

UC San Diego

Working Papers

Title

The Migration of High-Skilled Workers from Canada to the United States: Empirical Evidence and Economic Reasons

Permalink

<https://escholarship.org/uc/item/1020t306>

Author

Iqbal, Mahmood

Publication Date

2000-08-01



CCIS

THE CENTER FOR
COMPARATIVE IMMIGRATION STUDIES

The Migration of High-Skilled Workers from Canada to the United States: Empirical Evidence and Economic Reasons

By Mahmood Iqbal

The Conference Board of Canada

**Working Paper No. 20
August, 2000**

**University of California-San Diego
La Jolla, California 92093-0510**

The Migration of High-Skilled Workers from Canada to the United States: Empirical Evidence and Economic Reasons

Mahmood Iqbal*

There is a growing perception that while Canada is attracting skilled personnel from around the world, it is also losing many of its best and brightest to the United States (a phenomenon commonly known as “brain drain”). This emigration has become more prominent since the free trade agreement (FTA) in 1989, and especially after the implementation of the North American free trade agreement (NAFTA) in 1994. However, there is great controversy about the extent of brain drain.

Canadian Immigration and Citizenship, the national agency responsible for collecting and disseminating migration data keeps track of only immigrants entering into Canada. Statistics Canada, on the other hand, estimates Canadian high-skilled workers leaving for the United States through secondary sources: US Current Population Survey, Canadian Census and personal tax filers data. Unfortunately, these approaches primarily focus on those Canadians who emigrate to the US on “permanent” basis. They fail to include emigration of Canadian professionals to US on “non-permanent” basis and therefore, result in “incomplete” counting.¹ While in recent years, most emigration to US has been taking place under NAFTA temporary work visas.

This paper (primarily based on the Conference Board study²) is a comprehensive examination of brain drain. First, it provides the significance of the issue from Canadian perspective. Then it provides an historical view of overall migration between Canada and the United States. It also provides data on immigrants in Canada from other parts of the world. It then looks at the recent trend in emigration (both permanent and non-permanent or temporary) of highly educated and skilled Canadians to the United States and examines its significance in a broader economic context. Using national data, the paper also provides empirical evidence of factors responsible for brain drain and establishes a quantitative link

* Principal Research Associate, The Conference Board of Canada, Ottawa, Ontario, Canada. E-mail: iqbal@conferenceboard.ca

¹ See a series of presentations by Statistics Canada staff under various titles, made in October 1997 in Quebec City; September, 1999 in Toronto; October 1999 in Ottawa. Most recent publication by John Zhao, Doug Drew and Scott Murray of Statistics Canada, “Brain Drain and Brain Gain: The Migration of Knowledge Workers from and to Canada,” *Education Quarterly Review*, May 2000, vol. 6, no. 3, Statistics Canada, catalogue no. 81-003.

² Mahmood Iqbal, *Are We Losing Our Minds? Trends, Determinants and the Role of Taxation in Brain Drain to the United States*, Detailed Findings no. 265-99 (Ottawa: The Conference Board of Canada, August 1999). Also see Mahmood Iqbal, “Brain Drain: Empirical Evidence of Emigration of Canadian Professionals to the United States,” *Canadian Tax Journal*, vol. 48, no. 3, 2000, forthcoming.

between the trend and its determinants. Since the tax-wedge between Canada and US is often identified as the main determinant of brain drain, details on differences in personal taxes of the two countries also are provided.

The main and historically consistent data source on emigration of Canadian professionals to the United States is the *Statistical Yearbook*, published by the US Immigration and Naturalization Service (INS). According to this source,³ there are two main categories of Canadian professionals moving to the United States: “permanent” and “non-permanent.” Permanent immigrants are those who move with the intention of holding permanent employment.⁴ Non-permanent immigrants are those who receive temporary visas to work in specific fields. In this study, they mainly include workers under NAFTA (for whom visas are issued for a year or more), intracompany transferees (for whom visas are issued for up to seven years) and persons in specialty occupations (for whom visas are issued for up to six years). Key features of important temporary visas are provided in Table 1:

Table 1

Criteria	H-1B Visa (Outside NAFTA)	TN Visa (NAFTA)
Proof that US workers will not be adversely affected	Required	Not required
Application	Apply to Depts. of Labor and Immigration	Apply at border
Time to process	6-10 weeks	Instant approval
Initial duration	3 years renewable	1 year renewable
Maximum time limit	6 years	Unlimited
Limit on level	World immigration capped at 115,000	Unlimited

Note: H-1B specialty workers are professionals and highly skilled individuals in specialty occupations. Similarly, to qualify for a TN visa, the individual must work in a professional occupation listed in Schedule 2 of NAFTA and provide documentation of credentials. Also, TN applicants need a letter from the intended U.S. employer which included remuneration arrangements. Source: U.S. Immigration and Naturalization Service. Cited in Shane Williamson presentation, *A Perspective on the International Migration of Skilled Workers* (Conference held by IRPP and CERF in Ottawa, Canada, June 3-4, 2000)

Although business visitors, traders and investors receive visas for one year, they are *not* included in the study because their visits are intermittent and each of their trips cannot exceed six months. The study also does not include spouses and dependents.

Why Is Brain Drain an Important Issue for Canada?

A lion share of public spending in Canada is allocated to education, health and social services. They account for 57 percent of total consolidated expenditure of all levels of government⁵. These expenditures are essential for producing a well educated, healthy and productive citizen. Every graduate produced in Canada, therefore, is highly subsidised by public money or tax revenue. When these graduates leave for

³ US Immigration and Naturalization Service, *Statistical Yearbook of the Immigration and Naturalization Service, 1997* (Washington, DC: US Government Printing Office, 1999).

⁴ But many Canadians who emigrate to US do not know before hand whether they intend to stay there or not, given the ease of return.

⁵ Karin Treff and David Perry, *Finances of the Nation, 1998* (Toronto: Canadian Tax Foundation, 1999) Table A.4, p. A:5.

some other countries, most notably to the United States, they create significant negative balance in Canada's public account.

Though there is big controversy in Canada about the actual extent of brain drain or high-skill workers emigrating to US, there is complete agreement that they are the best and brightest of Canadian human resource pool.⁶ Their departure would negatively affect the country's economic growth, productivity and ultimately living standard of ordinary Canadians.

Further, most of the emigrating Canadian high-skill workers to the United States fall in high income category. Their departure leads to an erosion of the tax base and government revenues. These revenues are essential to finance the social programs for which Canadians are so proud of.

In recent years, Canadian economy is also getting hot like the US, although not to the same extent. For example, the national unemployment rate in Canada decreased to 6.8 percent from more than 10 percent a few years back. (The national unemployment rate in US is 3.9 percent)⁷. Canadian business community, especially in high-tech areas have been complaining about shortage of skill workers since last few years. The emigration of scarce Canadian high-skill workers to US in the presence of existing shortage would have further negative implication on the Canadian economy.

While there has been increasing demand of knowledge workers in the United States with exponential growth of high-tech industries, the supply of graduates in US is lagging. Consequently, the United States will increasingly rely more on other countries to meet its unfulfilling need. Canada is well known for its quality and well educated workforce. Being next to the United States where economic opportunities abound and NAFTA visas are easily available, Canada is afraid of losing its valuable human resource.

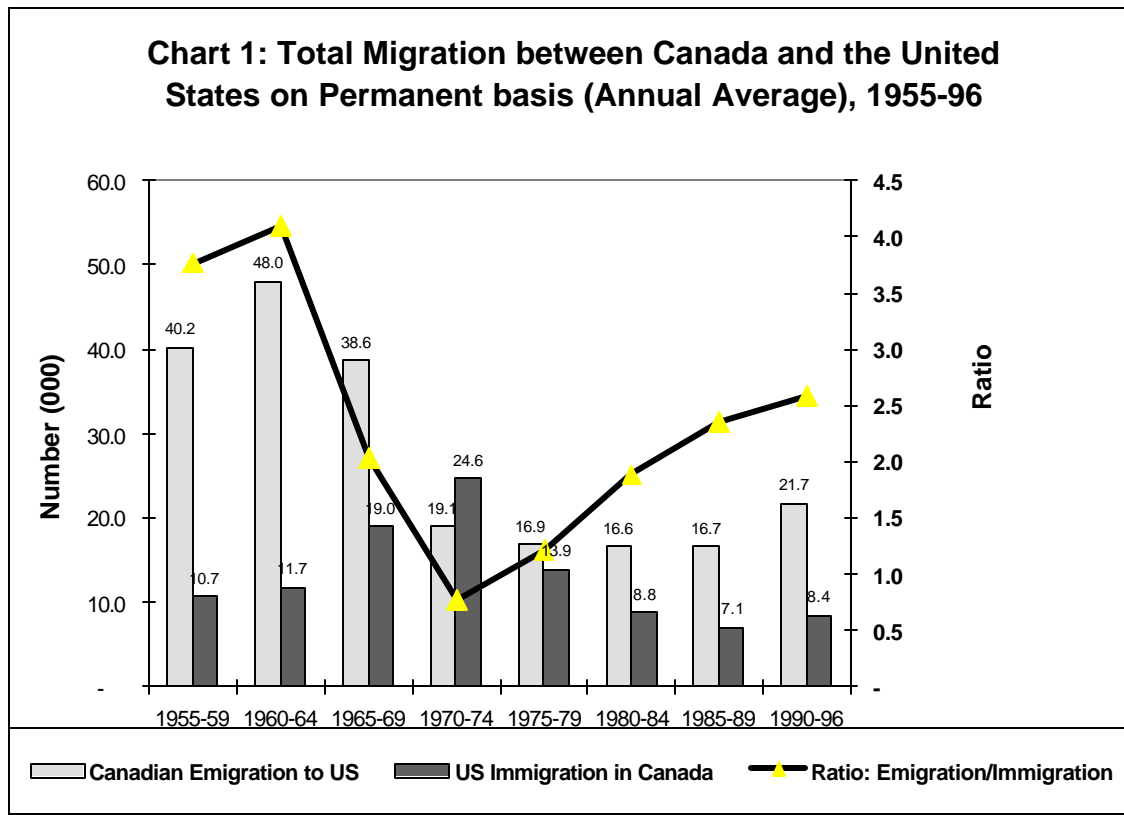
There is severe competition among various developed countries, notably the United States, Canada and western Europe to attract well educated and high skill workers from various developing countries, such as India and China. Many developing countries have also started progressing at a rate and areas where demand for knowledge and technology related industries are growing significantly. Therefore, it would be increasingly difficult for the West to convince workers from these countries to leave their home and migrate to alien territories.

Migration between Canada and the United States

Total "permanent" migration (high-skill and all other categories of people) between Canada and the United States is presented in *Chart 1*.

⁶ This aspect of brain drain is best analyzed by Danial Schwanen, *Putting the Brain Drain in Context: Canada and the Global Competition for Scientists and Engineers*, Commentary 140, (Toronto: C.D. Howe Institute, April 2000).

⁷ *The Globe and Mail*, Toronto, May 6, 2000.

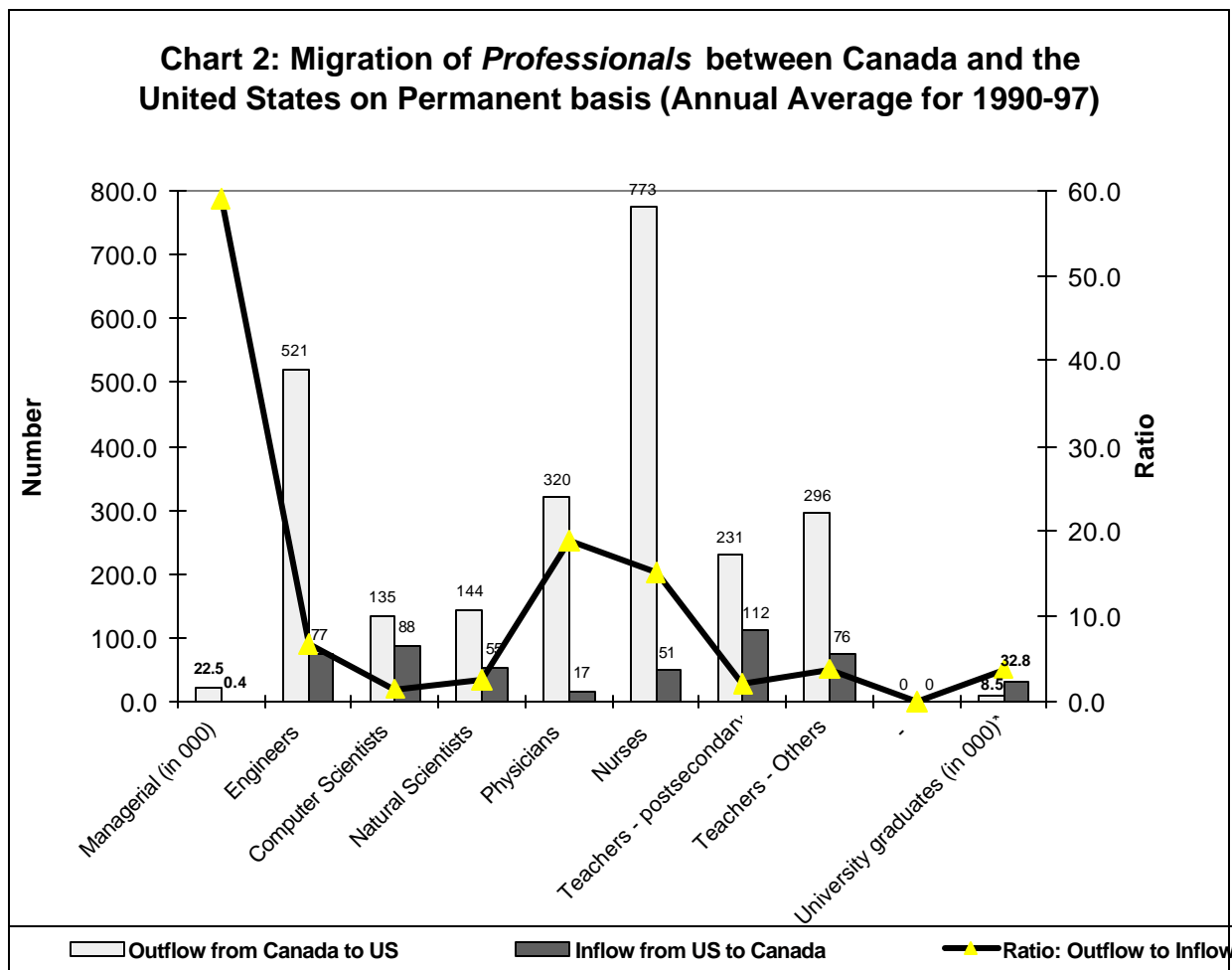


Source: Statistics Canada, various presentations and *Education Quarterly Review*, May 2000, vol. 6, no. 3; The Conference Board of Canada.

Historically, more Canadians moved to the United States than Americans immigrated to Canada. In recent years, for every American who moved to north, about three Canadians emigrated to south of the border. Similar picture (even in more dramatic way) appears for “temporary” migration between the two countries, presented in the latter section of the paper.

Also in high skill areas, significantly more Canadians are emigrating to the United States on permanent basis than the other way round (see *Chart 2*). For example, for every American coming to Canada in the managerial occupation, there are 59 Canadians moving to US. Canadian engineers, nurses and physicians have similarly high tendency of emigrating to US. However, in a global perspective, Canada receives four university graduates from all over the world for departure of one of its graduate to US, estimated by Statistics Canada.⁸

⁸ Ratio of four to one (four inflow in Canada against one outflow to US), estimated by Statistics Canada is very questionable, because it grossly underestimates outflow from Canada. First, it does not include Canadian outflow to other countries beside the United States. Outflow to US accounts for only one half of Canada’s total outflow. Second, the ratio does not include Canadian professionals emigrating to US on temporary basis. All immigrants from the rest of the world enter in Canada on permanent basis, whereas a significant majority of Canadians move to US on temporary basis. When these facts are included in the calculation, the ratio of outflow to inflow could turn against Canada’s advantage.

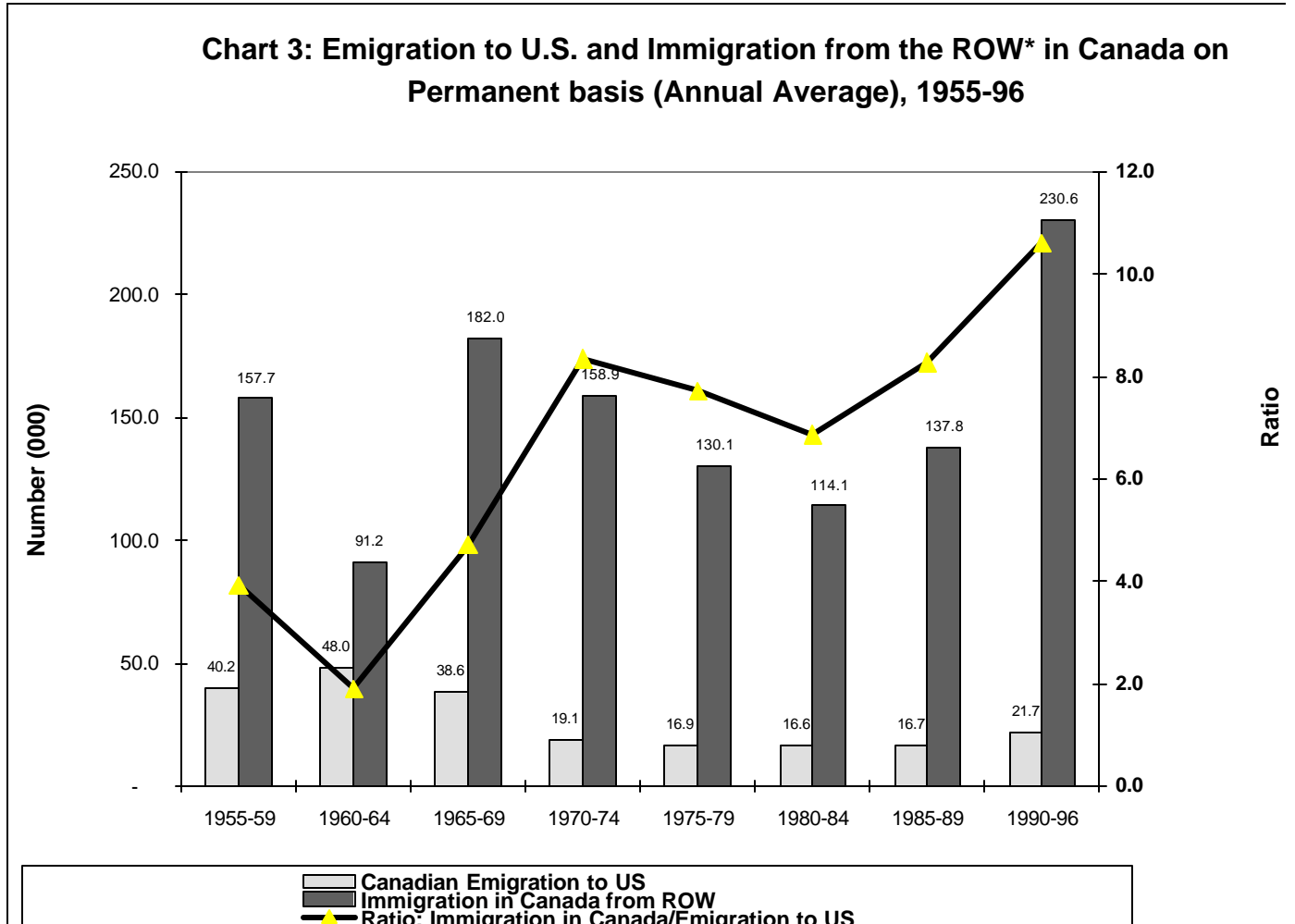


Note: Numbers for managerial occupations and university graduates are in thousand.

* For university graduates, outflow is from Canada and inflow is from rest of the world into Canada. This ratio is inflow to outflow; all other ratios are outflow to inflow.

Source: Statistics Canada, *Education Quarterly Review*, May 2000, vol. 6, no. 3; The Conference Board of Canada.

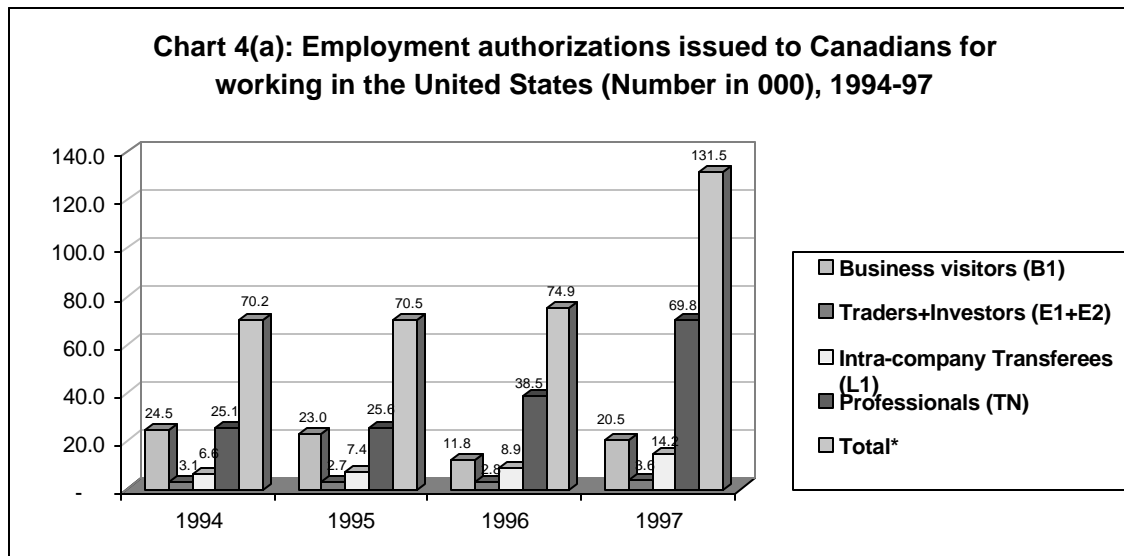
Overall, level of migration between Canada, the United States and the rest of the world is presented in *Chart 3*. Canadians migrating to US during 1990s is small in a historical sense and relative to the inflow of immigrants from all over the world. In 1990s (1990-96), for every Canadian who moved to US, Canada received more than 10 immigrants from the rest of the world.



* The Rest of the World.

Source: Statistics Canada, various presentations and *Education Quarterly Review*, May 2000, vol. 6, no. 3; The Conference Board of Canada.

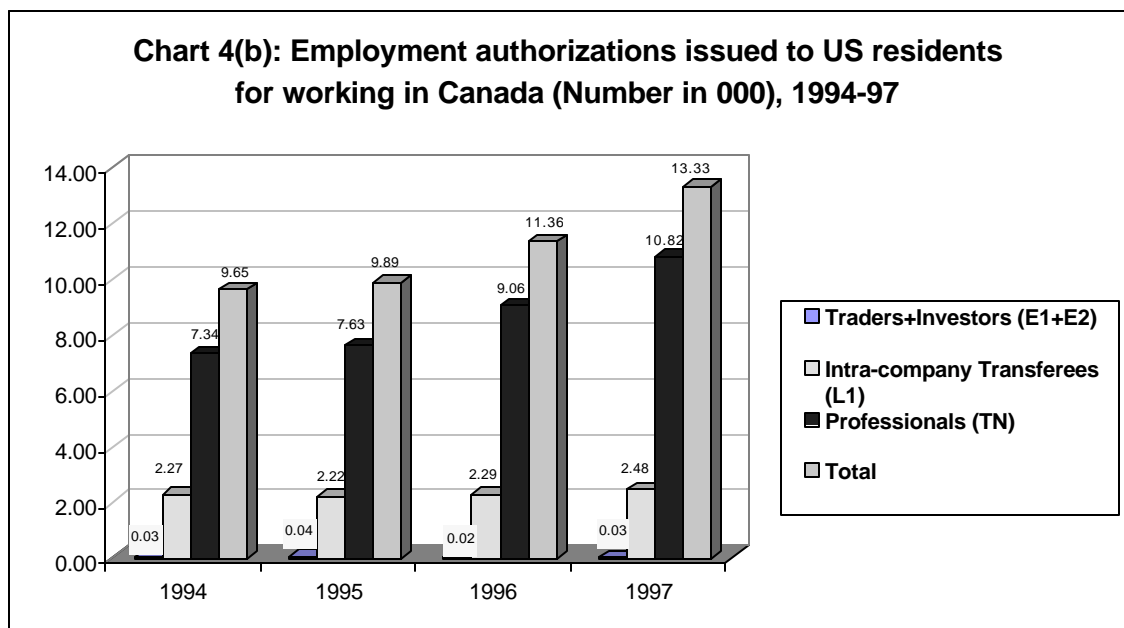
But one needs to be extra careful while analyzing these data. They completely exclude temporary migration. Since after NAFTA, more than 90 percent of emigration (based on number of visas issued) from Canada to US in high-skill area has been taking place in "temporary" category (TN and H1B etc.), *Chart 3* grossly underestimates total emigration of Canadian professionals to the United States.



* Total includes dependents like those in visa categories of L2 and TD.

Source: *US Immigration and Naturalization Services* (obtained by Department of Foreign Affairs and International Trade, Canada); The Conference Board of Canada.

For example, *Chart 4(a)* clearly shows significant growth in the emigration of Canadians to the United States, especially workers under TN categories. This is explained further in latter part of the paper. Like permanent, American emigration to Canada under temporary work visas is very small (see *Chart 4(b)*). For example, under TN category, only 1 American came to Canada for every 7 Canadians who moved to the United States in 1997.



Source: *US Immigration and Naturalization Services* (obtained by Department of Foreign Affairs and International Trade, Canada); The Conference Board of Canada.

The Controversy Over Numbers

The Statistics Canada discounts the migration data collected by the US INS due to the possibility of multiple counting and other administrative anomalies.⁹ Further, the agency believes that emigration from Canada to the United States is more than offset by immigration to Canada from other countries. This is not surprising as the agency focuses on “permanent” migration, whereas it is the “non-permanent” or temporary who accounts for the lion’s share of today’s emigration of highly educated and skilled Canadians to the United States, and their numbers are increasing. Even the temporary absence of these workers could have significant negative repercussions to the Canadian economy, especially if there is a shortage of these professionals, as is often suggested by the business community.

NAFTA workers account for the lion’s share of temporary visas. Workers generally receive visas (TN-1) for one year, with the option of renewing them for an indefinite period, or after meeting some legal requirements, converting them to permanent status. The NAFTA visa has generated a lot of confusion regarding the extent of brain drain or the actual number of Canadian professionals leaving for the United States. Many people get confused between employment visas and regular border crossing. They consider that high number of TN-1 visas are primarily due to the problem of multiple counting of the same emigrant.

There are sound reasons for including temporary and NAFTA workers in the study. First, they account for more than 90 percent of total number of visas issued to Canadians working in the United States; therefore, their inclusion is critical to an understanding of the brain drain issue. Second, NAFTA visas offer advantages over the traditional method of emigrating to the United States on a permanent basis: they are convenient, more quickly obtained, and more flexible.

If the movement of professionals were analysed purely on the traditional criterion of “permanent” emigration, the result would be inaccurate and misleading. Indeed, adopting such an approach would be like adding a new lane to a major highway, then not counting the cars and trucks that use the new lane in the statistics on highway use. The effect is the same for emigration. For example, permanent emigration in 1997 (the latest year for which data is available) was about 30 percent less than in 1996. This drop is likely the result of the new, more easily accessible visas. Indeed, given the convenience provided by NAFTA visas, advancements in communication and better economic opportunities in the United States, it is not difficult to find some compelling economic arguments to support the notion that brain drain is increasing.

From the perspective of a company or an economy, what is important is the output and tax revenue contributed by a worker in a given period. The economic cost to the country, in terms of person-year lost, is the same whether one Canadian moves to the United States for two consecutive years or two Canadians move for one year each. Therefore, for a given time period, the absence of these professionals from the Canadian economy has the same implications whether the move is temporary or permanent.

It has often been claimed that Canada is a “net brain gainer.” For each professional we lose to the United States, we receive four from the rest of the world (see ratio of inflow to outflow for university graduates in *Chart 2*). These numbers are valid only for “permanent” emigration. Once “temporary” numbers (which account for the bulk of Canadian professionals emigrating to the United States) are included in the calculation, the ratio is reversed. Moreover, the suggestion that a Canadian professional leaving for the United States is easily and perfectly replaced by a newly arriving professional immigrant is misleading. A large body of research shows that it takes years for new immigrants to assimilate with

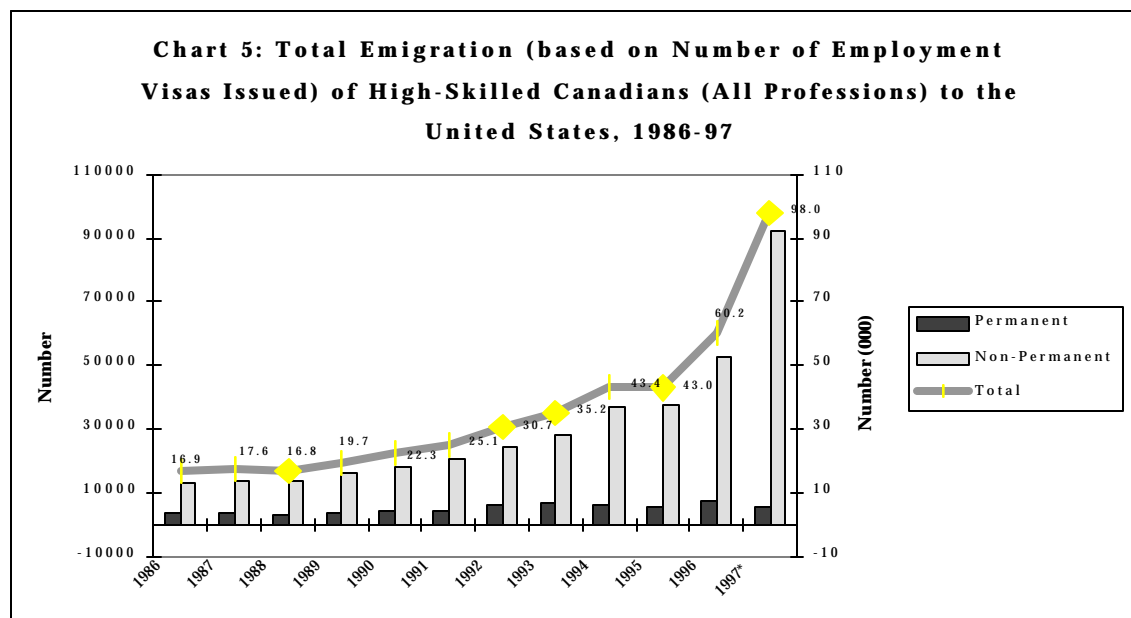
⁹ Statistics Canada, *Education Quarterly Review*, May 2000, p.15.

North American culture, language and the labour market structure. There is a significant lapse of time before new immigrants find jobs closely related to their specialized disciplines, and secure salaries and responsibilities in commensurate with their education and experience. Indeed, some estimates suggest that it may cost more than \$200,000 to replace a Canadian born and -trained professional with a newly landed foreign professional.¹⁰

It is interesting to note that according to the October 1996 INS estimate (published in October 1999)¹¹, there are 120,000 Canadians (Canadian born and immigrant Canadians) living in the United States illegally, or as "undocumented immigrant population." About half of them "entered legally on temporary basis and failed to depart." All published studies have failed to recognize their existence. These individuals are supposedly young, energetic hardworking Canadians who are contributing to the US economy.

Trend of Canadian Emigration to US

Emigration numbers of skill workers, provided in *Chart 5* are based on number of employment visas granted. They include engineers, computer scientists, physicians, nurses, professors, teachers, managerial personnel and social scientists. There has not been much growth in the "permanent" skilled emigration to the United States. However, when non-permanent emigration are included in the analysis, the picture changes dramatically, especially after the implementation of NAFTA.



Note: Admissions under FTA (TC visa) began January 1989 and ended December 31, 1993. Admissions under NAFTA (TN visa) began January 1, 1994.

* The TN-visa number for 1997, which is 75 percent of total high-skilled Canadian emigrants to the United States, is from US INS by the Department of Foreign Affairs

and International Trade, Ottawa). Numbers for permanent emigrants are also from US INS. Other numbers are estimates. Of those Canadians who go to the United States as students, some 5 percent change

their status to permanent immigrants. They are included in these charts according to their proportions in different occupational categories.

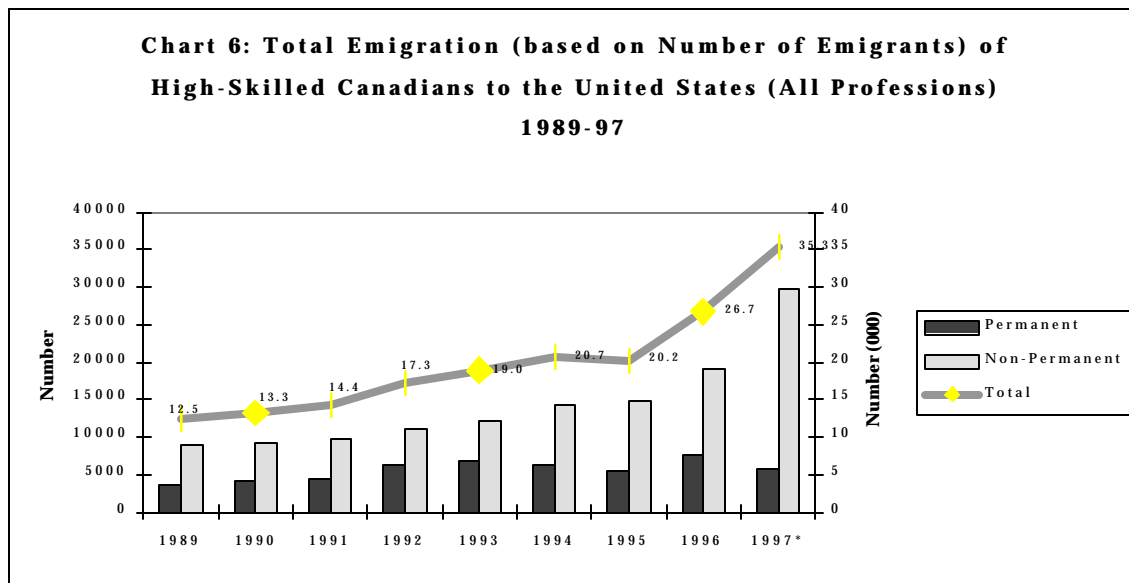
Sources: Estimates by the author using the following: Various presentations by Statistics Canada; John Zhao, Doug Drew and Scott Murray

¹⁰ Don DeVoretz and Samuel Laryea, *Canadian Human Capital Transfers: The United States and Beyond*, Commentary no. 115 (Toronto: C.D. Howe Institute, October 1998), p. 21.

¹¹ *US INS Statistical Yearbook, 1997*, pp. 199-200.

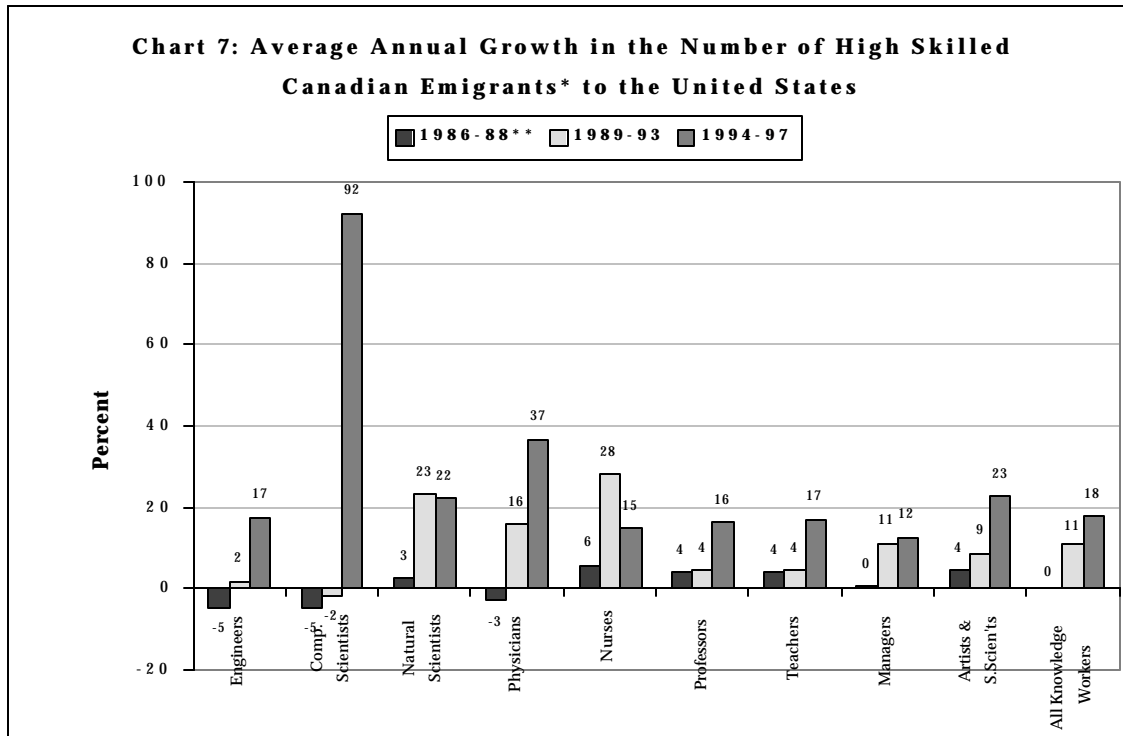
of Statistics Canada, "Brain Drain and Brain Gain: The Migration of Knowledge Workers from and to Canada," *Education Quarterly Review*, May 2000, vol. 6, no. 3, Statistics Canada, catalogue no. 81-003; US INS, *INS Tapes and Statistical Yearbook of the Immigration and Naturalization Service* (various years); Don DeVoretz and Samuel A. Laryea, *Canadian Human Capital Transfers: The United States and Beyond*, Commentary no. 115 (Toronto: C.D. Howe Institute, October 1998); Industry Canada, *Perspective on the "Brain Drain,"* (Draft), December 1998.

In 1997, they accounted for 94 percent of the total outflow of Canadian professionals to the United States as compared to 77 percent in 1986. The numbers of permanent and non-permanent emigration (based on visas issued) jumped from 17,000 in 1989 to 98,000 in 1997. Again this growth is basically attributable to the non-permanent category.



Sources: Estimates by the author using publications noted in footnote, Chart 5; and various assumptions, provided in the Appendix.

In order to eliminate the problem of multiple counting, particularly for those individuals who renew their non-permanent visa before it expires, the study attempts to convert the number of emigration visas into the actual number of Canadians who moved to the United States (see *Chart 6*). Based on a series of conservative assumptions (given in the Appendix), the estimate shows that in 1997, about 35,000 Canadian professionals moved to the United States. This overall trend is the same as presented in *Chart 5* (based on the number of visa issued).



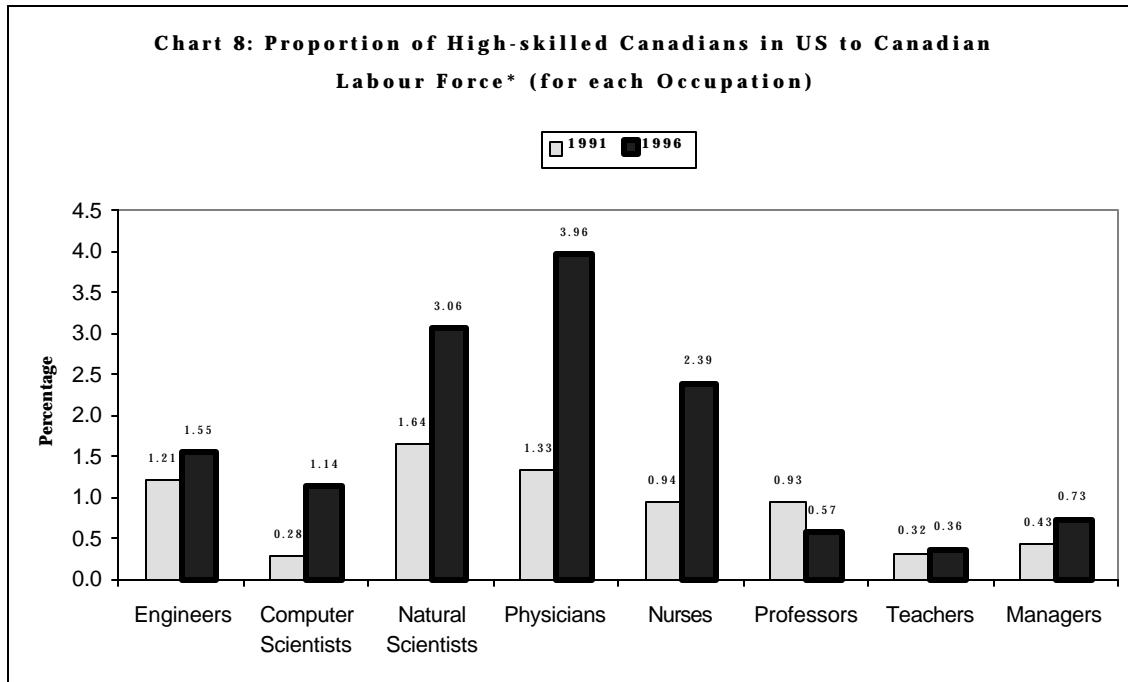
* Includes both permanent and non-permanent.

** Based on number of employment visas issued. For other periods, actual number of Canadian emigrants to U.S.

Sources: footnote, Charts 5 and 6.

Chart 7 examines the impact of FTA/NAFTA on emigration in key occupational categories. For each occupational group, data are divided among three periods: 1986-88 (pre-FTA, emigration based on number of employment visas issued), 1989-93 (during FTA, emigration based on actual number of professionals moved) and 1994-97 (post NAFTA, emigration based on actual number of professionals moved). Within each category, growth in emigration accelerated after the trade agreements were implemented. In fact, during the pre-FTA period, there was either negligible growth or even a decline in emigration. The FTA resulted in significant overall increase in emigration, especially for computer scientists, physicians and nurses. NAFTA resulted in a sharp increase for all groups of emigrants in knowledge areas.

When this rapid growth in the emigration of high-skilled Canadians to the United States is viewed in the context of the overall Canadian labour force, the potential for significant negative economic repercussions becomes evident (see *Chart 8*). In 1991, for example, only 1.3 percent of Canada's physicians emigrated to the United States. By 1996, the proportion had increased to 4 percent, a jump of nearly 300 percent.



* Labour force data are estimates from Statistics Canada, cat. no. 93-327. Number of emigrants includes both permanent and non-permanent.

Sources: Footnote, Charts 5 and 6.

The proportion of natural scientists, nurses and engineers pursuing careers south of the border also recorded significant growth. Since these professionals are leaving Canada at a rate higher than their rate of entry into the Canadian labour force, the country's reservoir of human capital pool is diminishing.

Causes for Emigration

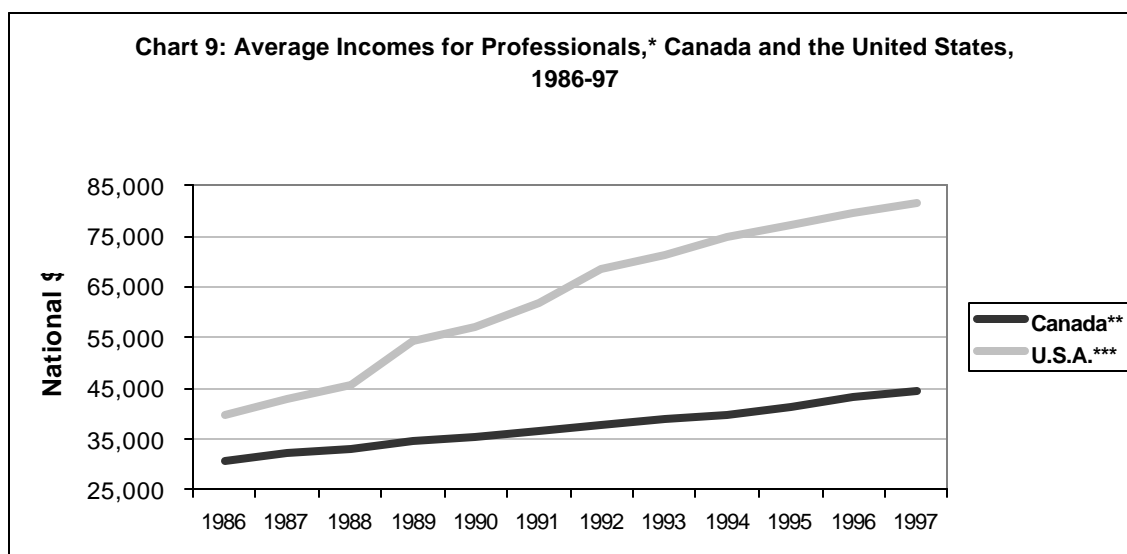
Despite the attraction of better economic opportunities, migration in general is "costly" in both monetary and psychological terms. Relocation in a distant country with alien traditions, language, and culture presents the newcomer with the risk of being excluded from the main stream. This difficulty is greatly diminished for migrants between Canada and the United States. Similarities between the two countries open an easier path to relocation.

In addition, with the advent of Internet, people who are considering emigration can collect valuable information on the key factors associated with the decision to move -- salary range, tax rates, cost of living, housing, education facilities, and quality of life. Information supplied by relatives and friends provides further support to the decision to move.

Most emigrants are young.¹² They are at a stage in their lives when they can move without the burden of many family responsibilities. Also, there has been an important attitude shift across generations. In this era of globalization and economic opportunism, many younger people are willing or even eager to relocate in another country.

¹² See "The Lure of the US Hitech Job," *Inside*, no. 1, prepared by Personal Systems, (Ottawa: April 1999).

Surveys by various research and business organizations invariably identify the same reasons for emigrating to the United States (though not necessarily in the same order): higher salary, paid in US dollars; more growth opportunities; exposure to leading-edge technology; lower taxes; better management; and even a warmer climate. But surveys have limitations: questionnaire bias, restricted sample size, limited time frame and questionable statistical validity. A more comprehensive study requires historically consistent national data on differences in earnings, employment opportunities, and taxes between the two countries, which are often considered to be the main economic factors for brain drain. These data are presented in Charts 9, 10, and 11.



Note: Canadian earnings are converted into U.S.\$ using purchasing power parity rate.

*Average of average incomes of engineers, computer scientists, professors, teachers, physicians, nurses, and managerial occupation.

** Canada: an average of average income of Alberta, Quebec, Ontario and Nova Scotia. Average income for cities were not available.

*** USA: an average of average income of Chicago, Houston, Los Angeles, Miami, New York and San Jose. For San Jose, it is only for the period from 1991 onward.

Sources: Estimates by the author using following: Statistics Canada, 1996 Census, 93F0029XDB96004; Census, *Employment Income by Occupation (The Nation)*, cat. no. 93-332; *Education Quarterly Review*, 1997, cat. no. 81-003-XPB, vol. 4, no. 1; *Labour Force Update*, 1998, cat. no. 71-005-XPB;

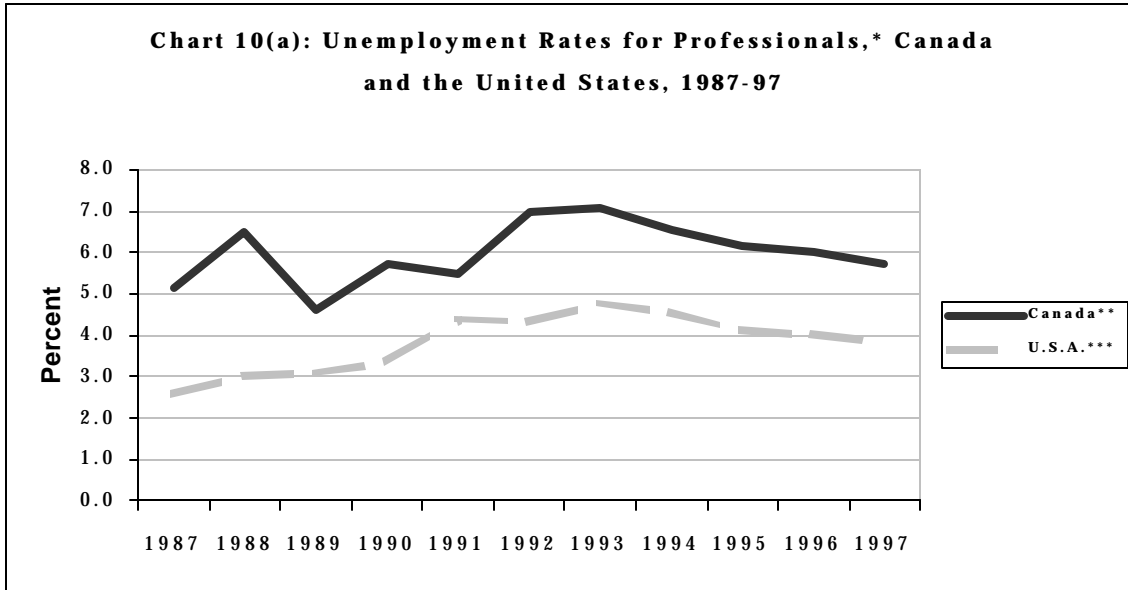
Marie Lavoie and Ross Finnie, "Science and Technology Careers in Canada: Analysis of Recent University Graduates," *Education Quarterly Review*, 1997,

cat. no. 81-003-XPB, vol.4, no. 3; US Department of Commerce, *1998 Statistical Abstract*; U.S. Bureau of Labour Statistics, *Employment and Wages*;

and US Bureau of the Census, *Current Population Reports*.

Until the mid-1980s, earnings in Canada were close to the United States. In some cases (for example, for nurses and teachers), they were even higher.¹³ From 1990 onward overall, Canada has lagged in the growth of earnings, and the gap between the two countries has been widening (see *Chart 9*). In recent years, the discrepancy has been particularly apparent in the computer science, engineering, medicine, and university teaching professions.

¹³ Mahmood Iqbal, *Are We Losing Our Minds?*, p. 18.



*Average of unemployment rates of engineers, computer and natural scientists, professors, teachers, physicians, nurses, managerial occupation and social scientists.

** Canada: an average of unemployment rate in Vancouver, Calgary, Toronto, Ottawa-Hull, Montreal and Halifax.

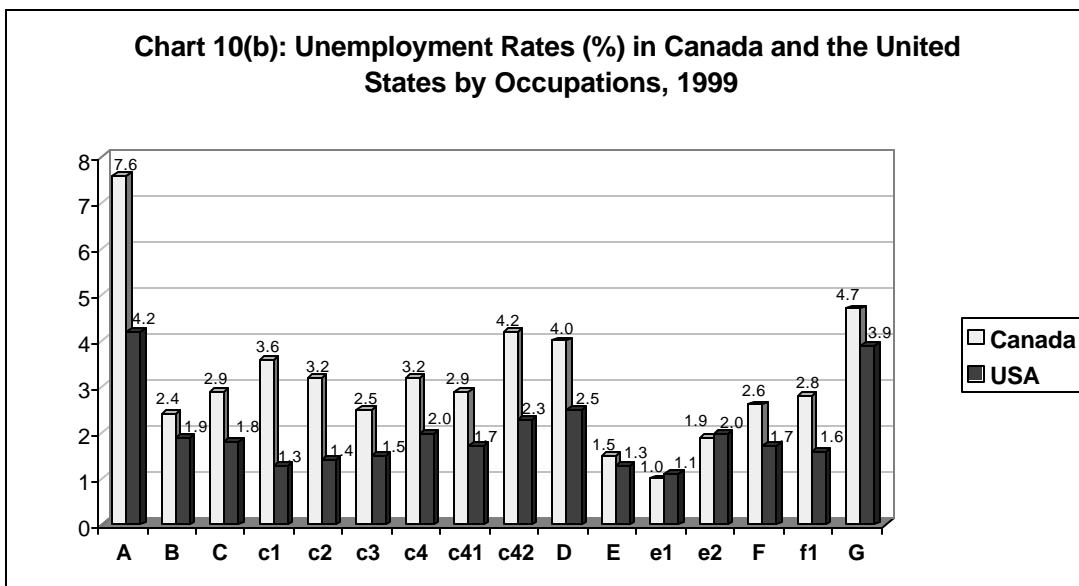
*** United States: an average of unemployment rate in New York, Los Angeles, Chicago, Houston and Miami.

Sources: Estimates by the author using following:

For Canada: Statistics Canada, *Historical Labour Force Statistics, 1997*, catalogue no. 71-201-XPB; and Marie Lavoie and Ross Finnie, "Science and Technology Careers in Canada: Analysis of Recent University Graduates," *Education Quarterly Review, 1997*, cat. no. 81-003-XPB, vol. 4, no. 3.

For the United States: U.S. Bureau of Labour Statistics, *Employment and Wages*; US Department of Commerce, *1998 Statistical Abstract*.

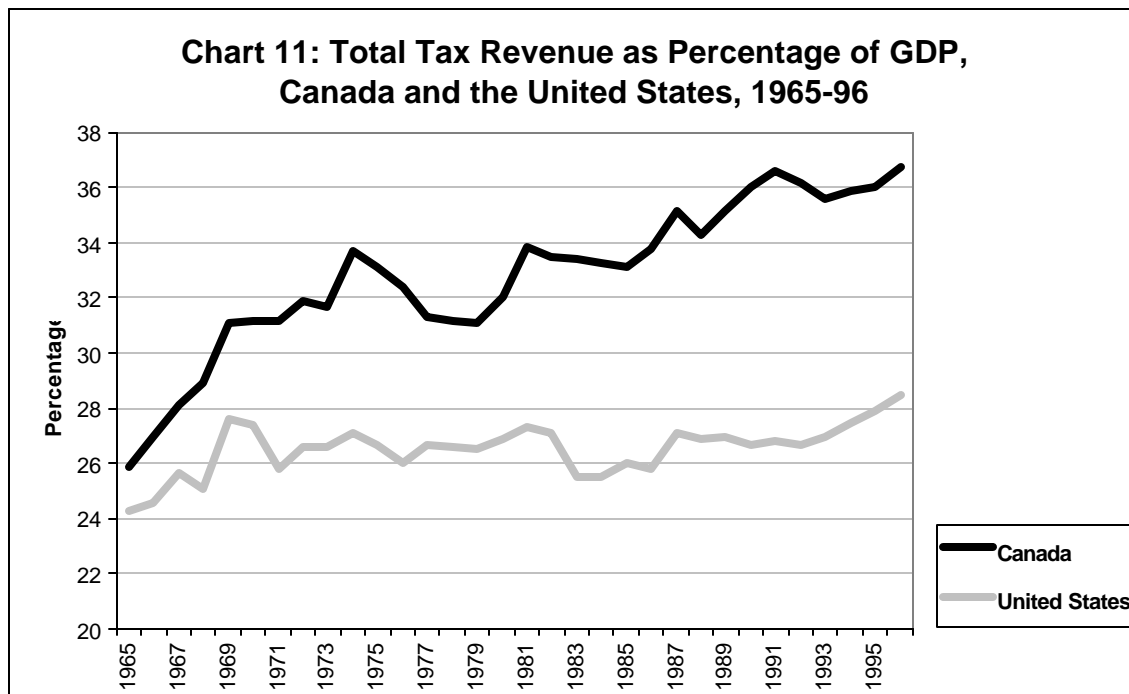
The difference in job opportunities in the two countries is best reflected by the gap in *unemployment rate* (see *Chart 10(a)*). After 1988, the gap in the unemployment rate narrowed between the two countries. Then the gap widened. In recent years, the gap is stable, but still there is significant difference in the unemployment rate of the two countries, especially in knowledge areas as shown in *Chart 10(b)*).



Note: A=All Occupations
 B=Executive & Managerial Occupations
 C=Professional Occupations in Natural & Applied Sciences
 c1=Physical scientists
 c2=Life scientists
 c3=Engineers
 c4=Math.,system analysts & computer programmers
 c41computer systems analysts
 c42=computer programmers
 D=Technical Occupations in Natural & Applied Sciences
 E=Health Occupations
 e1=Professional occupations in health & nursing
 e2=Technical, assisting & related occupations
 F=Social Science, Education, Govt. & Religion
 f1=Teachers and professors
 G=Occupations in Art, culture, recreation & sport

Source: Unpublished data, Statistics Canada, the Bureau of Labor Statistics and the Conference Board of Canada.
 Cited in Shane Williamson presentation, *A Perspective on the International Migration of Skilled Workers* (IRRP and CERF Conference, Ottawa, Canada, June 3-4, 2000).

The *tax wedge*, or the difference in the level of tax burden, is often mentioned as the key reason for brain drain. The ratio of tax to gross domestic product (GDP) has been consistently higher in Canada than in the United States since 1960s, but again the gap widened in the 1990s (see Chart 11).



Source: Organization for Economic Co-operation and Development, *Revenue Statistics, 1965-97* (Paris: OECD, 1998)

Growth Opportunity

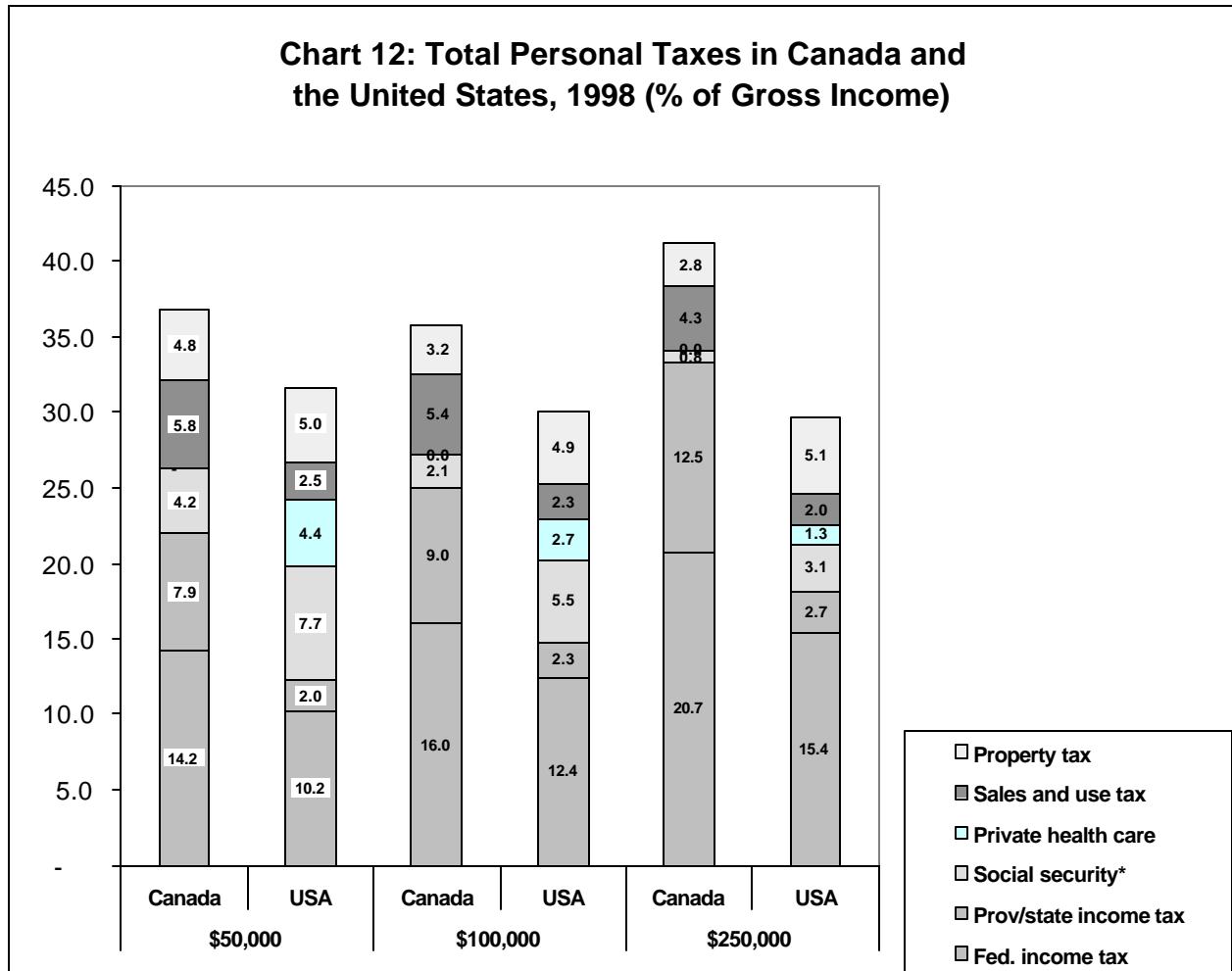
Compared to Canada, United States has a GDP that is 11 times higher and a population that is 9 times larger. It accounts for 27 percent of world output, 16 percent of world trade and 25 percent of world foreign direct investment.¹⁴ It is the hub of international financial activities and world technological breakthroughs. Therefore, by inference, the United States also offers a higher level of learning and growth opportunities. This superiority is particularly evident in the knowledge areas, as demonstrated by the level of research and development (ratio of R&D expenditure to GDP being 1.66 in Canada against 2.62 in the United States) and the concentration of researchers (5.4 per thousand of labour force in Canada against 7.4 in the United States).¹⁵

Gap in Personal Taxes

Since the gap in personal taxes of the two countries could be one of the main motivations for emigration, an in-depth examination is presented here. It focuses on the differences in all type of personal taxes: federal income tax, provincial/state tax income tax, social security related taxes (such as pension plans, employment insurance, medicare), sales tax, property tax and private health care cost in the United States. It examines the tax burden of households with three levels of income -- \$50,000, \$100,000, and \$250,000 -- in six Canadian cities (Calgary, Halifax, Montreal, Ottawa, Toronto and Vancouver) and six US cities (Charlotte NC, Chicago IL, Jacksonville FL, Houston TX, Los Angeles and New York City) where many skilled emigrants reside. All income and tax calculations are based on *national currencies* (that is, in Canadian \$ for Canada and in US dollars for the United States).

¹⁴ Organization for Economic Co-operation and Development, *Main Economic Indicators* (Paris, OECD, April 1999).

¹⁵ Organization for Economic Co-operation and Development, *Science and Technology, Main Indicators* (Paris, OECD, 1998).



* Includes Canada/Quebec Pension Plan and Employment Insurance in Canada; FICA, OSADI, medicare and private health care in the United States.

Note: - An household of a spouse and two children, tax filed jointly for 1998 tax year.

- Canada is an average of six cities: Calgary, Halifax, Montreal, Ottawa, Toronto and Vancouver.

- USA is an average of six cities: Charlotte NC, Chicago IL, Jacksonville FL, Houston TX, New York City (Queens) and Los Angeles CA.

Sources: Estimates by the author using the following: Karin Treff and David Perry, *Finances of the Nation*, 1998 (Toronto: Canadian Tax Foundation, 1999); *Canadian Master Tax Guide* (North York, Ontario: CCH Canadian, 1998); *US Master Tax Guide* (Chicago: CCH Inc., 1998); and US Department of Commerce, *Statistical Abstract of the United States*, 1998.

It is clear (*see Chart 12*) that, overall, taxes are higher in Canada than in the United States. For example, a person who earns \$50,000 pays 36.8 percent of gross income in various taxes in Canada compared to 31.7 percent in the United States (a gap of 5.1 percentage points). This suggests that, from the taxation viewpoint, even lower income earners can benefit from moving to the United States. As income increases, the gap widens. At the \$250,000 level, the total tax payment rises to 41.2 percent of gross income in Canada but amounts to only 29.7 percent in the United States (a gap of 11.5 percentage points). The major reason for this gap is the high income tax and surtax in Canada, especially at the provincial level. Although taxes related with social security are significantly higher in the United States, their weight in the overall tax burden is low. Property tax is relatively higher in the United States. Sales tax, on the other hand, is high in Canada, largely because there is no US federal tax equivalent to the goods and service tax.

Econometric Analysis

The purpose of econometric analysis is to establish a link between emigration and the factors responsible for it. The analysis indicates that economic factors like earnings, taxes and job opportunities influence decisions of highly skilled Canadians to emigrate to the United States.

$$\text{Emigration} = 0.46 * (\text{Income gap}) + 2.09 * (\text{tax gap}) + 0.16 * (\text{unemployment gap})$$

$$\text{t-value} \quad (5.12) \quad (4.48) \quad (1.41)$$

$$\text{R-squared} = 0.72 \quad \text{Durbin-Watson} = 1.95 \quad \text{Pooled data, number of observations} = 48$$

According to regression estimates (based on annual observations of a cross-section data, 1986-97) a \$2 increase in the gap between incomes in Canada and the United States, with the effects of all other variables held constant, will result in the emigration of one more high-skilled Canadian to the United States. Also, a 1 percent increase in the existing tax gap (measured by the ratio of total tax revenue to GDP), can push 2 percent more Canadians towards the United States.¹⁶

Conclusion

We can debate the actual numbers associated with brain drain and the methods used for their estimation. However, we cannot minimize the significance of the emerging trend: brain drain is rising and perhaps at an increasing rate. The conclusion is same whether analyzed using temporary employment authorization visas issued to Canadians or Canadian professionals moving to the United States as permanently. In a NAFTA environment, it would be short sighted to exclude temporary emigration numbers. Given the convenience, flexibility and opportunity, an increasing number of Canadian professionals have been taking temporary emigration route, rather relying on costly and time consuming traditional method of migrating on permanent basis.

A significant increase in the number of Canadian professionals emigration to US is not surprising. All economic factors, such as higher income, better employment opportunities, and lower taxes, have consistently been weighted in favour of the United States. The regression analysis performed in this study suggests that Canadian professionals respond to these economic factors in a strong way.

In addition, the emotional and psychological barriers that used to keep Canadians at home are now much less relevant. The health care and welfare systems, a hallmark of Canadian distinctiveness, similarly do not carry much weight. Indeed, the professionals who are moving to the United States can afford to buy the services they need with the new wealth they are acquiring. For many professionals working in the United States, the cost of health care is covered by their employer and the quality of the service is superior to Canada.

¹⁶ These results are meant to provide a guideline to the relationship between brain drain and the various economic factors that influence it. They should be interpreted with caution and not taken literally.

Appendix: Assumptions Used for Converting Temporary Employment Authorization Visas Into Permanent Emigration Number

Assumptions used for NAFTA TN-1 Workers

- * 70 percent have New I-94 form each year, while 30 percent have NO new I-94 form. Of the 30 percent, half stay permanently, the rest come back to Canada.
- * 30 percent held two visas in one year;
- * After 1st yr., 70 percent stay in US (renewal); 30 percent come back to Canada;
- * After 2nd yr., 70 percent of the balance stay in US (renewal); 30 percent come back to Canada;
- * After 3rd yr., 70 percent of the balance stay in US (renewal); 30 percent come back to Canada;
- * After 4th yr., 10 percent of the balance convert into permanent; 60 percent stay as temporary in US (renewal); 30 percent come back to Canada;
- * After 5th yr., 20 percent of the balance convert into permanent; 60 percent stay as temporary in US (renewal); 20 percent come back to Canada;
- * After 6th yr., 30 percent of the balance convert into permanent; 40 percent stay as temporary in US (renewal); 30 percent come back to Canada;
- * After 7th yr., 50 percent of the balance convert into permanent; 40 percent stay as temporary in US (renewal); 10 percent come back to Canada;
- * After 8th yr., 90 percent of the balance convert into permanent status in US; the rest come back to Canada.

Assumptions for other Temporary Visa Holders: (L-1, O-1, H-1A, H1-B, H-3 & P-types): Visas for 3+ yrs.

- * All staying first 3 yrs.
- * After 3rd yr., 40 percent convert into permanent; 40 percent stay in US (renewal); 20 percent come back to Canada;
- * After 4th yr., 60 percent of the balance convert into permanent; 20 percent stay in US (renewal); 20 percent come back to Canada;
- * After 5th yr., 80 percent of the balance convert into permanent status in US ; 20 percent come back to Canada.