, the net immigration of some 890,000 persons represents 27.7 percent of the population change.

The historical estimates are subject to a degree of uncertainty, but it is

generally recognized that the current estimates by Statistics Canada are reasonably accurate. Nonetheless, with varying degrees of undercoverage from census to census, there is always a "closure error" in comparing the annual population change established by estimation to that obtained on the census. For the most part, this discrepancy has been reduced now that the census is adjusted for net under coverage. However, the estimate of emigration is based on limited information.

Two other categories of international exchange are also subject to error: returning Canadians and non-permanent residents. It is possible that the numbers of non- permanent residents are overestimated since the estimates are partly based on visas which may still be valid but the person has left (Declos and Michalowski, 1996). Clearly, these basic data on international migration and population change require continued attention. Even the basic data on the landing of immigrants needs to stay on top of the administrative procedures and their application, from which the data are extracted.

Another approach to studying the impact of immigration on the population is simply to consider the proportion foreign born in the census data. This permits various breakdowns by geography, place of origin and period of arrival. For instance, this indicates that 15 to 16 percent of Canada's population was foreign born in the censuses 1951-91. Especially in the case of immigrants who started as

non-permanent residents in Canada, there may be some inaccuracies in the census capture of year of immigration (Badets, 1991). In particular, it is not always possible to follow the stock of given immigration cohorts from census to census, making the assumption that departures are only a function of death and emigration.

The second generation, that is persons whose parents are foreign born, have not been captured in the censuses since 1971. This census found that 33.8 percent of persons were either foreign born or had at least one foreign born parent. Using data on births and deaths, Edmonston (1996) calculates that over the period 1951-91 about 35 percent of the Canadian population has been first or second generation, while about half have been in the first three generations. It is unfortunate that recent censuses have not included this "birthplace of parents" question. The resulting data would permit some rather straightforward analyses on the integration and adaptation of the second generation. Given the difficulty of properly measuring the economic performance of the first generation, which is a function of the diversity of circumstances that need to be taken into consideration, it is unfortunate that census data are not available on the second generation (Boyd and Norris, 1994 and Boyd and Grieco, 1996). In particular, analyses on the second generation do not need to be concerned about the effective meaning of crucial variables like education and experience.

From a policy perspective, research concerning the contribution of

immigration to population growth falls in a vacuum since Canada has no demographic goals in terms of population size. The Immigration Act does say that immigration needs "to support the attainment of such demographic goals as may be established by the Government of Canada from time to time in respect of the size, rate of growth, structure and geographic distribution of the Canadian population". However, without such demographic goals, this particular policy orientation is rather vacuous. At the same time, it is noteworthy that the United Nations conference on Population and Development also did not propose demographic goals. Such goals can seem rather abstract and they run counter to the greater interest in individual well-being as contrasted with the common welfare. However, it can also be argued that the common welfare, including the basic parameters of population size and growth, are an important feature of average well-being (McNicoll, 1995). For example, average welfare may be undermined if a population is growing excessively rapidly or is declining. Depending on the specifics of the situation, this negative effect could be a function of population pressure against resource limits or, the inadequate renewal of the labor force that occurs with slow growth. Quebec has been more willing to engage in discussions concerning the population dynamics and common welfare, and these have tended to support both a reasonable level of immigration and policies that would help in the retention of immigrants. Some of the concern regards maintaining the relative

size of the Quebec population in Canada.

The *Statistics Canada* population projections based on the 1986 census included results that assumed zero international migration. Over the period 1986-2026, an annual immigration of 140,000 implies that 55 percent of population growth would be a direct or indirect function of international migration. With an immigration of 200,000 per year, some 69 percent of growth would be due to migration. The projections based on the 1991 census did not include the zero international migration scenario (*Statistics Canada*, 1995). While such a scenario is unrealistic, it does allow for the calculation of the impact of international migration under various assumptions. These should be more carefully worked out in the official projections, under various assumptions of mortality, fertility, and emigration. Three turning points are useful to focus attention in the projection results (Beaujot, 1991). One is the date at which population growth is due more to net international migration than to natural increase. The second date is that at which natural increase becomes negative, and consequently more than 100 percent of population growth is due to net migration. The third is the point at which population decline begins. Each of these scenarios are outside of Canada's historical experience. In particular, over this century, 22 percent of growth has been due to migration, and consequently 78 percent due to natural increase. Possibly data from a given region would help us to focus on implications of

populations where growth is largely a function of migration. It would appear that the structures that accommodate new members to a population, especially education and labor force entry, need to take into account the shift wherein a larger proportion of this new entry occurs through migration.

Another useful projection involves considering the immigration level that is necessary to prevent population decline under given fertility assumptions. Avery and Edmonston (1988) find that a net migration of 163,000 (or immigration of 212,000) prevents population decline under a fertility assumption of 1.7 births per woman. For Quebec, Ledent (1992) considers various scenarios that produce stationary populations. These vary between an immigration of 15,000 paired with a fertility of 2.1 births per woman, and an immigration of 75,000 paired with a fertility of 1.5. An intermediate result indicates that an immigration of 45,000 with a fertility of 1.8 births per woman produces, after a hundred years or so, a stationary population where 19 percent are foreign born. This compares to the 1991 population of Quebec where 9.2 percent are foreign born. Comparable scenarios should be worked out at the national level, and for other provinces or regions. One could also work out scenarios that produce other meaningful figures such as a continued population growth of one percent per year (Romaniuc, 1984).

In any case, it is hard to put this research in a policy context since Canada has no population policy. One could read some elements of such policy in

particular documents. For instance, the 1966 White Paper on immigration was rather enthusiastic, stating that immigration had made a major contribution to the national objectives of maintaining a high rate of population and economic growth (Manpower and Immigration, 1966). The implication was that without a substantial continuing flow of immigrants, it would be doubtful that Canada could sustain the high rate of economic growth and the associated cultural development which are essential to the maintenance and development of the country's national identity beside the economic and cultural pulls of the United States. The 1974 Green Paper was more cautious: "it would probably be a not unfair assessment of our understanding of the economic consequences of higher against lower population growth rates ... to conclude that the evidence in favor of higher rates is uncertain" (Manpower and Immigration, 1974).

In *Population Change in Canada: The Challenges of Policy Adaptation,* Beaujot (1991) seeks to bring together the various research and views concerning both policy that might seek to influence population (through mortality, fertility, international and internal migration) and policy that needs to take account of population change (aging, family and household units, population composition). With regard to overall population growth, Beaujot (1991) cites various views but he tends to conclude that Canada has profited from population growth in the past, and may well profit from such growth in the future. While free trade reduces the need

for population growth as a source of demand and as a basis for economies of scale, the main disadvantages of slow growth involve more marked population aging and a less flexible labor force.

The future is difficult to anticipate, partly because the population dynamics are likely to be quite different than those of the past. In particular, immigration will become the main source of population growth. Depending on the level of fertility, it would take a substantial level of annual immigration to compensate for the deficit in natural increase. While immigration is often seen as a possible compensation for low fertility, in another sense immigration may be more difficult to accommodate in an environment of population decline. When a population is growing, immigration constitutes a smaller proportion of the overall population change. Once population growth occurs through net migration rather than through natural increase, immigration will have a larger impact on the society and the structures through which it integrates new members (births and immigrants). For instance, in the period 1971-1986 there were 35 immigrants per 100 births. At levels of immigration that would maintain population growth with low fertility, the period 2021-2036 would involve 60 immigrants per 100 births (Beaujot, 1991). Since these population dynamics are outside of Canada's historical experience, it is difficult to anticipate their social and political consequences.

Findings

Compared to the Canadian born, the foreign born are somewhat more mobile, especially those who have been in the country for a short time. Using 1986 census data, Balakrishnan (1993) compares the internal migration of the Canadian born and foreign born over the period 1981-86. In relation to the 1981 population, the net internal migration ratios tend to be higher for the foreign born. However, in the three provinces of Ontario, British Columbia and Alberta, the probabilities of departure are lower for immigrants than for the Canadian born. That is, the very provinces that were receiving disproportionate numbers of immigrants were less likely to see their departures for other provinces. Projecting these probabilities to the point of stability, The study concludes that the internal migration of the immigrant population brings a greater concentration of this population.

Edmonston (1996) finds that when they move across provinces, both the foreign born and the native born are more likely to move to provinces that have larger populations, more economic opportunities, and higher proportions of foreign born population. At the same time, immigrants are more likely to stay in a province that has a higher proportion of foreign born of the same ethnicity, and they are more likely to leave provinces with low relative incomes. Consequently, there is no evidence of an increased dispersion of immigrants over time.

These questions of the onward migration dynamics of immigrants merit

further analysis. For instance, they could be compared to the migration patterns of Canadian born who are not living in their province of birth (Hou and Beaujot, 1995). While immigrants may not be very different in their mobility patterns after five years of residence, they may be more selective in terms of places of origin and destination. For instance, it would be important to better determine why Montreal retains fewer of its immigrants, while Toronto and Vancouver are more often chosen as places of destination for immigrants who are relocating. Another aspect of the migration of immigrants is their departure from Canada. Available analyses suggest that an important component of emigration involves the departure of immigrants (Beaujot and Rappak, 1989; Michalowski, 1991)

Like migration itself, return migration is a complex and inadequately understood phenomenon. Rogers (1984) provides a useful interpretive statement. He starts by proposing that immigration occurs when persons feel a sense of deprivation and expect that they would be better off elsewhere while the costs would not be unacceptably high. Thus, return may follow a failure either on the part of the migrant to adapt or on the part of the receiving society to integrate its newest members from abroad. However, return could also follow the successful accomplishment of the migrant's objectives and it may even have been part of the migrant's original plan. Alternatively, needs and preferences may change, bringing migrants to reconsider their decision, possibly at some threshold in the life cycle.

Finally, the conditions themselves may change, either in the host or sending country.

Obviously, migrants retain ties to their places of origin and in fact modern means of communication and travel make it easier to retain these ties (Richmond, 1984). Freer trade and the international recognition of specialized skills promotes more movement in various directions (Richmond, 1981). When the places of origin and destination are more different and distant, the move involves a greater investment, and the return may be more difficult. More return could be expected when the places of origin and destination are more similar (Beaujot and Rappak, 1989). Returns could be more common if the original migration was mostly a function of pull factors. In the extreme case of push factors, refugees are prevented from returning unless conditions change in their place of origin. However, given the attachment to one's place of origin, it may not take a large improvement in the home conditions to provoke a return. Like non-migration, return migration may be less a function of economics and more a function of social integration. Uhlenberg (1973) argues that non-migration is best understood as resulting from social integration in one's place of residence; often in spite of economic factors which would promote movement. Similarly, return migration may be an attempt to reestablish this social integration. Thus, the pull of return migration is strong, and it is far from necessarily implying a failure of integration.

Another specific issue related to emigration is the extent to which it represents a brain drain, especially toward the United States. Historic studies have found that Canada has been losing professional and skilled manpower to the United States for some time. For example, Brox (1983) qualifies migration between the United States and Canada over the period 1947-72 as a labor market adjustment, following especially on differences in levels of income. The flows in the 1970s became more balanced in these regards (Taylor, 1982). A joint publication updates the results on the exchanges with the United States (U.S. Department of Commerce and Statistics Canada, 1990). For instance, the stock of both Americans in Canada and Canadians in the United States indicates a greater concentration in the professional and highly skilled occupations, with this concentration becoming more marked among persons who moved more recently. While these exchanges have become more equal, they continue to favor the southern movement. For instance, among persons who moved in the period 1975-81, there were 9,480 Americans in Canada, and 14,303 Canadians in the United States, with occupations in executive, administrative, managerial, and professional categories. These questions of the internal migration of immigrants, the departure of immigrants and the characteristics of emigrants, require continued updating. It is easy for incorrect impressions to arise that typically exaggerate the flows. Consequently, it is important to have current information, especially following a

given census.

Age Composition

The impact of immigration on the age structure can best be appreciated by comparing the median age of immigrants on arrival to that of the Canadian population. The median age of immigrants has been relatively stable, averaging 25 years for each year between 1956 and 1976, then increasing to 27 years in 1981-86 and 28 years in 1986-90 (Hou and Beaujot, 1995). The median age of the entire Canadian population has changed much more, increasing from 26.3 in 1961 to 33.5 in 1991. In effect, the median age of arriving immigrants has been about a year younger than that of the receiving population over the period 1945-71, changing to two years younger by 1981 and close to five years younger by 1991.

These measures imply that immigration has a rather minor impact on the age structure. In effect, simulating population change as a function of only births and deaths since 1951 produces a 1981 population with an average age that is only 0.5 years older than the actual average observed in that year. Stated differently, the 1951-81 immigration would have reduced the average age of the 1981 population by a half year.

Similar results are obtained with projections into the future. The Statistics Canada (1990) population projections based on the 1986 census produce median ages in 2036 of 44.7 years under high immigration 45.7 under low immigration and

46.9 years under zero migration. The population aged 65 and over in 2036 is 24.5 percent, 25.6 and 27.0 percent under high, low and zero migration assumptions. Clearly, the immigration assumptions have a rather small impact on the age structure. Nonetheless, the impact is to reduce the aging of the population. Between 1981 and 1986 the proportion over 65 increased from 9.7 to 10.7. In this context, the higher level of immigration would reduce this aging indicator for 2036 by the equivalent of 12 years of aging. These results are nonetheless simplistic because the age distribution of immigrants at arrival is typically held constant. With an aging of the world population, that is unlikely to hold true.

Rappak and Rappak (1990) have projected the age composition under the assumption that there would be higher proportions of younger persons among arrivals. It is found that such scenarios would have a significant impact on the age structure, especially under higher levels of immigration. Since population aging is such a significant factor, the impact of immigration should be further analyzed. There are two erroneous conclusions. One is that immigration would be a solution to the question of population aging. Clearly, aging will continue regardless of the level of immigration. The other erroneous view is to look at the average age of the foreign born, and to notice that they are quite old. This is because the children born in Canada are not counted in the population. Further simulations and projections should be made under varying assumptions, in order to capture more accurately

the impact of immigration on sensitive indicators such as the average age of the population, the proportions of children and of persons at retirement ages, as well as the numbers of people at ages of entry and departure from the labor force.

Determinants of Immigration

Much demographic research considers the determinants and consequences of population questions. There is a vast literature on the determinants of immigration, or of migration more generally. These determinants can be analyzed from the point of view of places of origin and places of arrival, along with intervening obstacles and the characteristics of persons that influence their likelihood of migration. That is, one can consider push and pull factors of various kinds. One can also consider separately the factors that affect staying/leaving and the factors that affect the choice of the place of destination. It can be argued that social factors are mostly involved in the decision whether or not to move; people are more prone to move when they are at stages of the life cycle that involve less integration in the community of origin. Once the decision to move has been made, economic factors seem to play the major role in the choice of a place of destination (Beaujot, 1991).

In a broad ranging book called The Age of Migration, Castles and Millar (1993) argue that international migration is a constant in human history and that population movements accompany demographic growth, technological change, as

well as political conflict and warfare: Over the last five centuries mass migrations have played a major role in colonialism, industrialization, the emergence of nation-states and the development of the capitalist world market. They also propose that international movements have never been as significant as today. As a consequence, most developed countries, and many less developed ones, are far more diverse than they were a century ago. They see these trends of increasing ethnic and cultural diversity, along with transnational networks and cultural interchange, as providing a possible grounds for greater unity over the globe.

Determinants of Departures

From the point of view of sending countries, out-migration tendencies are strongest when development is occurring. For instance, the displacements brought about by development prompted much population movement including out-migration from Europe, especially over the period 1890-1960. After having reached higher standards of living, and lower population growth, the out-migration tendencies from Europe have declined significantly. Many parts of the Third World are undergoing the development and displacements that bring out-migration pressure, especially since 1960. This pressure is likely to continue (United Nations, 1995).

Freer trade brings various types of linkages between countries, including those of migration. In terms of the NAFTA agreement, Zlotnik (1996) argues that

the associated development for Mexico is likely to increase emigration pressure in the short run, and to reduce it in the long run. However, given the historical links between Mexico and the United States, this migration pressure is expected to have less effect on Canada.

Determinants of Arrival

From the point of view of Canada as a receiving country, the conclusions regarding determinants of immigration are largely based on broad factors of political economy. In view of the geographic size of the country, and the need to control the resources that were present, immigration has often been seen as necessary if not essential (Sullivan, 1992). While arguments concerning family reunification and humanitarian attitudes to refugees have their importance, the economic argument has tended to be dominant in Canada's openness to immigration (Employment and Immigration, 1989c). Immigrants will naturally go to parts of the economy where there is more demand for labor (Richmond, 1992). In addition, immigration varies inversely with unemployment. Certain authors have concluded that immigration especially follows the need for cheap labor (DasGupta, 1994). Diversity of immigration also provides economic benefits, especially a larger selection pool and more open competition.

However, there are clearly questions that go beyond these economic considerations. An openness to the cultures of the world may be taken up as a

socio-cultural and demographic challenge that would bring Canada into the modern international world, where European-based societies are a declining component. Thus, as "stewards" of the land and its resources, Canadians might see themselves as managing their "endowment" for the greater benefit of humanity, and less for narrow self-interests.

The determination of an appropriate immigration level, and its composition, is clearly a political question. Research can provide some indication regarding the past, but it is for the political community to decide what it wants for its future, and how immigration is to figure into that social vision. For instance, Stafford (1994) argues that immigration levels can best be understood within state-centered theories dealing with questions like the relative power of capital and labor in a globalizing economy and the political interests of politicians and bureaucrats.

In 1990, the Standing Committee on Labor, Employment and Immigration argued for restraining the growth of immigration in the short term (Blackburn, 1990). Noting that immigration had exceeded 200,000 in only three of the last 70 years, and that there were continuing problems of social relations, concentration of immigrants and immigrant integration, the Committee proposed that caution in increasing immigration beyond the level of 200,000 per year. However, consistent with the policy of "modest, balanced growth in immigration" the 1990 *Annual Report to Parliament* set the 1991 target at 220,000 and the anticipated level for

each of 1992-95 at 250,000 (Employment and Immigration, 1990). It is only after 1994 that targets closer to 200,000 have been set.

For the most part, there is agreement to the effect that the current immigration act does a good job of setting out the major objectives of immigration and the context through which it is to be handled. For instance, Hawkins (1982) describes the act as "an innovative, liberal and effective piece of legislation". The act specifically lets the government decide on the level and composition of the immigrant stream. Discussions regarding the level of immigration are necessarily based on visions of Canada's future. Weinfeld (1988) suggests that there are two predominant visions in as much as they apply to immigration.

One view, which in its extreme version, might be called "Fortress Canada" sees the country as well established and needing to protect its resources and its inheritance against destabilizing external forces. This perspective is apprehensive about a multi-ethnic society, and would prefer to keep out strange elements. Tradition is preferred over change and immigration policy should be cautious. As the total number of Third World immigrants and their descendants rise, Canadian society will continue to face significant challenge in seeking ways to avoid conflict between racial, linguistic, and cultural groups (Simmons, 1988). A solution is simply to reduce the intake of immigrants. The interest in keeping out "strange elements" has been frequently expressed. In opinion surveys, the majority opinion

tends to be that immigration should be lower or at least that it should not increase. In August 1989, 43 percent of respondents felt there were "too many immigrants", 13 percent felt there were too few and 38 percent said there were about the right number of immigrants coming to Canada (Angus Reid Group, 1989).

The alternative perspective, according to Weinfeld (1988), views Canada as a country which is young, rich and that has not achieved its full development. In this perspective immigration is seen as a process of "nation-building," while ethnic variety and demographic growth are interpreted positively. Using the words of an Employment and Immigration (1989) discussion paper: "successive waves of immigrants from all over the world have successfully joined in Canada's experiment at nation-building, ... the emergence of an increasingly pluralistic society has added richness to Canadian life and has made us more open and tolerant". Passaris (1989) sees a multicultural and multi- linguistic society as a unique economic resource for trade, contacts, tourism, and technological transfer. Hawkins (1989) refers to Canada's "pressing demographic needs".

In terms of a debate between these alternatives, enlightened discussions on immigration need to take place in policy circles and beyond. This discussion should keep in mind that societies which find ways to manage ethnicity and pluralism may well be in a stronger position to face future challenges in the interdependent world of nations.

Naturally, questions of immigration do not involve Canada alone. Other nations can exercise pressure to the effect that immigration to Canada presents for them a "brain drain" or a drain on capital. Alternatively, people from heavily populated countries can come to resent Canada's vast land and resources, arguing that we need to exercise our stewardship over these to the benefit of a humanity that goes beyond our borders. Migration pressures are generated by a world system of economic inequality and political instability. It is estimated that there are some 125 million international migrants in the world, seeking to establish themselves in a favorable country, including some 19 million refugees (United Nations, 1995: 51, 55). The immigration process is therefore far from being totally under Canada's policy control.

According to an important research tradition, immigration in Canada can be seen as the major factor that defines new minorities and a specific orientation toward pluralism. Journalist Barbara Frum once said that the Minister of Immigration holds the key to the future of the country (Lacroix, 1991). Minorities can be defined in a variety of ways, but in Canada there is a tendency to base the definitions on immigration status, place of origin and ethnicity. All societies have minorities defined in some way or other, and need to find ways to balance assimilation and the respect for differences. The uniqueness of Canada does not come from such matters, but from the role played by immigration in these

questions.

Li (1988) poses the important question of which "benchmark" to use in the study of such questions. There is a tension between studying the immigrant society for its own merit and considering the structural arrangements that are oriented to integration. Richmond (1991) observes some important contradictions in terms of the consequences of immigration. Several interests push for an immigration that is open with regard to place of origin, in particular the economic interests that profit from more competition, to say nothing of international relations, the interests for family reunification and humanitarian concerns for refugees. On the other hand, the diversity that immigration brings can accentuate social conflicts and endanger unity. There is consequently a need for continued research to ensure the success of this economic and social experiment that is Canadian immigration. That is, immigration plays an important role in the history and evolution of Canada. It brings various politico-geographic and economic challenges, it permits unique links to other parts of the world, and it brings a diversity of population along with a continued need for pluralism, integration and incorporation.

Simmons (1995) argues that one can consider three broad phases in terms of the impact of immigration on Canada. In the pre-modern period, this involved conquest, displacement, and a means of establishing control over land and resources. In the modern period, say from the 1850s to the early 1960s, national

elites used immigration to help build a modern nation-state by bringing in farmers to settle the land and workers in the industrializing economy. In the subsequent postmodern period, immigration is very diverse, including the economic class but also family reunification and refugee admissions, along with both "permanent and non-permanent" immigrants. It remains a strategy for building an efficient, competitive national economy, but also for finding Canada's place in the world of nations where European populations are of declining relative importance. Consequently, for the society it brings "ethnic and regional differences and grievances" and for individuals it becomes one of the strategies for personal security in an "era of diminishing state-provided security".

Clearly there are many consequences of immigration. Chapters two and three highlighted matters of ethnicity, minority status, pluralism and the links created by migration. Still, there is need for more of the research on these questions to focus on differences across metropolitan areas in terms of accommodating the associated challenges. Broadly speaking then, we can say that the demographic behavior of immigrants does not differ strongly from that of persons of Canadian birth, but their geographic and linguistic integration shows stronger differences. Geographically, immigration favors Ontario and British Columbia, and the largest cities, particularly Toronto and Vancouver. This brings an ethnic profile where the concentration of visible minorities is stronger in these

same regions, while non-metropolitan areas as well as the Atlantic provinces are predominantly of European origin. In terms of linguistic integration, it is Quebec that differs from the other provinces. Outside of Quebec, immigrants integrate in the predominant English group. In Quebec, immigrants contribute to the English language disproportionately to the share of this language in the Quebec population of Canadian birth, and third languages persist longer. That is, the immigrant population differs from the population of Canadian birth on some factors more than others. Immigration contributes to population growth, to the geographic concentration of this growth, and to ethnic diversity. These aspects of growth, concentration and diversity apply especially at the time of arrival. Over the course of the presence of the foreign-born population, the impact declines. In particular, the immigrants do not differ significantly from the receiving population in terms of fertility, mortality, and internal migration. Partly due to education advantages, the socioeconomic differences decline with time. The vast majority come to speak the national languages, and even the visibility of ethnic differences declines, most certainly in passing to the second generation. Nonetheless, there remains significant concerns regarding the economic integration of the immigrants with visible minority status, even into the second generation.

The diversity of immigration has its advantages and limitations. It permits an openness on the world and engenders a national identity that is less defined in

ethnic terms. On the other hand, integration remains a continual problem. One could suggest that integration is easier if immigrants distribute themselves around an average that is not too different from the Canadian average. This similarity is present on the demographic aspects, except that of regional distribution. With a partial exception for Quebec, one could say that this similarity also applies to linguistic integration. However, the socioeconomic factors involve mixed results. On education, immigrants are more concentrated at the higher and lower levels, but on the whole the distributions are not very different. On labor force participation, the differences are not large, except for the lower rates of the arrivals of the most recent decade. On income, the averages are quite similar, but this covers significant disadvantages for immigrants arriving since about the mid 1970s, especially for those who are not from Europe and the United States.

It is the visible minority group that comprises the majority of these most recent arrivals (Simmons, 1990). At the same time, there is variation within this group. In particular, the persons with visible minority status who arrived before 1970 have average incomes higher than the national average. Also, there is less relative disadvantage for those who do not live in metropolitan areas. There is also diversity for specific groups; for instance, persons from China and Hong Kong are not as disadvantaged as those from South America. But the differences must not be ignored, especially when they involve an income disadvantage of more than ten

percent, for a cohort that has been in the country for 10 to 15 years.

If the policy of integration is to be seen as positive, there is need not only that the society accept diversity, but that there be common norms permitting equal access to the opportunity structure. The slight lowering of anticipated immigration levels, and the greater emphasis on language in the selection of immigrants, may be seen as another indicator of the sensitive balance between immigrant admissions and the policies on integration.

Chapter 4: ANALYSIS

Evaluating the Data Sources

Clearly, longitudinal historic data can tell us something about long term trends in demography. In this respect, migration from Canada to the United States is best estimated from the US census and the U.S. Current Population Survey (CPS), since these avoiding the risk of double-counting while giving full account to the stock of Canadian-born workers employed temporarily in the United States. Flows of migrants in the 1990s can be compared to earlier flows from Canada to the United States, from other countries to the United States, and from other countries to Canada. The comparison between flows from Canada to the United States and those from other countries to Canada is important in helping to assess the net costs and benefits to Canada from international migration.

As previously mentioned, there is a widespread perception that large and growing numbers of Canadians have been migrating to the United States. Because this perception appears to be so widely held, and generally accepted as fact, one might expect that it would quickly emerge from a review of population statistics. Thus, it may come as a surprise to find, at least at the aggregate level, that the widespread perception is not supported by the numbers. There has instead been over the past thirty years a steady continuation of the century-long downward trend in the number of Canadian-born residents of the United States. Population

statistics show that In 1980, there were 843,000 Canadian-born residents of the United States in 1980; in 1990 some 772,000; 679,000 in 1994; 660,00 in 1996, and 542,00 in 1997. Data from the March, 1998 CPS show 601,000 Canadian-born residents of the United States, suggesting that the sharp drop from 1996 to 1997 was in part due to sampling variation. Canadian-born migrants to the United States have not been numerous enough to from one survey to the next. In any case, measured as a share of the Canadian population in the same year, the number of Canadian-born living in the United States has fallen from more than 16 percent in 1910 and 12 percent in 1930 to 7 percent in 1950, 5 percent in 1960, about 4 percent in 1970, 3.4 percent in 1980, and less than 2 percent in the late 1990s.

Permanent emigration per year represented more than 1 percent of the Canadian population early in the century. By the 1930s it had dropped to about 0.35 percent of the population, holding steady at this percentage through the 1960s. By the 1990s permanent emigration had fallen to 0.15 percent of the population. The only data available on total emigration, including both permanent and temporary, from Canada to all countries is that derived from the Reverse Record Check of the 1991 and 1996 Censuses. These data indicate that annual total emigration from Canada represented 0.22 percent of the population between 1986 and 1991, increasing to 0.27 percent between 1991 to 1996. Despite the

small increase in the first half of the 1990s, emigration over this period was the lowest in Canadian history, and total emigration was a smaller percentage of the population than permanent emigration has been historically.

The falling trend of Canadian-born in the United States has been less than fully matched by a drop in the share of the U.S.-born in the Canadian population. Although the two trends are thus converging, there are still more than twice as many Canadian-born living in the United States as there are U.S.-born living in Canada. Given the tenfold difference in the populations of the two countries, however, the Canadian-born living in the United States represent only about 0.2 percent of the U.S. population, while the U.S.-born living in Canada represent 0.8 percent of the Canadian population. Using Canadian census data to evaluate the flows helps to round out the picture by permitting immigration and emigration flows to be compared, although the emigration data are measured residually, and are probably subject to a higher margin of error.

Canadian census data for the last 150 years also show the ratio of emigrants to immigrants, averaged over five or ten-year inter-census periods, to range from a minimum of 20 percent in 1991-1996 to a maximum of more than 150 percent in the latter part of the nineteenth century. During each of the four census decades between 1860 and 1900, emigration exceeded immigration, while for most of the 20th century, with the sole exception of the 1930s, immigration has

exceeded emigration, with net immigration being largest in the two most recent inter-census periods, 1986-1991 and 1991 to 1996.

In light of the special attention paid to migration of the highly skilled, it is noteworthy that the 1991-1996 census data for total immigration and emigration are matched very closely by *Statistics Canada* data for university graduates. Those with university degrees are more prevalent among both immigrants and emigrants than among the population as a whole, reflecting the higher mobility of those with more education. Statistics Canada estimates that the annual flows of university graduates immigrating to Canada are four times or more larger than the number of graduates moving from Canada to the United States. There is a similar pattern for higher degrees as well, with immigrants holding masters and doctoral degrees outnumbering emigrants holding bachelors, masters and doctoral degrees combined. It is also helpful to compare the trends in Canadian-born residents of the United States with migration from other countries to the United States. The declining numbers of Canadian born are matched by declining numbers of those born in the countries of Western Europe, and increasing numbers of those from poorer countries.

For the Canadian-born living in the United States at the time of the 1990 census, as for the German-born and Italian-born, more than half arrived before 1960 and three-quarters before 1970. By contrast, for those U.S. residents born in

Mexico or the Philippines, more than three-quarters arrived since 1970. Over the second half of the 20th century, there has been a significant narrowing in the per capita income gap between the United States and both Canada and the industrial countries, thus lowering the economic incentive to migrate from Canada to the United States, or from Western Europe to either Canada or the United States. The economic incentives to move from any of the richer industrial countries to the United States are far smaller than they were in mid-century, and the flows are themselves correspondingly smaller.

The greater degree of income inequality in the United States, and a wage premium for those with higher educations that is higher in the United States than in Canada, may have served to maintain the otherwise declining economic incentives for highly trained Canadians to migrate south. The importance of different countries as sources for migratory flows to North America, both to the United States and to Canada, has shifted from Western Europe to poorer countries.

Analysis by *Statistics Canada* suggests that the DeVoretz and Laryea (1998) estimates are misleadingly large, since many of the emigrants do not have university degrees (See Chapter two). The reduced flow from Western Europe reflects the fact that convergence to US and Canadian standards of living has proceeded much faster and further in Western Europe than in the rest of the world,

while the increased flow from poorer countries has been facilitated by changes in immigration policies to reduce the importance attached to ethnicity or country of origin. Canada plays an interesting middle role in these migratory patterns, being an even larger recipient of net migrants, as a share of population, than the United States, while also continuing its traditional role as a net provider of migrants to the United States. Although the aggregate data are helpful, they do not fully address concerns about migration of those in highly skilled occupations. Emphasis on the highly skilled, with education type and level being used as the principal measure of skill, has been at the center of brain drain discussions, not only in Canada in the 1990s, but in many countries over several decades. Widespread concern about brain drains to the United States in the 1950s and 1960s, from industrial and developing countries alike, led to special studies in several countries. These earlier studies provide some data suitable for comparing current and past flows, and for considering the Canadian case in a more global context.

The 1960s data can be compared with 1990s data for at least some brain-drain categories to put the current migration in some historical context. Two groups which have been fairly carefully tracked in both the 1960s and 1990s discussions are scientists and engineers, with the latter group being substantially the larger of the two, in terms of numbers of graduates and of emigrants to the United States, during both time periods. DeVoretz and Laryea (1998) calculated that engineers

migrating in 1993-94 from Canada to the United States were 6.3 percent as numerous as 1991, and Canadian engineering graduates with the corresponding figure being 14.5 percent for scientists and 8 percent for the two groups combined.

Grubel and Scott (1977), on the other hand, calculated that average annual emigration of engineers from Canada to the United States during 1970- 1976 at 527, was only 1.8 percent as large as the annual new supply, as represented by new entrants from the education system, reentrants to the labor force, and immigrants. For computer scientists, they calculated the corresponding emigrant percentage as 0.8 percent. They also compared the migration of scientists and engineers from various countries to the United States as shares of total students in those disciplines in the source countries, and as shares of total migration to the United States. Canada ranked 3 of 48 source countries by the first measure, and 16 by the second measure. Similar calculations for the sum of scientists and engineers averaged over the years 1957 to 1961, find that the earlier brain drain is more than three times as large as DeVoretz and Laryea's estimate for the 1990s, with the average number of scientists and engineers migrating from Canada to the United States equal to almost 30 percent of the number of Canadian first degrees granted in science and engineering over the 1957-1961 time period. For engineers considered separately, the ratio was even higher, averaging almost 46 percent over the five-year period 1957-61. This is twenty five times greater than the

Statistics Canada estimate of the percentage of new engineers leaving Canada for the United States in the 1990s.

Grubel and Scott (1977) also calculated comparable emigration ratios for several other source countries sending trained brains to the United States, and found the proportions much higher for Canada than for other countries. They found that during the 1957-61 period more than half the scientists and engineers emigrating from Canada to the United States were born in countries other than Canada, while for most other source countries the bulk of the emigrating scientists and engineers were born in the country of emigration. However, the total size of the flow from Canada to the United States was large enough that Canada ranked as the number one source of native-born scientific and engineering graduates to the United States, when measured as a proportion of the source-country's population, and ranked third as a provider of source-country students in those disciplines. Grubel and Scott's study also showed that these high ranks were largely due to Canada being a generally high provider of migrants to the United States, as there was not an unusually large proportion of the highly educated among Canadian-born migrants to the United States, compared to migration flows from other countries to the United States. This is quantitatively important, as U.S. Census data show that 56 percent of Canadian-born managerial workers in the United States today do not have any university degree.

The longitudinal data thus indicate that recent flows of migrants from Canada to the United States, whether considering total migration or movements of the highly educated, are less than a quarter as large as those in the 1960s, and in all recent decades have been much smaller than the inflows from other countries to Canada. In terms of numbers, it would appear there is a brain gain rather than a brain drain, and the outflows to the United States appear to be still be on a century-long downward trend.

But what of the possibility that the best are leaving, and are not being adequately replaced by those arriving from elsewhere? This risk forms the basis of DeVoretz and Laryea's calculation of "churning costs," which is their term to describe the extent to which the skills and wages of migrants to Canada are not as large, either per person or in the aggregate, as those of skilled migrants from Canada to the United States. Their aggregate estimate of the present value of these costs is $11.5 billion, and represents by far the largest part of their $11.8 billion estimate of the total costs of the brain drain. The DeVoretz and Laryea calculations depend on the numbers of skilled immigrants and emigrants and their average quality.

An evaluation of the DeVoretz and Laryea calculations by *Statistics Canada* suggests that there are material problems with their methodology. The two most significant difficulties relate to the comparability of the numbers of skilled

immigrants and emigrants, and the presumed paths of future incomes. According to the *Statistics Canada* analysis, DeVoretz and Laryea use non-comparable definitions for skilled immigrants and emigrants, with the result of materially undercounting the number of skilled immigrants. This happens first because they treat US immigration statistics for managerial workers as though the migrants are all highly educated, while making no comparable adjustment for immigration to Canada. Second, they treat all scientists and engineers emigrating to the United States as being highly skilled, regardless of whether or not they have any professional qualifications beyond a first degree, while they exclude bachelor's degree holders.

This is also an important asymmetry, as DeVoretz and Laryea estimate Canadian immigrants in science occupations 1989-96 to be 20,726, while *Statistics Canada* estimates immigrants in science occupations to be 64,990, even after removing all those who might be considered as technologists and technicians. DeVoretz and Laryea base their large estimate of churning costs on evidence that recent immigrant male workers have had salary profiles that remain below those of Canadian born workers with similar education levels long after the date of immigration. The *Statistics Canada* research argues that this differential is not there for female workers, an increasing share of the total, and that for many highly skilled groups,such as computer scientists, the salary gap is removed within a few

years even for males.

Borjas (1992) argues that the salary gap for recent immigrants, which also appears in U.S. data, is a function largely of the change in the pattern of source countries, with immigrants from poorer countries generally having skills and education that are less easily transferred to the workplaces of the United States. From the middle 1950s to the early 1990s, these average 72 percent of the total number of degrees conferred. The proportion is over 90 percent for the recent years, where greater efforts have been made to track graduates, but where some locations may still refer to parental homes or student addresses. The gap between the number of addresses and the number of degrees granted reflects the incidence of multiple degrees, graduates who have died from their figures for the matching inflows.

This non-comparability is compounded when DeVoretz and Laryea use salary differentials which compare the salaries of the wider group of immigrant scientists, including those with only undergraduate degrees, with those of emigrants to the United States. The *Statistics Canada* analysis shows that when comparable methods are used to value the skills and numbers of the immigrants and emigrants, the value and number of the immigrants much exceeds that of the emigrants. It is nonetheless likely, even with comparable evaluation procedures, that the average incomes of the emigrants is likely to exceed that of the immigrants,

reflecting Canada's traditional role as a temporary stopping point for US-bound migrants, as well as the greater relative skill premium in the United States.

In uncovering the effects of migration on education in Canada, longitudinal data can also be used to uncover some interesting aspects relative to the perceived brain drain of Canadian knowledge workers to the U.S. In 1999, The Laurier Institution conducted a longitudinal study of British Columbia's university graduates which indicates that many graduates who might have otherwise remained as instructors at Institutions in British Columbia, were being induced to move south or to other provinces within Canada in pursuit of better economic and professional opportunities.

A Statistics Canada survey of all of the 1995 graduates of Canadian universities, and the records of residence of a large majority of living UBC graduates. The Statistics Canada data as supplemented by a special survey of those in the graduating classes of 1995 who moved to the United States, provides a precise snapshot of the migration patterns for an entire cohort of graduates. The UBC data are drawn from a single institution, but they cover graduates from more than 75 years. To the extent that the two bodies of data can be shown to be consistent, they are mutually enriching: the UBC data provide evidence of trends, and their representativeness of what is happening in the country as a whole is reflected in the Statistics Canada data. Overall, the share of UBC's 1995

graduates living in the United States is about the same as for Canada as a whole; this finding results from the offset of the slightly larger Canadian-based group of bachelors graduates by the migration of UBC Ph. Ds, who represent a larger proportion of total graduates for UBC than for Canada as a whole and are more likely to be migrants both before and after their graduate education.

One of the interesting differences between the UBC and the national data relates to the health professions, especially nursing. A widely reported feature of the Statistics Canada report is that fully one-fifth of the US-bound members from the class of 1995 were nursing graduates. But the data from UBC show that almost none of its nursing graduates had moved to the United States. The reason for this difference is probably that the supply of nurses depends crucially on the management of the health care systems, which differ a great deal from province to province in the nature and especially the timing of the policies undertaken. Several provinces, but not British Columbia, were sharply reducing health care and nursing budgets in 1995, and since retrenchments are usually implemented in the form of freezes on new hires, the nursing class of 1995 in some provinces faced a jobless market in their home provinces.

The fact that so many Canadian nurses went from Ontario to US states with growing health care needs also probably explains why Texas and Florida were especially important targets for the national graduates, but not for the UBC cohort.

UBC nurses tended to remain in British Columbia; migrating graduates in other disciplines tended to concentrate in Washington, California, and Massachusetts, which are all centers for higher education and high technology.

Data shows that in the wake of the FTA and its successor, the North American Free Trade Agreement (NAFTA), bilateral trade and investment increased dramatically, leading to increased temporary and longer-term movements of staff and management. In addition, the trade agreements introduced new categories of temporary visas that rendered migration to the United States very simple for Canadians with degrees in hand and jobs to go to. These new categories, especially the NAFTA (TN) visa, which permit a series of renewals or replacements, have become an entry method of choice for temporary workers and for some longer-term migrants as well.

Looking first at the longer term, the US and Canadian censuses provide the longest systematic record of transborder migration. A comparison reveals that southbound migration has always been three to four times larger than northbound, although the gap has shown some tendency to shrink over the course of the past century. The most striking feature of these data, however, is the extent to which both migration flows have shrunk. At the beginning of the twentieth century, the number of Canadian-born individuals living in the United States was almost 20 percent of the total population of Canada. At the beginning of the twenty-first

century, it is about 2 percent, after an undulating but fairly regular slide over the previous hundred years. This falloff raises a puzzle: as international linkages have in general grown tighter, at least over the past half-century, why have those born in Canada and the United States tended to remain at home? One reason, of course, is that both countries have tended to be targets rather than sources of migration and have been attractive places to remain. Also, globalization, as it is now thought of, is really *re*- globalization, as the first half of the twentieth century, scarred by wars and depression, witnessed sharp reductions in international trade and capital movements. In fact, economic historians are still trying to decide if current levels of international trade and investment, relative to GDP, are as great as those a century ago.

For migration, however, the story differs; the whole of the 20th century witnessed increasing attention paid to nationality and citizenship, with more and more screening of would-be migrants. From the Canadian perspective, at least, the body drain was steadily declining over the century. However, recent data in absolute numbers, supplemented for the 1990s by estimates from the US Current Population Survey (CPS), tell a different story. These data include permanent and temporary migrants and, for the years covered by the CPS, are based on a sample, rather than a 100 percent census count. The figure also shows official projections, made in 1990, for the number of Canadian-born living in the United States in the

1990 and 2000 census years. The actual 1990 census, when tabulated, already showed a shortfall below the projection, and the CPS estimates for individual years during the 1990s show a general pattern of decline greater than that of the forecasts, which were based on 1980s' levels of net migration and the expected death rate of long-past migrants.

The pattern in the figure is somewhat surprising: that the 1990s' CPS numbers fall below those projected in 1990 does not square with the widespread reporting of increased southbound migration during the past decade, with well-publicized reports of sharply increasing numbers of Canadians obtaining NAFTA-based temporary migration status in the United States, or with the fact that unemployment rates, income gaps, tax gaps, and the effects of the FTA have all been such as to lead one to expect a sharp increase in southbound migration during the 1990s. Thus, the CPS may have failed to find a representative sample of the Canadian-born in their usual US haunts. In the meantime, it is still reasonable to estimate that the total number of Canadian-born now living in the United States, on either a temporary or a permanent basis, is unlikely to be greater than it was ten years ago. Despite an unusually powerful constellation of forces encouraging southbound migration and some indication of resurgence in the final years of the 1990s, it looks unlikely to have been large enough to offset the long-established downward trend. Similar patterns exist for those with higher education,

although they are always more likely to be migrants, whether within the country or internationally, and are an increasing share of the total and migrant populations as higher education becomes the norm rather than the exception.

What about the *brain drain*, the expression used to cover the loss of Canada's knowledge workers? Two relatively recent studies have examined the subject, concluding that the brain drain is real and is costing Canada; Devoretz and Laryea (1998), and Schwanen (2000). Schwanen provides an especially useful attempt to estimate the flows of science and engineering workers into and out of Canada and the United States. He shows that, while both countries are increasing their stocks of trained workers in these occupations, the Canadian stock is increasing twice as fast as that of the United States. The faster growth in Canada applies to all sources, including new domestic graduates and both permanent and temporary immigrants. However, Canada continues to show here, as for its population in total, emigration rates higher than those of the United States so that, although the Canadian net stock is increasing faster than that of the United States, the difference between the two countries is smaller than suggested by the gross flows of new graduates and new immigrants.

Statistical data obtained from the Laurier study showed that post-secondary funding cuts over the previous decade left provincial institutions in a weakened fiscal state. In nominal terms, the cash portion of federal transfer payments for

post-secondary education to the provinces was reduced by over 20 percent since 1989. At the same time the provincial government froze tuition fees thereby preventing BC institutions from making up the funding gap, while BC institutions fixed operating grants and have been seeing increases in the number of students ever since. At the same time, other Canadian and US universities, which enjoy a stronger financial position than that of BC universities, are also seeking new hires fir their staffing needs.

However, the data does show that recent bachelor's degree holders are less likely to be living in the United States than are graduates from earlier decades. Graduates from all decades are far more likely to be living elsewhere in Canada than in the United States, and far more likely still to be in British Columbia. For example, the data for bachelors degrees show each of the 32 U.S. states most likely to be a home to U.B.C. graduates has an average of 12 graduates from the total of 1990-1997 graduates, compared to 32,000 in B.C. and an average of 231 for each of the other Canadian provinces. This difference is even more striking when account is taken of the fact that the 32 states are, on average, 10 percent closer to B.C. and have economies that are almost three times as large as the average for other Canadian provinces. When these differences are factored in, by use of the gravity model, a U.B.C. bachelor graduate of the 1990s is about 70 times more likely to be living in another Canadian province than in a U.S. state of similar

size and distance. He or she is far more likely still to be living in British Columbia.

The data for Ph. Ds also show a far more cosmopolitan mix of addresses. This is what would in general be expected, as Ph.D. programs attract their students from all over, and they often migrate after graduation, whether to return home, to move to a third country, or simply to chase job openings that become fewer and more scattered as the degree of specialization increases. With Ph. Ds with North American addresses, there is some sign of increasing US residence in the 1990s, although this increase is less than that evident in the numbers of Ph. Ds staying in British Columbia. The analytical work on these data is just beginning, but the basic trends suggest two things. First, there is no general tendency for graduates in more recent decades to have moved to the United States; indeed, the data mirror population-based estimates from the US census, with graduates in more recent decades being less. Excluding temporary traders for business and treaty traders and investors, whom Leibowitz (1994) suggests may be less likely to be workers in the United States, the totals are 26,332 in 1989 and 47,915 in 1996.

Longitudinal data relevant to education also indicates an increasing trend in emigration in the 1990s among physicians and nurses. An average of about 150 physicians emigrated to the United States per year during the late 1980s, increasing to 450 per year in 1996 and 1997. Nurses leaving for the United States increased from 330 per year in the late 1980s, to about 750 in the early 1990s, and

to 825 in 1996 and 1997. For remaining knowledge occupations, the general pattern was for permanent emigration to increase from the late 1980s to the early 1990s, before decreasing somewhat in 1996 and 1997. Relative to the supply of new graduates, the annual loss of physicians and nurses in recent years has been relatively large. Among physicians, the annual outflow was equivalent in magnitude to about one-quarter of the supply of new graduates, with about 450 leaving (1996–1997 average), compared with a 1995 graduating class of just over 1,700. Among nurses, the outflow was also equivalent to about a quarter of the new graduates, with losses of 800 compared with 3,000 graduates. The annual loss of engineers, computer scientists and natural scientists has been smaller relative to the new supply of university graduates in these fields. The annual average loss of engineers in 1996 and 1997 was equivalent to 4 percent of 1995 university graduates in engineering (12,300). The annual average loss of natural scientists in 1996 and 1997 was equivalent to 1 percent of 1995 university graduates in these disciplines.

The bilateral exchange of post-secondary faculty between Canada and the United States has been more balanced, although during the 1990s faculty emigrating to the United States outnumbered those moving to Canada by a 2 to 1 ratio. Additionally, data of the Association of Universities and Colleges of Canada (AUCC) indicate that among faculty who left their positions (other than for

retirement) in 1996 and 1997, senior professors were more likely to leave Canada than to move within Canada (AUCC. 1997). Among faculty leaving their position, 58 percent of senior professors left Canada, compared with 40 percent of mid-career and 47 percent of entry-level faculty.

Thus, longitudinal data show that fewer highly educated Canadians are likely to have migrated to the United States than those in earlier decades. Second, there has been a sharp growth in the supply of both BAs and Ph. Ds, especially the latter. Both are on a strong upward trend, with Ph.D. production starting later and growing faster, having reached 250 per year in 1996. The acceleration of the growth of tertiary education, and especially postgraduate education, has been generally greater in Canada than in the United States. The postgraduate education especially attracts students from around the world, and the recipients of postgraduate degrees are also widely distributed. Thus, higher numbers of Canadian-educated Ph. Ds entering the U.S. and other foreign markets is something to be expected for the future, even if the share remaining in Canada should remain high or even increase.

The NAFTA Connection

In their discussions of the brain drain to the United States, DeVoretz and Laryea report the number of nonimmigrant professionals admitted to the United States under the provisions of the FTA and NAFTA as rising from less than 3,000

in 1989 to more than 16,000 in 1993 and nearly 27,000 in 1996. They argue that this fast-growing category has become an increasingly popular first step for permanent migration, and is thus an early indicator for future migration. There are, however, sufficient problems with this data series to render it a poor indicator of either temporary or permanent migration to the United States. First, the category they report is new under the FTA and NAFTA. It was zero before 1989, and acquired much of its growth by transfer from other categories. Thus, the total for all entries of temporary workers from Canada to the United States, including the series used by DeVoretz and Laryea, rose from 46,976 in 1989 to 62,199 in 1996, implying that much of the growth in the FTA/NAFTA series came through transfer from other categories. Second, there is some doubt about the extent to which the series contains, even in the same year, more than one entry for the same person. Third, the series captures people who are only spending a few days in the United States, and hence the total does not represent the likely number of Canadians working in the United States at any given time. Fourth, the United States has since 1990 strengthened the requirement for temporary professional visitors to have visas if they are to do any business in the United States. This has increased the number of temporary visas issued without thereby implying any increase in the actual number of temporary workers.

In the light of these large but not yet adequately measured biases in the

FTA/NAFTA series, they are not a reliable guide to either current or future emigration numbers. Collaborative efforts between U.S. and Canadian statistical agencies are underway to establish more clearly what these series measure, and how they should be related to migration and census data. In any event, the temporary flows should be given less importance than the CPS and Census data, which measure the number of Canadian-born actually living and working in the United States, including both temporary and permanent migrants. Thus, the best estimate of the cumulated 1990s flows of Canadian-born migrants to the United States, temporary and permanent alike, is probably that provided by the U.S. Current Population Survey. The CPS data show cumulative flows of post- 1990 employed migrants to have reached some 64,000, for an annual average flow of 8,000 beginning in 1998.These figures exclude those who have been born in other countries and migrated to the United States through Canada, and include temporary workers. The number who are highly educated and skilled permanent migrants, and hence the focus of brain drain discussions, is much less than 8,000. Future census numbers will provide more definitive figures, but the past matches between census and CPS data are close enough that very large surprises are unlikely.

Actually, the only really useful information available on the destinations of movers is that which relates to the country from which their tax returns are filed,

including a number filed from Canadian addresses. These filers may have used an accountant's or a relative's address in Canada to file their tax returns even though they are no longer residents of Canada, or they may have returned to Canada by the time of filing. Assuming that all tax filers who have filed from either a Canadian or U.S. address have moved to the United States yields an upper bound for tax filers who have moved to the United States. A lower bound on filers moving to the United States corresponds to half of tax filers leaving to all destinations; this is based on RRC estimates that between 1986 and 1996, half of all permanent migrants moved to the United States.

From this information, the number of Canadian tax filers who moved to the United States can be estimated in the 8,000–12,000 range in 1991, increasing to the 14,000–23,000 range by 1997, to lie between 11,000 and 17,000. Since the tax filer data on movers show a one-to-one ratio between filers and dependents, the average annual emigration to the United States may be estimated to lie between 22,000 and 34,000 over this period. In summary, estimates from various data sources are consistent, placing annual average emigration to the United States in the 1990s in the 22,000 to 35,000 range. This is about 0.1 percentage of the Canadian population, which is much smaller than what Canada has experienced historically. Nevertheless, tax filer data do suggest that there was an upward trend in total emigration, both permanent and temporary, from Canada in

the 1990s.

Tax filer data based on the 1995 income and age profile of tax filers who left in 1996 show movers to be disproportionately in the 25 to 44 age group, and at entry and mid- career levels when compared with all Canadian tax filers. Close to 10,000 of those who left in 1996 were aged 25 to 34, while another 7,000 were aged 35 to 44; together they accounted for about two-thirds of those who left Canada, compared with only 44 percent of all tax filers. Some 4,000 people aged 45 to 54 left, representing the same share of movers (12 percent) as of all tax filers.

In any case, while movers represented only 0.1 percent of all tax filers, they were over represented among higher income earners. For example, tax filers who left Canada represented 0.9 percent of those reporting income of over $150,000, and close to 0.6 percent of those with incomes between $100,000 and $149,999. Looking at this in another way, movers were 7 times as likely as all tax filers to have incomes of over $150,000 (4.0 percent of movers versus 0.6 percent of all tax filers). Similarly, movers were 5 times as likely to have incomes between $100,000 and $149,999 (4.0 percent of movers versus 0.9 percent of all filers). Of the tax filers who left Canada in 1996 by 1995 25,700 who left, the majority, about 19,000, had incomes of less than $50,000 in 1995, about 5,000 had incomes between $50,000 and $99,999, and a further 2,000 had incomes of $100,000 or more. The Current Population Survey provides a similar age profile of Canadian-

born people residing in the United States and entering during the 1990s. As with tax data, overall CPS results portray emigrants to the United States as disproportionately in the 25 to 44 age group, which comprises about two-thirds of all emigrants to the United States.

As far as education profile is concerned, Current Population Survey results show recent migrants to the United States possessed very high levels of education; higher than those of both the Canadian-born population and recent Canadian immigrants. Among migrants to the United States aged 16 and over, for the period 1994 to 1999, nearly half had a university degree. From the 1996 Census, comparable figures were 12 percent for Canadian-born people and 21 percent among Canadian immigrants during the 1990s. The high proportion of well-educated Canadians entering the United States in recent years may thus be partly the result of NAFTA provisions. NAFTA has made it much easier for university-educated Canadians and college graduates in a few computer-related occupations to live and work in the United States on NAFTA temporary visas.

Most of the analysis presented in various longitudinal data studies examines brain drain and brain gain phenomena from the perspective of individuals. However, the issue can also be viewed from a business or industrial sector perspective, also using tax filer data. Industries with the greatest number of movers in 1996 have been identified using this method, showing that, in 1996, 10 industries

accounted for over one-fifth of close to 27,000 movers. The industries with the most movers were Hospitals; University Education; and Elementary and Secondary Education. Also in the top ten industries was a cluster of high-technology industries, including Architectural, Engineering and Other Scientific and Technical Services; Computer and Related Services; and Communication and Other Electronic Equipment. The other industries in the top 10 were Banks, Trust Companies and Credit Unions; Other Business Services; Federal Government Service; and Food Services.

In addition to the insights gained from an industrial perspective, this type of analysis also provides indirect information on the type of workers who are leaving. However, the data need to be viewed cautiously. For example, not all movers employed by a university were necessarily full-time university professors; some may have been master's or doctoral students whose primary income was from teaching and/or research duties. Likewise, it would be wrong to assume all movers from high-technology industries are high-technology workers. Another limitation of the analyses undertaken is the exclusion of the self- employed.

INS data derived from annual statistical yearbook workups, provide not only a reliable count of permanent migration from Canada to the United States, but also information on the occupation of the migrants. The INS data on temporary visas, while meeting the administrative purposes for which they were designed, do not

provide a reliable statistical picture of the number of people leaving Canada for the United States per year. Moreover, for a number of reasons, the INS temporary data are of limited use, even as an indicator of trends in the temporary entry of Canadians to the United States. As opposed to an actual count of people, the INS temporary data are based on visas issued. General I-94 forms, used to capture all categories of temporary visas, are completed on initial entry to the United States and on renewal of visas that are done at border points. However, the data reported by INS make no distinction between initial entries and renewals.

To further illustrate this process, consider the case of the NAFTA temporary worker visa, the so-called TN visa, which is valid for a maximum of 12 months. There are two ways TN visas can be renewed within this period, either by sending a renewal request to one of four INS service centers within the United States, or by exiting and reentering the United States and getting a renewal at the border upon reentry. The former method may take up to three months, while renewals can generally be done quickly at the border. For renewals done at the central sites, no I-94 forms are generated and no counts are produced of the number of renewals. For renewals at the border, a new I-94 form is generated, hence these renewals are included in the count of temporary visas reported by the INS.

The INS data on temporary visas include visas issued in other circumstances. Individuals on temporary working visas are required to fill out a new

I-94 form when they reenter the United States after an absence of 30 consecutive days or longer. It is also becoming increasingly common for Canadians receiving income from U.S. sources to obtain a NAFTA visa. For example, a Canadian professor making three visits to the United States to give one-hour lectures for fees might generate three INS entries, but not a single stay of significant duration in the United States.

Clearly then, the INS figures on temporary workers, NAFTA or otherwise, do not accurately represent the number of Canadian temporary workers going to the United States each year. These figures may include multiple entries made by the same individuals in a given year, as well as renewals made by the same individuals year after year. They also include an unknown number of single or multiple entries, involving very short stays.

Problems also arise in use of the INS temporary counts to illustrate trends over time in temporary migration to the United States. Increasingly, NAFTA visas are replacing the other categories of temporary visas. Given that NAFTA visas require renewal annually versus every three years for other visas, part of the overall increase in the number of temporary entries reflects more renewal activity in the larger NAFTA category. Additionally, changes in U.S. immigration regulations regarding temporary workers from Canada to the United States may be resulting in increases in the total number of temporary visas that have nothing

to do with the actual number of Canadians leaving to work in the United States. For example, in April 1997, the INS introduced stricter measures to crack down on visa overstaying. Changes in unpublished data provided to Statistics Canada by INS reveal a significant surge across all categories of temporary visas issued at that time, which subsided after a few months but was repeated around April the following year. In summary then, the INS data are not a reliable source of information on either the magnitude of temporary movements from Canada to the United States, or of their trend over time because of the many difficulties discussed above.

Other Considerations

Statistics Canada, in collaboration with Human Resources Development Canada, carried out a survey of 1995 graduates who moved to the United States. The survey found that the overall percentage of 1995 post secondary graduates living in the United States in 1997 remained small (1.5 percent). Graduates with more advanced degrees, however, were more likely to leave, with 12 percent of Ph.D. graduates living in the United States in 1997. A disproportionately high percentage (44 percent) of movers ranked themselves in the top 10 percent of their graduating class. Movers were also somewhat more likely than non-movers to have received scholarships or other academic awards. The survey also found that movers to the United States had significantly higher salaries than did non- movers.

A possible contributing factor might be the high proportion of the movers who rated themselves near the top of their classes. The survey also found that 18 percent of movers to the United States had moved back to Canada by 1999. The salaries of those back in Canada at the time of the survey in 1999 were similar to those remaining in the United States, evidence that those returning may be bringing valuable work experience from the United States back to Canada. Among those who moved to the United States for work-related reasons, the most common reasons cited included greater availability of jobs and higher pay. A very small percentage of graduates explicitly mentioned lower taxes as one of the reasons for their move.

Overall then, emigration to the United States remains small by historical standards and small relative to the stock of workers in the Canadian labor force. However, emigrants are over represented among the prime working age groups, the well educated, and high- income earners. In the public sector, emigrant outflows are the greatest among people employed by hospitals, universities and other educational institutions and government. In the private sector, emigrant outflows are the greatest in high technology, finance and business services. When placed in the context of the bilateral exchange with the United States, Canada clearly suffers a net loss of highly educated workers.

However, while this analysis shows that Canada suffers from a brain drain

to the United States, other analyses present data from a variety of sources to explore the extent to which this drain is offset by a concomitant gain of skilled workers from the rest of the world. These studies profile the age, education and occupation of recent immigrants and examine their contribution to the employment expansion of the high-technology sector. For example, the Landed Immigrant Data System (LIDS) - database of Citizenship and Immigration Canada) data on the intended occupation of immigrants show that knowledge-based occupations in high demand experienced large increases in permanent immigration from the mid-1980s until 1997, the most recent year for which data are available. Over this period, permanent immigration increased fifteen-fold among computer scientists, tenfold among engineers, eight-fold among natural scientists, and fourfold among managerial workers. In 1997, the combined immigration of computer scientists, engineers and natural scientists surpassed 20,000. On the other hand, permanent immigration has decreased in knowledge-based occupations for which the labor market demand was not as strong during the 1990s, namely physicians, nurses and teachers. Between 1990 and 1997, annual immigration fell 30 percent among post secondary teachers, 50 percent among elementary and secondary teachers, 40 percent among physicians and 70 percent among nurses.

The ‘points system’ used in the selection of independent immigrants has been contributing to the recent increase in Canada’s gain of individuals in high-

demand occupations. The high points awarded to individuals in these occupations help them reach the necessary points to immigrate to Canada. Points are also awarded for factors such as level of education and abilities in an official language.

The Canadian Occupational Projections System (Roth 1998) forecasts that demand for high-technology workers will remain high, above the level of current domestic supply. It is worth noting in this context that Canada produces proportionately fewer graduates in the fields of mathematics, sciences and engineering than other G-7 countries, with the exception of Italy. In 1995, Canada produced 741 university graduates in science-related fields per 100,000 people aged 25 to 34 in the labor market, compared with 938 in the United States, and an average of 831 across OECD countries (OECD 1997). 3.2 Aggregate fit data may also be used to understand connections between In the fit between the intended occupation of immigrants when they became landed immigrants in Canada and their realized occupations. These data helps shed light at an aggregate level on the adjustment and integration of immigrants into the Canadian labor market. Current data sources do not permit examination of the labor market adjustment at an individual level; however, new initiatives will permit such analysis.

LIDS data also shows that between 1990 and 1994, 1.17 million people became landed immigrants in Canada. The 1996 Census found 0.98 million people who reported immigrating to Canada over the same period, some 83 percent of

the Citizenship and Immigration Canada figure. There are several reasons for this difference, including deaths, return of immigrants to their country of origin, or emigration to another country. Additional reasons include undercounting of immigrants in the census, and possible reporting errors by immigrant respondents, for example, in reporting the year of landing in Canada. LIDS is thus a principal source of data on immigration to Canada. The LIDS files have been used as a source of information on the intended occupation of immigrants at the time of becoming landed immigrants based on their education and work experience.

The census is another important source of data on immigrants. The 1996 Census has been used to profile the educational level of immigrants and to examine the occupations of people immigrating between 1990 and 1994. The 1996 Census has also been the source of data used in estimating the lifetime annual earnings of immigrant and Canadian- born computer scientists. The actual percentage of recent immigrants working in natural and applied science occupations combined (including computer sciences) was lower than the intended percentage at the time of landing. One possible factor may be ‘flow-through’ immigration in these high demand occupations; that is, a portion of the new immigrants may have emigrated to other countries, particularly the United States. Additionally, among the great number of immigrants Canada admitted each year in the 1990s in these high- technology fields, a portion may not have successfully

integrated into the Canadian labor market and found employment in their field of training.

The intended and actual percentages of immigrants working as physicians and nurses matched quite closely. It seems, therefore, that despite licensing requirements for health professionals, immigrant health professionals had successfully integrated and were practicing in their field of training in Canada. The health sector may have been better able to absorb immigrant physicians and nurses, perhaps because of the relatively small number admitted each year.

The situation for educators at post secondary levels was different from that of educators at the elementary and secondary levels. The actual percentage of immigrants working as post secondary teachers (4.1 percent) exceeded the intended percentage (2.7 percent). It may be that some of the recent immigrants were graduate students at the time of landing but by 1996 were teaching at universities or colleges. The actual percentage of immigrants working as elementary and secondary teachers (3.9 percent) was below the intended percentage (5.1 percent). This may reflect more limited opportunities for new hiring of teachers because of factors such as declining school-age populations in some jurisdictions and reductions in public spending on education as part of the effort by governments to reduce or eliminate deficits. The realized percentages in managerial, administrative, and technical occupations were all close to or slightly

higher than the intended percentages in these occupations.

Another way to examine the impact of recent immigrants on the Canadian labor market is to compare their occupational distribution with those of the Canadian-born population and previous cohorts of immigrants. The objective is to learn whether recent immigrants tend to be over represented in occupations where shortages have existed in recent years, such as high-technology occupations. Likewise, it will also identify occupations in which immigrants tend to be underrepresented. Comparing the occupational distributions of recent immigrants and earlier cohorts of immigrants will shed light on adjustment issues; in particular, whether the length of stay has a positive impact on occupational profiles. In the 1996 Census, among people aged 15 and over, 57 percent of recent immigrants (those who immigrated into Canada between 1990 and 1994) were in the labor force, compared with 65 percent of the Canadian-born and 59 percent of immigrants who came to Canada before 1990. The lower rate of labor force participation among recent immigrants may reflect initial difficulties faced by newcomers in adapting to the Canadian labor market.

On the other hand, the lower rate of labor force participation among immigrants who came to Canada before 1990 compared with the Canadian-born population can be mainly attributed to their older age. When viewed by age group, labor force participation rates of pre-1990 immigrants were comparable to or higher

than rates of the Canadian-born population. Rates were identical for people aged 25 to 54; however, at ages 55 to 64, pre- 1990 immigrants had a higher labor force participation rate than the Canadian-born. If the experience of immigrants of previous cohorts is any indication, we can expect the labor force participation of recent immigrants to converge towards that of the Canadian-born.

Recent immigrants were twice as likely as the Canadian-born population to be working as computer scientists and engineers (2 versus 1 percent, respectively) and in natural sciences (2.5 versus 1.3 percent, respectively). These are precisely the occupations where employment has been expanding and where a shortage of workers has been reported. However, recent immigrants were underrepresented in managerial occupations, nursing, teaching at below-post secondary levels, and social sciences and related occupations, compared with the Canadian-born. Immigrants who came to Canada prior to 1990 were equally represented or over represented in the same occupations, with the exception of elementary and secondary teachers. The under representation of recent immigrants may be a reflection of adjustment issues and/or lower labor market demand in these occupations.

In general, international migrants tend to be younger and more highly educated than non-migrant populations. Why? Because immigration laws tend to favor migrants who are highly educated. This is true of immigration laws in both

Canada and the United States. At the same time, the accompanying knowledge and skill levels of highly educated people are also likely to be in demand, not only in their native countries but also abroad, reducing a major element of uncertainty surrounding a life-altering decision.

More highly educated people are also more likely to have the contacts and information needed to move to another country. Age is a factor inasmuch as younger people may, on balance, be less likely to be tied down by personal and financial commitments. The propensity to be younger and better educated is also evident among interprovincial migrants, suggesting that a common economic incentive may be operating in both international and interprovincial migration.

Data from the last four Canadian censuses show interprovincial migrants to be about 1.5 times as likely to be 44 years of age or less, and about 1.5 times as likely as the non- migrant population to have a university education. In comparison, recent immigrants were about 1.25 time as likely as the Canadian-born population to be 25 to 44 years of age. Adjusting for age, recent immigrants were close to 2 times as likely as native-born Canadians to have a university education. Recent immigrants were even more likely to hold advanced university degrees, between 2 and 3 times as likely to have a master's degree, and about 4 times as likely as the Canadian-born to have a doctorate. Migrants to the United States are even more highly educated than recent Canadian immigrants. However, because of the

much larger number of Canadian immigrants, university graduates migrating to Canada from all countries in the world outnumber graduates leaving for the United States (permanent and temporary) by a ratio of approximately 4 to 1. There are as many immigrants entering Canada with a master's or doctorate as the number of university graduates at all levels leaving for the United States.

Based on the 1996 Census, about 39,000 degree holders entered Canada per year (both permanently and temporarily) from 1990 to 1996, including 11,000 master's and Ph.D. degree holders. This compares with an estimated 10,000 university graduates at all levels combined leaving Canada for the United States per year in the 1990s, based on the 1994 to 1999 U.S. Current Population Surveys. The latter estimate includes both permanent and temporary migrants, and both the Canadian and foreign-born. It is important to point out that university graduates emigrating to countries other than the United States are not included because of lack of data.

Undoubtedly, a factor influencing the high educational qualifications of recent immigrants is the 'points system,' which, as previously mentioned, aims at selecting independent immigrants on the basis of their education, labor market experience and language abilities. Canada's immigration laws, however, are multifaceted. The goal is not only to promote Canada's economic interest, as manifested by the 'points system' in selecting independent applicants, but also to

reunite families and to assist refugees on humanitarian grounds. The two latter objectives are reflected in the other two main classes of immigrants, family class and refugees. Immigrants who are admitted in these two classes are not subject to the same screening as independent immigrants. However, when immigrants of all classes are grouped together, they still have significantly higher educational qualifications than the Canadian-born population, especially at the master's and Ph.D. levels.

Much of the debate on brain drain and brain gain has focused on the shortage of skilled workers in the information technology sector. Because of the high demand for these workers, this sector is keenly aware of losses from migration to the United States. It is equally important, however, to consider the contribution of recent immigrants in this sector. In this respect, recent immigrants are twice as likely as the Canadian-born population to be in high-technology occupations. In recent years, with the expansion of the high-technology sector, employment of high-technology professionals has grown rapidly, not only among immigrants, but also among the native-born. Between 1991 and 1996, employment of computer engineers, systems analysts and computer programmers grew by 39,000, from 124,000 to 163,000.

Recent immigrants (since 1990) accounted for almost a third of this increase. It is clear that recent immigrants have become an important component

of high-technology employment expansion and that they are contributing to meeting the high demand for workers in this sector. Results of the 1996 Census show that, among those aged 15 to 49, the annual income of immigrant computer scientists who had been in Canada for less than 10 years was slightly lower than their Canadian-born counterparts. Among those aged 50 and over, immigrants in Canada for less than 10 years earned significantly less than the Canadian born. Compared to the Canadian-born, immigrants in Canada for more than 10 years had similar incomes up to the age of 44, and had higher incomes after age 45. Thus, it appears that those immigrating at relatively younger ages integrate well, and actually earn more, than the Canadian-born computer scientists after the age of 45. On the other hand, those immigrating at older ages appear to experience more difficulties. For the most part, immigrant computer scientists tend to be quite young (average age in the early 30s) when they immigrate into Canada. An analysis of expected lifetime earnings showed that the projected lifetime earnings of young immigrant computer scientists were comparable with those of their Canadian-born counterparts.

Thus, in high demand occupations, there is no evidence that the labor market discerns qualitative differences between immigrant and Canadian-born workers. In the absence of qualitative differences, given the sheer numbers involved, it is clear that immigrant computer scientists are making a significant

contribution to Canada's high-technology industries. less than 1 percent of the stock of workers in any specific knowledge occupation. The composition of emigrants, however, is weighted towards the better- educated, high income earners and people of prime working age. Further, they are drawn from sectors that are thought to be important to Canada's economy and society.

Chapter 5: SUMMARY AND CONCLUSIONS

That there has been a net transfer of highly skilled Canadians to the United States in the 1990s is not in doubt, although the figures attendant to the phenomenon have been often disputed. In any case, this flow of highly trained permanent and temporary movers between Canada and the United States after 1989 has been largely one-way and constitutes a substantial subsidy from the Canadian taxpayer to the richest country in the world. Recent changes in United States immigration law, together with the signing of NAFTA and its attendant mobility provisions, which are exclusively reserved for highly educated Canadians, have accelerated this trend. Moreover, this transformation of the way the US immigration policy regime has affected Canada means that reference to the pre-1989 era for evidence of a Canadian “brain exchange or drain” is largely irrelevant. Immigration policy is what ultimately determines the number of highly-skilled Canadian émigrés to the United States. Canadian domestic economic conditions are “push” factors, which serve mainly to increase the size of the queue of highly-skilled Canadians awaiting admission to the United States. What is different from previous decades is that this Canadian-induced queue now forms both in Canada and in the US itself, as Canadian- born temporary residents seek permanent visas. The Canadian push factors inducing this movement are both the differential tax rates that are talked about so much these days and a host of other economic

forces. These neonate forces include: dramatically different post- secondary educational subsidy levels between the two countries; employment conditions in Canada; and, in the 1990s, restrictive Canadian fiscal policies, both federal and provincial, that have reduced the demand for labor in the health, education and science sectors.

The primacy of United States immigration policy as a key conditioner of Canadian emigrant flows is made clear if we look at what happened during the recession of the early 1980s. Immigration was quiescent, even though Canadian post-secondary graduates had strong economic incentives to move to the United States, with its lower taxes, higher income and greater prospects for career advancement. But despite all this, a virtually closed immigration door for Canadians led to only 215 net managerial emigrants in 1982. Contrast that with the 1,655 managers who left in 1993, after the change in immigration rules in 1989. The figures clearly demonstrate that when the US door has opened wider, Canadians have filed through it. As far as the composition of the migration is concerned, the flow of managers clearly grew after 1989, and became virtually one-way, Canada to the United States. Within the professions, the movement out of Canada is highly selective, with nurses, physicians and engineers representing the majority of movers by 1996/97.

Both the total resources devoted to training the people who left and the

portion of this accounted for by taxpayer subsidies to post-secondary education are large and have been growing over time. Between 1989 and 1996 over $6.6 billion (measured in 1994 dollars) in educational resources was embodied in the net flow of emigrants to the United States. The Canadian taxpayer's share of this bill was $2.9 billion. The loss of this $2.9 billion subsidy is especially worrisome given Canada's implicit but clear intergenerational education contract. It had been due to be reimbursed by these newly educated workers when they entered the Canadian labor market and paid taxes that could have gone to finance the education of subsequent generations of Canadian students. To put the 1989- 96 skilled outflow into perspective, the $6.6 billion in transferred educational resources is more than three times the $2.1 billion (in 1994 dollars) transferred during the last "brain drain," that from 1950 to 1963.

An analysis of the 1990 US census indicates the high degree of occupational segmentation of Canadians in the United States. Fifty-five per cent of resident Canadians aged 16-59 were in the managerial, professional, technical or administrative professions. Moreover, after controlling for a variety of their other attributes, the simple fact of being a Canadian immigrant on its own raised the earnings of Canadian residents in the United States by 10 per cent. Moreover, unlike other immigrant groups in the United States, more recent Canadian born immigrants earn more than the older stock of Canadian immigrants resident in the

US. In sum, recent Canadian immigrants in the United States are the best and the brightest in terms of occupational choice and earnings performance relative to both resident Americans and previous Canadian immigrants in the United States.

Because of the exclusive entry provisions of NAFTA, Canadian émigrés form a unique set of quasi-temporary entrants to the United States economy. So far, TN visas have been available only to highly-skilled Canadians with a *bona fide* job offer on a near immediate basis. Such entrants are subject to no quota limitations and no labor market displacement tests. This latter waiver is crucial. Canadian TN visa holders are not subjected to expensive and lengthy certification to insure that their arrival would not displace a similarly qualified US citizen. The TN visa thus represents a unique, low cost entryway, of virtually unlimited width. Moreover, it is renewable, thus allowing stays of indeterminate duration. In short, a TN visa means no lawyers and no wait. It represents a clear structural break from the pre-1989 period, when only permanent visa entry or expensive and time-consuming applications leading to traditional temporary visas, which were subject to quotas and duration restrictions, were available.

Canadians are not restricted to the TN visa, of course. They can compete with the rest of the world for other temporary visas or for the more traditional “L” visa for intracompany transfers and H-1 visas. Despite the low cost TN visa, Canadians do continue to use these traditional and more restrictive temporary

visas. Between 1994 and 1996 over 20,570 intracompany transfers or visas were issued to Canadians. The “L” visa has become a transitional visa for many Canadians, allowing them, in effect, a probationary period before being permanently transferred by a parent Canadian company to its US outlet. More than 30 per cent of 1994/96 intracompany transferees have moved from temporary “L” visa status to a more permanent “E” visa. No doubt many people transferred by their Canadian company search for a better position in the US and then have their new employer assist them in obtaining an employment-based permanent visa. This alphabet soup of temporary visas, far from diluting Canadian movement to the US, has allowed Canadians who choose not to wait in Canada in the permanent queue, as they would have had to do in the 1980s, to instead enter the US with a temporary visa and queue from there. Thus, some fraction of these temporary movers represents part of the modern brain drain and cannot be dismissed as simple trade facilitating short-term movers.

To be sure, however, only an unknown fraction of the 48,000 Canadians who moved temporarily between 1994 and 1996 will become permanent movers. Still, NAFTA and FTA visas had grown from zero to almost 27,000 per year by 1996, while “L” visas (intracompany transferees) and H-1 visas (others) represent an additional 20,000 visas. These temporary movers, who in effect, have their foot in the door, represent a new 1990s twist on the brain drain. When, as often

happens, the brain drain debate moves beyond numbers, and even the skeptics admit that the most highly skilled Canadians leave for the United States or Hong Kong, the excuse is offered that highly skilled Canadians have always been drawn by the hope of career improvements beyond the ability of Canada's small market to provide. In other words, the movement is small, exceptional, and impossible to counteract.

Is this trivializing of the United States pull factor to the single advantage of scale really accurate? Is it truly only a problem of a few superstars moving to a larger market? Clearly not. Canadians are not over-represented in the exceptional H-class visa, reserved for world class talent wishing to enter the United States. Moreover, in the early 1980's, Canadian emigration to the US was small or trivial, hence putting the lie to the argument that Canada has been an historical victim of the alluring career development prospects of the United States. After the change in US immigration policies, university-trained Canadians have been leaving in large numbers across a variety of fields, including nursing, medicine, and academe.

It is true that in interviews conducted with 134 Canadian private firms experiencing the brain drain in the 1990's, that all of them mentioned the prospect of career improvement in the United States as a motivation governing the transfer of their professionals. However, emigration for career improvement, far from being a unique event reserved for a few superstars, is simply another routine pull force.

Other forces also hasten the exodus. When Canadian graduates emigrate in the 1990s they avoid repaying their subsidy while enjoying the rewards of a tight US labor market. Consider that by 1993/94 some 40 per cent of the entire 1990/91 graduating class from Canadian nursing schools had left for the United States. In light of the shrinking Canadian labor market, why would young Canadians continue to seek training in nursing? Two obvious reasons. The training is highly subsidized, and relocation to the United States has become easier.

This then, is a clear case of moral hazard, which requires a policy response. Subsidies to nursing were designed in part to encourage Canadian student nurses to continue to enter the faltering, publicly financed Canadian health sector. The suddenly greater accessibility of a nursing job in New York or Hawaii allows graduating nurses to break this implicit contract. Low pay, unemployment and long hours, not to mention repaying the taxpayer loan, are “sacrificed” when Canadian nurses emigrate to the United States.

But there is also an exodus in engineering. Though there is still an abundant demand for engineers in Canada, entire graduating classes of electrical engineers are often recruited by Americans. What is the motivation for a newly trained engineer to move? He or she may not have much of an education subsidy to pay back, since engineering is less subsidized than many other fields, but higher post-tax income and greater opportunities for career development are still attractive.

Finally, mature Canadian professionals who have already repaid their educational subsidy are likely to emigrate mainly to avoid higher marginal tax rates. The point of these examples, which feature different occupations with different labor market conditions, is to illustrate that the motivation to move, and the remedial measures that may be necessary to repatriate highly skilled Canadians, can differ by occupation. In sum, the motivations to move to the United States are abundant and complex and vary by occupation and by where a person is in his or her career. But only rarely is the emigration of highly skilled Canadians motivated by unique advantages of a foreign market that can not be replicated in Canada.

Against the measures that matter most, Canadians enjoy an outstanding quality of life. Overall, life expectancy is long, the population is healthy, income levels are high and communities are safe. Canada's natural environment makes it a tourist destination for the rest of the world. Canada consistently ranks as one of the best countries in the world in which to live. Obviously, as a country, Canadians are doing a lot of things right, but the country faces a serious challenge in the question of the brain drain to the United States. In this respect, Canada has the seventh highest standard of living among the 30 member countries of the Organization for Economic Cooperation and Development (OECD). However, relative to the United States, the world's benchmark economy, real incomes per capita in Canada have been steadily falling over much of the last two decades.

The income gap narrowed somewhat in 1999, and again in 2000. This suggests that things are moving in the right direction, but the substantial gap that remains is cause for concern because the U.S. is Canada’s closest neighbor, largest trading partner and key competitor for talent and North American investment.

The gap with the U.S. is almost entirely due to a lower level of productivity. Improving productivity is heavily reliant on innovation and, at present, Canada's overall level of innovation capacity is near the bottom of the world's leading economies. However, Canada's innovation performance is improving, and in some areas it is outpacing major competitors. For example, over the past two decades, Canada achieved the fastest rate of growth in the G-7 in the number of workers devoted to research and development (R&D), in external patent applications, and in business expenditures on R&D. There is a growing body of evidence from international bodies, including the World Economic Forum, that Canada's future economic prospects are significantly more promising than its current performance.

In taking this view, observers have noted that government, academia and the private sector have made substantial investments in innovation in recent years and progress has been made in every region of the country. Canada has eliminated the deficit, paid down the public debt and reduced taxes. The Government has provided direct support for public, private and academic R&D through the Canada Foundation for Innovation, Canada Research Chairs and

Technology Partnerships Canada, to name just a few. In 2001–02, federal expenditures on science and technology amounted to some $7.4 billion. The Government of Canada also appears to understand the skills challenge and has begun to encourage the development of highly qualified people through such initiatives as Canada Millennium Scholarships, Canada Study Grants, Canada Education Savings Grants and tax measures that help Canadians finance their education needs. Still, in order to curtain the loss of vital knowledge workers to the U.S., Canadians must become even more innovative.

NAFTA's Role

There is no question that trade with the U.S. has expanded dramatically during the years since the agreements were implemented, however. Canada's exports are now equivalent to 40 percent of its gross domestic product, up from 25 percent in 1989. More than half of Canadian manufacturing output now flows south of the border, and Canadian producers account for less than half of domestic demand. This north-south trade boom has been mirrored by a relative decline in trade within Canada. Trade has also become more concentrated with the U.S., rising from 74 percent to 85 percent of exports. Two-way investment flows have also increased greatly. Both Canadian foreign direct investment and portfolio flows to the U.S. grew much faster than did U.S. flows to Canada during this period.

On the downside, growth performance in the 1990s was worse than in any

other decade of the last century except the 1930s. Average per capita income fell steadily in the first seven years of the decade and only regained 1989 levels by 1999. By comparison, per capita income in the U.S. grew 14 percent during this period (Sharpe, 2000). Canada has also become a noticeably more unequal society in the free trade era. Real incomes declined for the large majority of Canadians in the 1990s and employment became more insecure and the social safety net frayed. Moreover, while productivity has grown rapidly in some sectors wages have not, a trend mirroring the de-linking that has taken place in the U.S. But the overall productivity gap with the U.S. has not narrowed as free trade proponents predicted; rather, it has widened.

Successive waves of corporate restructuring, including bankruptcies, mergers, takeovers, and downsizing, have been accompanied by public sector restructuring, downsizing, deregulation, privatization, and offloading of state responsibilities. Public sector spending and employment have declined sharply, and publicly owned enterprises in strategic sectors such as energy and transportation have been transferred *en masse* to the private sector. Manufacturing employment bore the brunt of corporate restructuring, most severely in the first wave (1989-93), falling by 414,000 or some 20 percent of the workforce. The number of manufacturing establishments fell by 19 percent during 1988- 95. High-tariff sectors were especially hard hit. Leather experienced a 48

percent drop in employment, clothing 31 percent, primary textiles 32 percent, and furniture 39 percent. But employment was also slashed in medium-tariff sectors such as machinery and electrical and electronic products. By the end of the decade manufacturing employment was still six percent below its 1989 level. Employment in clothing, for example, was still 26 percent below 1989, and electronics was down 19 percent. Wages were flat or falling even in the so-called “winning” export sectors.

Unemployment in the 1990s averaged 9.6 percent compared to the U.S. rate of 5.8 percent, a doubling of the gap compared to the 1980s (Sharpe, 2000). This level of unemployment was higher than in any other decade since the 1930s. While average worker earnings were stagnant, nonstandard employment exploded, as people struggled to cope during the prolonged slump and restructuring.

Paid full-time employment growth for most of the decade was almost nonexistent (Jackson and Robinson, 2000). The absolute number of full-time jobs did not recover its 1989 level until 1998. Self-employment skyrocketed, accounting for 43 percent of new job creation between 1989 and 1999. Part-time employment accounted for another 37 percent of net employment growth during 1989-99. More than half of this growth was involuntary due to the inability of people to find full-time work. Temporary work grew from 5 to 12 percent of total employment during

the first half of the decade. Labor force participation rates dropped sharply, and at the end of the decade they were still well below their 1989 rates.

Evidence that the trade expansion and economic integration under NAFTA have had adverse employment effects in Canada comes from the government itself, in the form of a little-known study commissioned by Industry Canada. The authors, Dungan and Murphy (1999), found that, while business sector exports grew quickly, import growth also kept pace. At the same time, the import content per unit of exports also grew markedly, while the domestic content per unit of exports fell. Employment in export industries rose from 19.6 percent of total business sector employment in 1989 to 28.3 percent in 1997. However, the rapid rise in imports displaced even more employment. The job-displacing effect of imports rose steadily from an equivalent of 21.1 percent of total business employment in 1989 to 32.7 percent in 1997. The authors concluded that imports are displacing more jobs than exports are adding. What does this mean in terms of actual jobs created and destroyed? Between 1989 and 1997, 870,700 export jobs were created, but during the same period 1,147,100 jobs were destroyed by imports. Thus, Canada's trade boom resulted in a net destruction of 276,000 jobs (Dungan and Murphy, 1999). Obviously then, an good argument can be made that the idea that trade expansion under NAFTA has meant a jobs bonanza for Canada is false. On the contrary, trade expansion seems to have caused, at least in the

first eight years of free trade, a major net destruction of jobs.

The Dungan and Murphy study also found that the labor productivity of the jobs displaced by imports was moderately lower than that of exports, though the productivity of these displaced jobs was still higher than the average productivity level for the business sector as a whole. This was viewed as beneficial for the economy as whole. However, this positive spin on the study's findings is based on the existence of macroeconomic policies whose priority is creating full employment conditions and on the expectation that displaced workers will find other jobs, and that those jobs will be at higher levels of productivity and income. As for incomes, market income collapsed for low-income earners and inequality widened, most strikingly during the first half of the decade. Market incomes of the bottom 10 percent of families with children fell 84 percent during 1990-96, and those of the next 10 percent fell 31 percent. But the restructuring and the massive labor market failure was offset by public transfers, keeping the overall distribution of income after taxes and transfers stable for a while. The consequent accumulation of fiscal deficits became politically unacceptable, however, and the government's ensuing "war on the deficit" provided a rationale for the social cuts that resulted in a widening of overall income inequality in the latter half of the decade.

Under the FTA/NAFTA there have been difficult times for Canadian unions as well. The waves of layoffs and plant closures and the threat of closures in

heavily unionized manufacturing sectors cut into their numbers. Unionization rates in manufacturing fell from 35 to 33.4 percent during 1988-92 (Jackson and Robinson, 2000). Years of defensive bargaining have resulted in unions' inability to appropriate a share of productivity increases for their members. This, too, signals an erosion of labor's bargaining power. And yet, despite the disastrous labor market conditions in manufacturing and throughout the economy, despite negative changes in labor laws and employment standards in some provinces, total union membership has remained remarkably stable. The overall unionization rate slipped only slightly from 32.0 percent of the paid workforce in 1987 to 30.7 percent in 1998 (Jackson and Robinson, 2000).

To what extent should NAFTA take credit or blame for these changes? It is impossible to examine NAFTA in isolation from the broad antigovernment and pro-deregulation policy agenda that has for the last two decades been transforming national economies and restructuring the roles and relationships among governments, markets, and citizens in the push to create an integrated global market economy. As a cornerstone of this well-known neoliberal family of policies, privatization, deregulation, investment and trade liberalization, public sector cutbacks, tax cuts, and monetary austerity, NAFTA has made it easier for Canadian policy makers to bring about a "structural adjustment" of the economy in line with the dominant U.S. model. Advancing and entrenching these policies in a

treaty has secured investor rights, reined in interventionist government impulses and bargaining table demands of labor, and provided insurance against future governments' backsliding. These policies have had, with some exceptions, an adverse impact on the employment and income conditions of working people in Canada. This is not an unintended consequence since, in essence, these policies transfer power from workers to management and investors, from wages to profits, from the public sector to the market.

But assessing causality is a complex task. Outcomes are the result of policies interacting with each other in mutually reinforcing ways. They are shaped by technological forces, corporate strategies, and a varied landscape of social and labor market institutions. NAFTA has put downward pressure on employment and income conditions, but its impact varies from country to country, from sector to sector, from province to province depending on the strength of social and labor market institutions and the commitment of governments to either counter or reinforce these pressures. To be sure, policy choices do exist, but their range is more constrained, and with each turn of the "free market" screw the NAFTA legal framework makes it more difficult and often impossible to go in the other direction. For all these reasons isolating NAFTA impacts is exceedingly difficult.

NAFTA's most important provisions apply to investment. The treaty entrenches a set of rules protecting private property rights of investors, and

virtually all types of ownership interests, financial or non-financial, direct or indirect, actual or potential, are covered. NAFTA liberalizes investment, enhancing its ability to operate less hampered by noncommercial considerations and reducing the risk of future governments unilaterally imposing new conditions on investment. The very broad national treatment provisions of NAFTA oblige each member country to treat foreign investors exactly the same as it treats its own national investors, regardless of their contribution to the national economy. These provisions create an impetus for powerful alliances between foreign and domestically owned businesses to promote further deregulation and resist new regulation, since any policy to regulate foreign capital has to be applied equally to national capital. They remove important industrial policy tools, from local sourcing to technology transfer, tools that seek to channel foreign investment to strengthen domestic industrial capacity, create jobs, and so forth.

NAFTA also prevents governments from regulating the outflow as well as the inflow of capital. It prevents governments from placing restrictions on any kind of cross-border financial transfer, including profits, dividends, royalties, fees, proceeds of sale of an investment, and payments on loans to subsidiaries. It also prevents governments from restricting the transfer of physical assets and technologies. While NAFTA claims to break down international protections and barriers, it provides strong intellectual property protection for corporations'

technology. This is another instance of taking power out of the public realm and empowering corporations.

NAFTA thus limits the ability of state-owned enterprises to operate in ways that are inconsistent with commercial practice and in ways that impair benefits expected by private investors of the other NAFTA countries. This clearly affects the ability of public enterprises to pursue public policy goals that may override commercial goals. It also limits the ability of future governments to re-regulate or re-nationalize industries once they have been deregulated or privatized. It provides the legal framework for greater private penetration into traditionally public areas, notably health care and education.

Finally, NAFTA guarantees investors the right to prompt compensation at "fair market value" for measures that are deemed to be "tantamount to expropriation," a vague term for measures that are seen in some way to impair commercial benefits, including any future benefits that might be expected. Claims under these and other provisions may be adjudicated through various dispute panels, including an investor-state disputes tribunal, where in recent years a flurry of corporate challenges have forced governments to reverse policy decisions. The likelihood of these kinds of challenges is putting a chill on any policy or regulation that might be perceived as an infringement of investor rights. Under these rules of continental integration, considerations of competitiveness tend to override all other

policy considerations. In Canada, this dynamic has had three major impacts:

On the corporate level, Canadian companies rationalize their cost cutting and restructuring through takeovers, downsizing, closure, and relocations as the only means to stay competitive against their NAFTA partners. Increased competition also intensifies the pressure on employers to demand worker concessions. Workers are legally confined by national borders. Capital has the upper hand, since it can move more easily under the new regime or threaten to move if labor does not make wage and other concessions. It also increases the pressure to lower costs through production and work reorganization, leading to the increased use of part-time, temporary, and contract workers and outsourcing to nonunion firms in low-wage jurisdictions.

The Canadian government is shifting its fiscal and regulatory policies in order to be more competitive under NAFTA. This translates to raising subsidies while lowering taxes, regulations, and standards to maintain and attract investment. There are no common rules governing acceptable and unacceptable subsidies or limiting subsidy wars among governments. And labor and environmental side agreements, which purport to limit the competitive bidding-down of labor and environmental regulations, are ineffectual. Policy levers such as performance requirements and conditional tariffs, which aim to nudge investors in accordance with public policy priorities, have been largely removed. Thus, the

need to provide incentives to attract investment has created dual stresses; downward pressure on regulations and upward pressure on government spending.

The macroeconomic policy priorities and choices, especially on the issue of wage control, changed under NAFTA. They have included disciplining labor through monetary policy austerity, reducing government income supports, notably unemployment insurance and other social program spending, and lowering corporate and personal taxes. As a result, the wages and well-being of Canadian workers are declining. Most economists agree that the great Canadian slump of the 1990s was caused mainly by bad macroeconomic policy choices. First by severe monetary tightening, which coincided with the implementation of the bilateral FTA, and later in the decade by fiscal retrenchment, which, according to the OECD, was the harshest of any industrial country in the postwar era. At its peak in 1990, short-term interest rates were five points above U.S. rates. The massive federal spending cuts began in 1995 and over four years cut spending from 16 to 11 percent of GDP, the lowest level since the late 1930s. Program spending at all levels of government fell from 45 percent to less than 35 percent of GDP during 1992-99, an unprecedented structural shift in the public-private sector balance (Stanford and Brown, 2000).

Many economists look at this disastrous economic record as the consequence of macro-policy error. The NAFTA-induced structural changes have

been largely ignored. Monetary policy in the late 1980s and early 1990s was driven by the determination of monetary authorities to virtually eliminate inflation from the Canadian economy, which at the time was roughly the same as U.S. inflation and thus was not a problem. Canadian authorities were also concerned about falling labor cost competitiveness with U.S. manufacturing as Canada entered free trade. Productivity was growing more slowly, and real wages were growing faster, than in the U.S. These wage increases were certainly justified by productivity increases, but in the de-unionized United States, wages were rising more slowly than productivity.

The bulk of the social program destruction was implemented by 1997, and with the budget balanced, the government began the second phase of the fiscal adjustment, corporate and upper-end income tax cuts. In 2000, the finance minister announced tax cuts totaling more than $100 billion over five years. Canadians are thus far enough along now in the FTA/NAFTA adventure to answer the question: “Have the FTA and NAFTA delivered the goods that were promised?” The answer depends on who you ask. For those who wanted to diminish the role of government as an active player in the economy and provider of collective social protections, and for those who wanted to improve the environment for business competitiveness by disciplining wages, NAFTA and the FTA have been successes. But in the public debate that preceded implementation of the free trade deal,

delivering the goods, according to proponents, meant rising productivity levels and rising incomes. It meant ushering in an age of prosperity for all Canadians. That was the promise to the Canadian public. The answer here is clearly no.

Clearly, the FTA/NAFTA arrangement has had great impact on all fronts in Canada, socially, politically and economically. However, how it has influenced the movement of Canada's knowledge workers is still somewhat up in the air. In extrapolating from the effects that FTA and NAFTA have had on all aspects of Canadian life, however, one can make some basic assumptions in this area. First, it seems certain that NAFTA has had an effect on labor on both sides of the border, and that things in this regard are still in a state of flux and adjustment which might not fully materialize for years. Second, it appears that the provisions for visas allowed under the agreements may have both direct and indirect effects on the freer movement of workers across the border, thus forming at least a contributory reason for the movement south.

There is ample evidence that trade in general and NAFTA in particular then, play only a limited role in shaping labor markets. NAFTA's impact on labor markets is proportionally greater in Canada and Mexico, but the labor backlash is by far greatest in the United States. Labor market churning is part of economic progress. Workers quit their jobs all the time in search of better prospects. Even during periods of rapid economic growth, workers lose their jobs involuntarily. Job losses

impose substantial costs on workers in terms of forgone income during the unemployment period and even after, if finding new employment means a lower salary. These costs exist whether the cause of the job loss is technological change, economic downturn, or increased trade. To ease worker concerns, governments can promote programs that reduce the economic hardship by providing temporary income support, wage insurance, health coverage assistance, and incentives for rapid reemployment. This is the focus that policy planners in Canada should pursue to address the problem of the brain drain.

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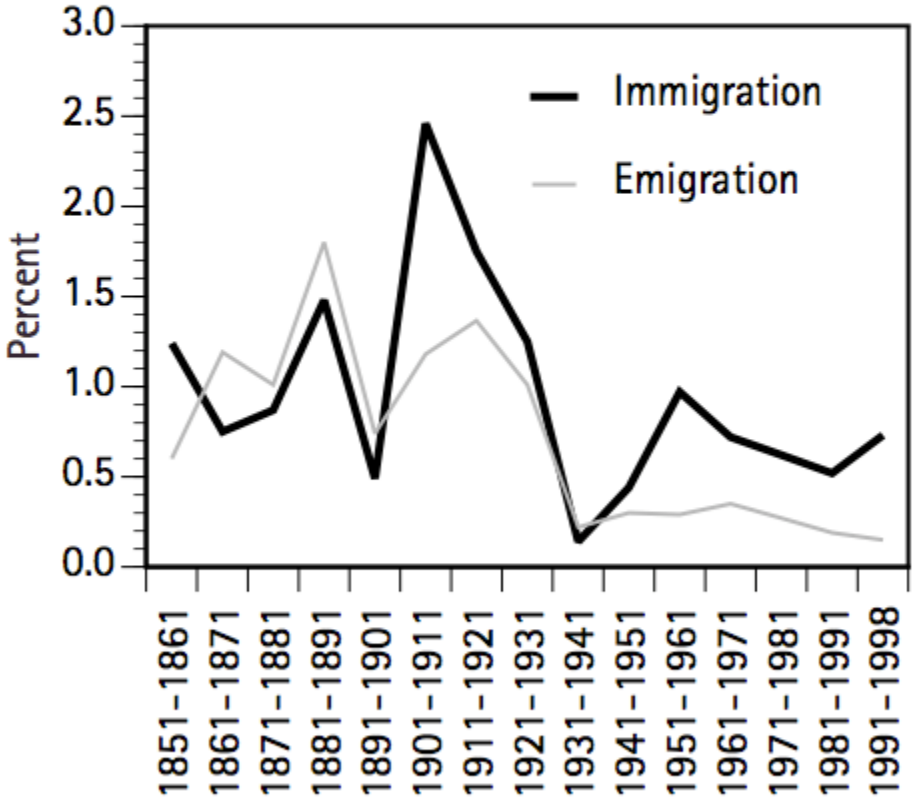
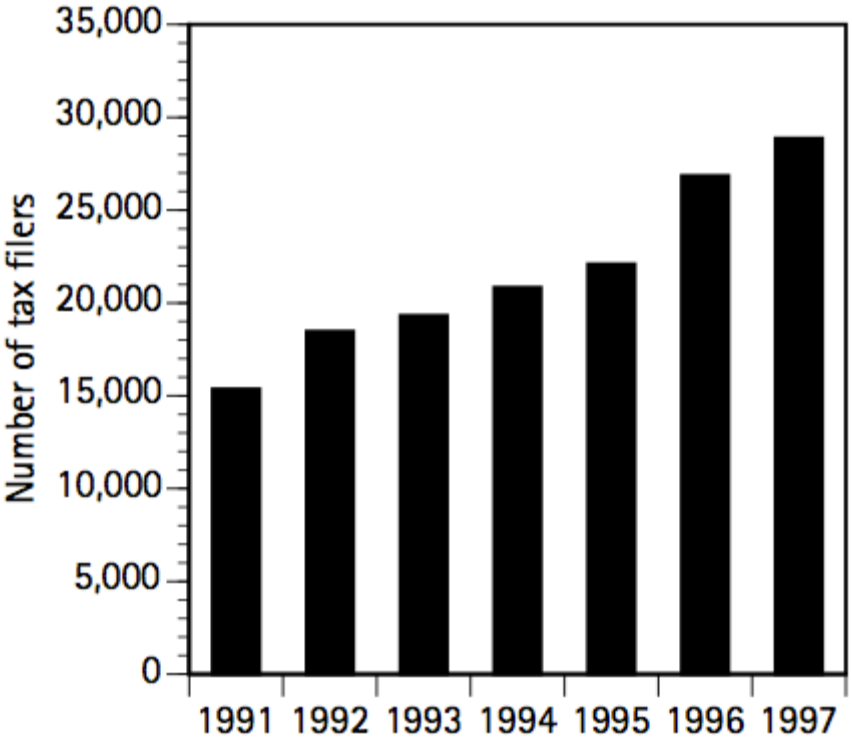
Graph 1
Annualized Permanent Immigration to and Emigration from Canada as a Percentage of the Population, 1851–1998



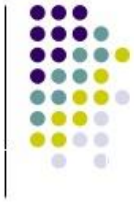
Source: Census Data (see Statistics Canada [2000])

Graph 2
The Magnitude of Emigration to All Destinations — Tax Filers Who Ceased to Reside in Canada



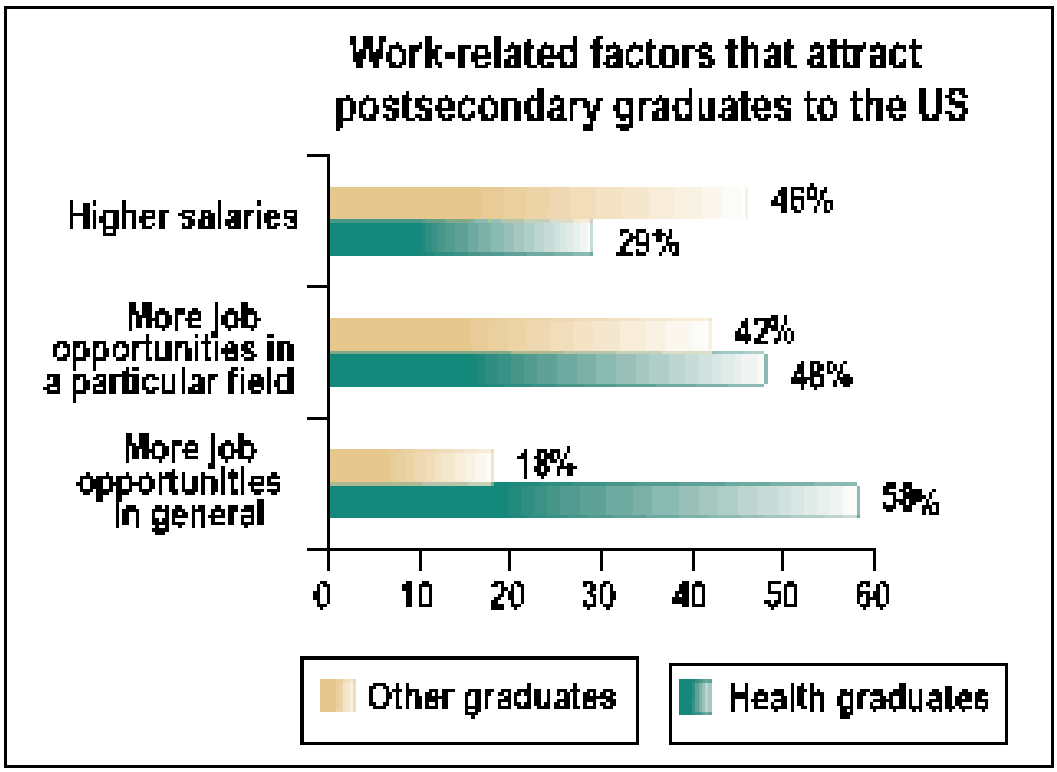
Source: Revenue Canada tax files, Small Area and Administrative Data Division, Statistics Canada.

PUSH FACTORS OF BRAIN DRAIN :-



- Under employment.
- Economic under development.
- Low wage/salary.
- political instability.
- Over production and under utilization or HQM.
- Lack of research and other facilities.
- Lack of freedom.
- Discrimination in appointment and promotion.
- Poor working facilities.
- Lack of scientific tradition and culture.
- Unsuitable institution.
- Desire for a better urban life.
- Desire for higher qualification and recognition.
- Better career expectation.
- Lack of satisfactory working conditions.

Source: Monk School of Global Affairs, University of Toronto 2001



From “The Brain drain: Myth and reality – What it is and what it should be, “ by R. Finne, 2001, Queens University, Kingston, Canada.