Skills Research Initiative
Initiative de recherche sur les compétences

How is Canada Faring in the Competition for Internationally Mobile High-Skilled Workers?

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Working Paper 2005 D-06

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B. la formation en entreprise;
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Abstract:

The international market for some segments of the high skilled population is becoming more competitive as industrialized countries compete strategically for these talents. In Canada, given a high demand for skilled workers and the unfavourable demographic change with aging population, competing in the international arena for skilled workers is becoming crucial to maintain its success in innovation, economic growth and prosperity. Attracting and retaining skilled workers is now one of the most important challenges facing Canadian policymakers. The key objective of the paper is to assess how Canada is holding up in attracting high-skilled workers in comparison to our key OECD competitor countries. The paper addresses three issues: First, it examines international mobility in terms of stock and flows of high-skilled workers in selected OECD countries and assesses whether Canada attracts "Fair Share" of internationally mobile skilled workers; Second, it explores the importance of key economic factors, in particular the knowledge-intensive factors that may contribute to a country's success in attracting foreign high-skilled workers; and Third, it discusses recent policy measures in selected OECD countries that influence a country's ability to attract these workers from abroad.

Résumé

Dans le cas de certains segments de la population hautement qualifiée, le marché international est en train de devenir plus concurrentiel, car les pays industrialisés rivalisent de façon stratégique pour attirer ces talents. Compte tenu de la forte demande de travailleurs qualifiés et de l'évolution démographique défavorable dans la foulée du vieillissement de la population au pays, il est crucial que le Canada concurrence les autres nations pour attirer des travailleurs qualifiés, et ce, en vue de maintenir son succès sur le plan de l'innovation, sa croissance économique et sa prospérité. En fait, attirer et garder les travailleurs qualifiés est maintenant l'un des plus importants défis auxquels font face les décideurs canadiens. Le présent document a comme grand objectif d'évaluer comment le Canada s'en tire pour ce qui est d'attirer des travailleurs hautement qualifiés par rapport à ses principaux pays concurrents au sein de l'OCDE. Dans ce contexte, nous abordons trois questions. Premièrement, nous examinons la mobilité internationale au chapitre du stock et des flux de travailleurs hautement qualifiés dans des pays choisis de l'OCDE, en vue de déterminer si le Canada attire une « juste part » des travailleurs qualifiés et mobiles partout dans le monde. Deuxièmement, nous nous penchons sur l'importance des principaux facteurs économiques, en particulier les facteurs à fort coefficient de savoir qui peuvent contribuer au succès que connaît un pays pour ce qui est d'attirer des travailleurs hautement qualifiés étrangers. Enfin, nous traitons des mesures prises récemment par des pays choisis de l'OCDE et influant sur leur capacité d'attirer des travailleurs étrangers.

1. Introduction

There is a wide recognition that today's economy is being fundamentally transformed via globalization, economic integration, new technologies and a shift to more knowledge-intensive activities. The skill intensity of production, both in manufacturing and services, has risen so the demand for high-skilled workers has increased in all countries. An important aspect of this global knowledge economy is the emergence of a new trend where segments of the highly-qualified labour force are becoming increasingly mobile. Key features of this new trend include a growing focus on temporary migration as opposed to permanent migration, and an increase in the share of high-skilled workers moving across industrialized countries. These globally mobile skilled individuals generally comprise those who participate in high-tech industries, manage multinational enterprises (MNEs), and occupy scientific and technical professions. These individuals participate in industries that are largely knowledge-based and global in scope.

Some argue that the greater international mobility of high-skilled workers may well be the by-product of globalization.[1] As the argument goes, the new trend, which became more noticeable in the 1990's, is driven by the information technology revolution, the proliferation of regional trade and investment agreements, the general economic integration of product markets (e.g. the increased globalization of corporations) and the rapid industrialization of Asia. Head and Reis (2004) note that until recently, the most sought after internationally mobile resource (IMR) has been foreign direct investment (FDI), particularly new manufacturing facilities of MNEs. The desired set of IMRs has now widened to include a variety of activities of MNEs such as R&D and access to highly skilled professionals. The authors argue that the location decisions of FDI, R&D and skilled professionals are jointly determined: success at attracting one resource draws more of each.

The international market for some segments of the high skilled population is becoming more competitive as industrialized countries compete strategically for these talents (Gera, et.al., 2004; Harris 2004). In Canada, given a high demand for skilled workers and the unfavourable demographic change with aging population, competing in the international arena for skilled workers is becoming crucial to maintain its success in innovation, economic growth and prosperity. Attracting and retaining skilled workers is now one of the most important challenges facing Canadian policymakers. Advanced industrialized countries including Canada now seek to strategically attract the high-skilled migrants through adjustment of immigration controls in face of a very large, but highly differentiated, queue of potential migrants. The US H-1B temporary visa program for highly-qualified individuals and the Canadian and Australian point system for immigrants which emphasizes skills are examples of these reformulated immigration policies.

[1] See, for example, Harris (2003) and European Economic Advisory Group Report (2003), henceforth referred to as EEAG (2003).

A key objective of this paper is to assess how Canada is holding up in attracting high-skilled workers in comparison to other OECD competitor countries. The paper focuses on three issues in each of the subsequent section:

- First, it examines the international mobility of high-skilled workers in terms of stock and flows in selected OECD countries and assesses whether Canada attracts its "fair share" of these mobile talents.
- Second, it explores the importance of key economic factors, in particular the knowledge-intensive factors that may contribute to a country's success in attracting high-skilled workers from abroad.
- Third, it highlights recent policy measures in selected OECD countries that influence a country's ability to attract globally mobile skilled workers in the knowledge economy.

2. Measuring high-skilled workers across countries: definitions and data

In our earlier work (Gera, et.al., 2004), we defined high-skilled workers as those individuals who are engaged in knowledge-intensive professions such as science and technology (S&T) workers, engineers, information technology (IT) specialists, physicians, nurses, graduate and post-doctoral students, scholars and researchers, and high-level administrators and managers. Other studies such as the OECD (2004) defines high-skilled workers as those who have attained at least tertiary level of education.[2]

Getting a firm grip on the data related to the international mobility of high-skilled workers is imperative to inform and fashion appropriate policy responses. Unfortunately the quality and comparability of international data on migration is scarce. In this study, we use two different data sets. First, we make use of the recently available OECD database on foreign-born population in OECD countries by educational attainment. This database showing the *stock* of foreign-born population with tertiary education in OECD countries is built on the latest censuses or labour force surveys (OECD, 2004). It offers the best comparative set of data on high-skilled foreign-born workers to date and allows us to address issues concerning the mobility and expatriation of these individuals, both within the OECD area and from non-OECD countries to OECD countries.

Second, we use the flow data concerning the mobility of the highly skilled. These data come mainly from the country's immigration departments and remains quite limited. We limit our analysis to five main comparator countries which are quite active in competing for the globally mobile knowledge workers; these countries are the US, the UK, Australia, Germany, and France. We document trends of recent migratory flows of

[2] OECD's Canberra manual (OCED, 2001) defines high-skilled people on a mixed base of profession and education . For example, skilled human resources in science and technology (HRST) are defined as personnel with a tertiary education level in science and technology study or currently employed in a S&T occupation.

the highly skilled in these countries in terms of their magnitude, direction and the nature of movement (i.e., temporary versus permanent). However, again there are some comparability issues. For example, a landed immigrant in Canada is considered a permanent migrant (regardless of the length of his/her actual stay in Canada) while in the UK's International Passenger Survey a migrant is a person who declares the intention to stay in the UK for a year or more. In this study, we group foreign workers into permanent or temporary groups according to their visa types. Immigrants are generally considered as permanent movers.[3]

3. Benchmarking Canada's performance

In this section, we proceed as follows. First, we benchmark a country's performance in *attracting* high-skilled workers from abroad by comparing the *stock* of foreign-born with tertiary education. Second, we use *stock* data on expatriates with tertiary education to benchmark country performance in *retaining* these workers. This provides a broad view of the significance of highly skilled emigration to OECD countries. Third, we use *flow* data to benchmark inflows of highly skilled workers. This includes both permanent inflows (in-migrants based on skilled focused programs) and temporary inflows (persons with employment authorization). Finally, we benchmark a country's performance in attracting foreign students at advanced education levels. These students represent an important part of potential supply of skilled workers in the host country.

3.1. Benchmarking immigrants – stock of foreign-born with tertiary education

The best comparative set of data we have is the number of foreign-born population aged 15 or more with tertiary education in OECD countries. Figure 1 shows that, in absolute terms, the US, Australia, Canada, Germany, the UK, and France are the major beneficiaries of highly skilled foreign-born workers from around the world.[4] The US hosts more than 8 millions foreign-born high-skilled workers, out of which over 5% (443,000 persons) are PhDs. Canada ranks second with slightly above 2 millions high-skilled foreign-born of which 3% or 69,000 are PhDs. While Australia hosts almost 1.5 millions, yet with 121,000 PhDs, it outperforms Canada at the high end of skilled workers.

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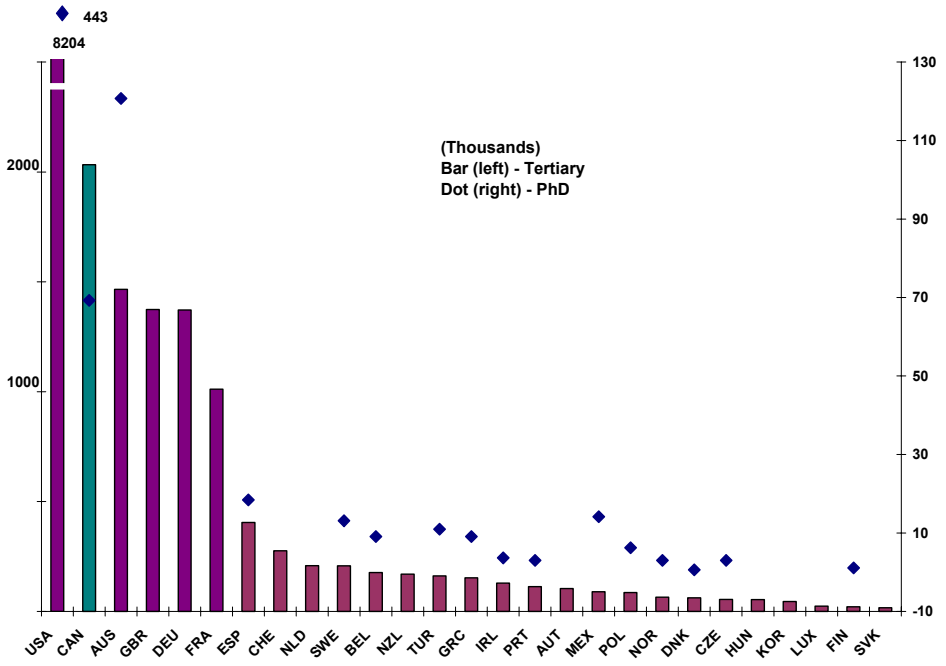
[3] There are some additional data-counting complexities. For example, the notions of place-of-birth, country of last residence, and citizenship are used differently across countries and databases. For example, employment data in Canada, the US, and Australia separate foreign-born workers from natives. In these countries, immigrants (naturalized or not) and foreign workers residing in the host country on a temporary basis are viewed foreign-born workers. While in employment data of most European countries, the distinction is made based on citizenship. Immigrants who have been naturalized are considered nationals while the non-naturalized immigrants and temporary workers are non-nationals.

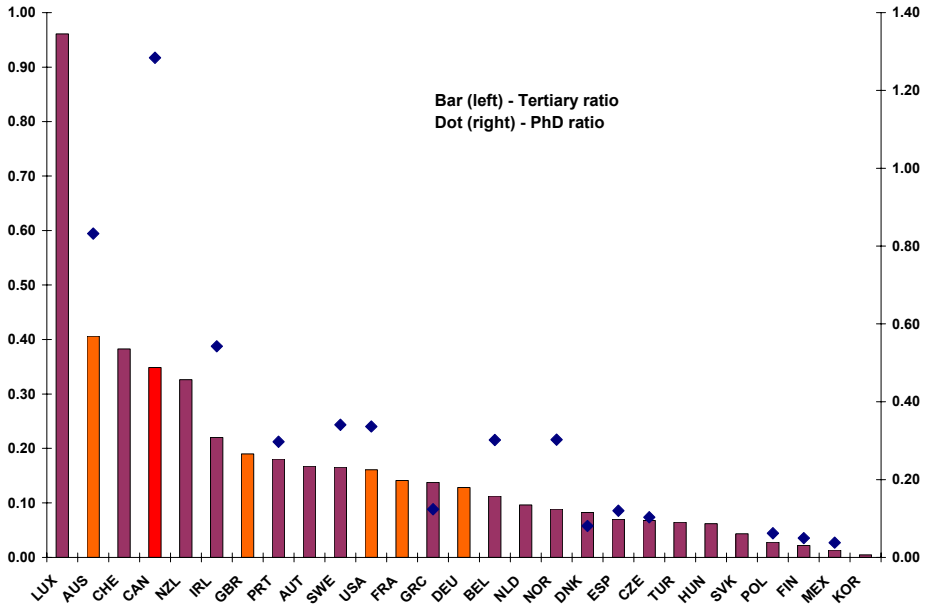
[4] These figures may not reflect the *ex ante* education status of these individuals as some of them may have acquired higher education in the host country after they arrived.

Figure 1 Stock of foreign-born population aged 15+ with tertiary education, OECD countries, 2000-2001



Note: Data from national censuses or labour force surveys in OECD countries. Most are from year 2000 and 2001, except for France (1999) and Ireland (2002)
Source: OECD (2004)

Figure 2 Ratio of foreign-born to native-born population aged 15+ with tertiary education, OECD countries, 2000-2001



Source: Calculation based on data from OECD (2004)

We also compare the numbers of foreign-born high-skilled to the native-born with tertiary education (Figure 2). Canada ranks fourth with 35 percent of foreign-born to native population with tertiary education. At the top end of education spectrum, Canada has the highest ratio of foreign-born PhDs to native PhDs (1.28). Australia has a higher ratio of foreign-born with tertiary education than Canada (0.41) but it lags Canada in terms of foreign-born PhDs to native PhDs (0.83). The UK ranks 7th while the US ranks 11th in foreign-born with tertiary education.

The distribution of educational attainment of foreign-born and native-born population is given in Table 1. The data confirms that Canada, Australia, and the UK attract relatively more highly educated foreign-born than the other competitor countries.

Table 1 Educational attainment distribution of foreign-born and native-born population aged 15 or more, competitor countries, 2000/2001

	Native born (%)			Foreign born (%)		
	ISCED 0/1/2	ISECD 3/4	ISECD 5/6	ISCED 0/1/2	ISECD 3/4	ISECD 5/6
Australia	45.8	15.7	38.6	38.3	18.8	42.9
Canada	31.6	36.9	31.5	30.1	31.9	38.0
UK	51.2	28.7	20.1	40.6	24.5	34.8
US	21.9	51.2	26.9	39.8	34.3	25.9
France	45.8	37.4	16.9	54.8	27.2	18.1
Germany	23.7	56.8	19.5	43.7	40.8	15.5

Notes: ISCED 0/1/2 corresponds to an education attainment of less than upper secondary level,
ISCED 3/4 is for upper secondary and post-secondary non-tertiary education,
ISCED 5/6 is tertiary education (colleges and university starting from Bachelor's degree).
Source: OECD (2004).

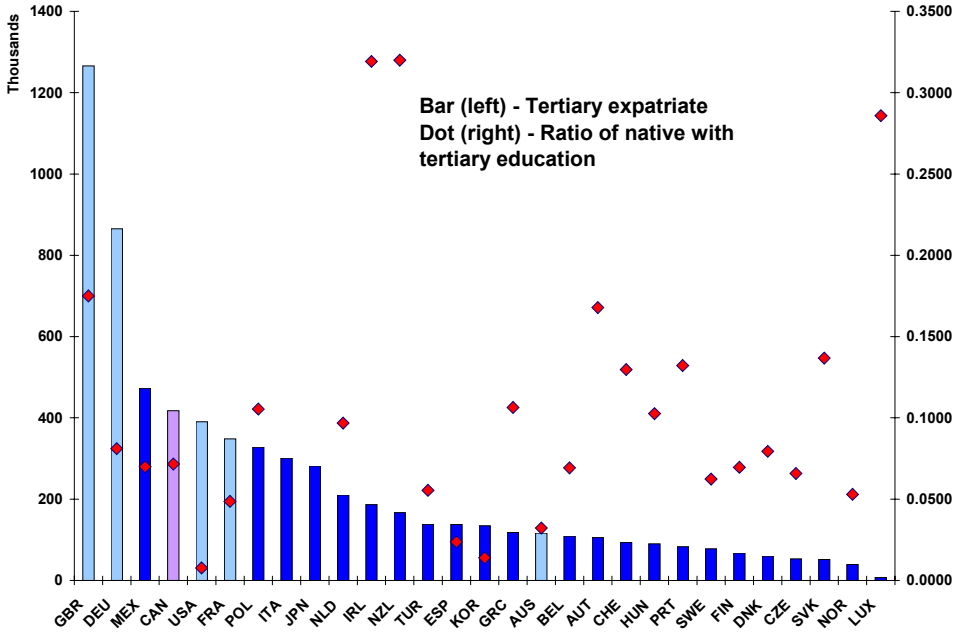
3.2. Benchmarking expatriates – stock of expatriates with tertiary education

Over the last many years industrial country immigration policies have been attacked as promoting a 'brain drain' from poor South to a rich North. However, more recently, industrial countries have also become alarmed about their emigration of the highly skilled. Harris (2004) notes that the 'brain drain' is now an industrial country issue. The stock of expatriates[5] with tertiary education may reflect a country's ability to retain high-skilled workers. The OECD database discussed above does provide a broad overall picture of expatriates of OECD member countries residing in another member country. Admittedly, the database does not offer the overall global picture of the emigration of the highly skilled from the OECD economies as it does not include those who left to non-OECD countries.

[5] 'Expatriates' are native-born persons living abroad, regardless of the current or eventual duration of they stay abroad OECD (2004).

Canada is in the middle rank on the 'export' magnitude, with about 400,000 Canadian-born living abroad. The UK and Germany are the top sending countries, with 1.3 and 0.9 million expatriates respectively. Among the comparator countries, Australia ranks the lowest with 116,000 expatriates (Figure 3 – left axis). Looking at the ratio of expatriates to natives with tertiary education (on the right axis) similar story emerges; Canada is doing better than the UK and Germany, but worse than the US, France and Australia. The US is the top performer in this regard (with less than 1%).

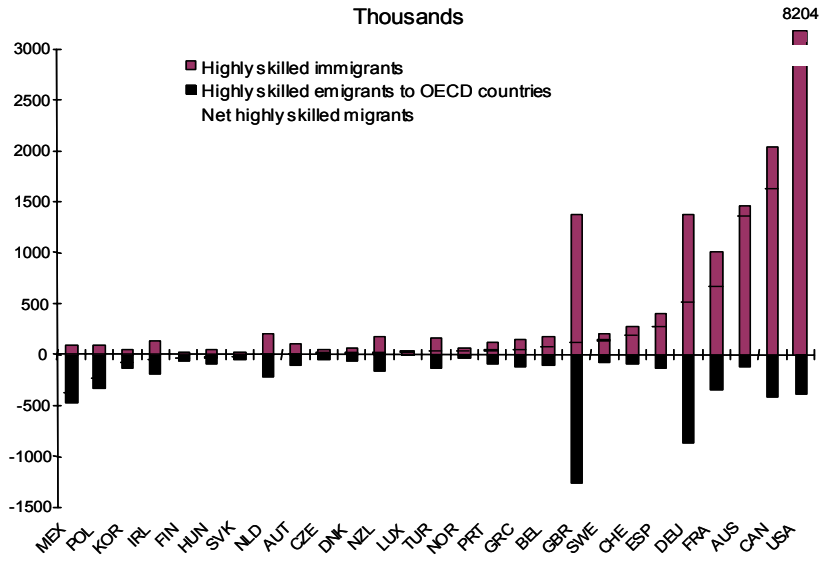
Figure 3 Stock of expatriates to OECD countries aged 15+ with tertiary education, OECD countries, 2000-2001



Note: Data from national censuses or labour force surveys in OECD countries. Most are from year 2000 and 2001, except for France (1999) and Ireland (2002)
Source: OECD (2004)

A country's net position is showed in Figure 4. In terms of the net gain (in absolute terms) of high-skilled workers, all of our key competitors show net gains. The US ranks first while Canada is second. Note that the countries with high receipts of immigrants – the UK, Germany and the US – also have high number of expatriates to other member OECD economies. Australia is an exception where the country has a high intake with a relatively small number of expatriates.

Figure 4 Net gain (foreign-born versus expatriates) aged 15+ with tertiary education, OECD countries, 2000-2001



Note: Data for Korean emigrants are partial as several OECD countries do not systematically distinguish South and North Korea.

Source: OECD (2004)

3.3. Benchmarking inflows of the highly skilled using *flow* data

The *flow* data on high-skilled immigrants are from country's immigration departments. Inflows of high-skilled workers are divided into permanent and temporary flows according to visa types and/or skill classification. Flow data reflect recent cross-border mobility of workers better than the stock, but the limitation in terms of availability and compatibility is of concern. Getting a concrete cross-country comparison of temporary inflows of skilled workers is not an easy task as data from country immigration offices differ considerably. Most countries record admissions of all temporary workers, but fewer have records based on 'skill' classification. As well, units of measurement vary from country to country. For example, while Canada's record is a client-based system emphasizing person as the key reporting unit, the US record of temporary workers is based on number of admissions[6], and the Australian system counts the number of visas granted[7]. Record of temporary workers entering the EU countries generally includes only non-EU workers.

The US is the main destination for temporary skilled-workers from all over the world. A strong demand by US technology-intensive firms, and the demand by

[6] It is possible to get the number of visas granted to a specialty occupation workers (H-1B) from the US-CIS, however, this measurement cannot be consistently aggregated with the number of admissions from the other classes of temporary skilled-workers.

[7] The number of visas granted is a closer approximation of persons/workers than the admission count.

universities for academic faculty and researchers contributed to an increased temporary inflows to the US. In 2002, there were about 1.1 millions of entries of temporary high-skilled workers. In the same year, Canada attracts more than 41,000 workers with managerial, professional, and technical skills, an 11% fall from 46,000 workers three years earlier (see Table 2). Canada is doing better than the competitor countries in terms of a high proportion of skilled workers relative to overall inflows of temporary workers. The ratio, however, tends to fall over during the observed period (1999-2002) for both Canada and the US. In Australia, the absolute number of visas granted to high-skilled workers is very close to that of Canada, about 43,000 in 2002/3, although the skill content of the overall flow is much smaller. The figures for the European competitors are small partly due to the fact that there was no record on cross-EU temporary workers.

Table 2 Temporary inflows of highly skilled workers, competitor countries, various years

Country	Year	Inflows of skilled-workers (thousands)	Skilled inflows as % of total temporary inflows
Australia [a]	2000/1	37.0	na
	2002/3	43.0	24.0
Canada [b]	1999	46.1	53.6
	2002	41.5	47.2
France [c]	1999	5.3	48.3
Germany [c]	2000/1	8.6	na
United Kingdom [d]	2000	28.7	45.0
United States [e]	1999	880.6	47.0
	2002	1,083.5	37.7

Notes: a) Australia data on temporary inflows are in terms of visas granted admitted under long-stay business visas for skilled workers (3 months to 4 years), and independent executive visas, excluding New Zealand citizens. The total inflows exclude visitors and overseas students. Source: Population Flows: Immigration Aspects, DIMIA (2004)

b) Temporary flow to Canada are numbers of temporary workers with managerial, professional, and technical skilled levels. Source: CIC (Facts and Figures, various years)

c) Data relate to specific programs dedicated to highly skilled workers in Germany. In France, highly skilled are those engaged in occupations classified as manager or professional. Intra-company transferees are not included. Source: OECD (2002), STI Outlook, Chapter 8, Table 1.

d) Figures obtained from UK work permits granted to skilled occupations including managers and administrators, and professionals. Note that work permits are issues to employers and EU citizen do not need work permit to work in the UK. Source: Dobson et. al. (2001)

e) Temporary inflow to the US is in terms of admissions, not persons, under the following visa arrangements: NAFTA-TN, H-1B, exchange visitors (J1), and intra-company transferees (L1). The total flows of non-immigrant admissions exclude visitors, students and students' dependents. Source: US-CIS (Statistical Yearbook, various years)

Turning to the permanent inflows of high-skilled workers, Canada, Australia, and the US have comprehensive immigration schemes specially aimed at attracting skilled

immigrants.[8] Table 3 shows the magnitude of permanent high-skilled immigrants in three countries – Australia, Canada and the US. It can be seen that Canada and Australia are the major beneficiaries of skilled immigrants and more than half of their permanent inflows are highly skilled.[9] Canada admitted more than 123,000 skilled immigrants in 2002 while the counterpart number for Australia is 59,000 persons. The US receives the highest number of skilled immigrants (163,500 persons), however a relatively smaller skill proportion (11-15%) reflects the fact that family reunification program, not the skill consideration, is the major component of the US immigration policy.

Table 3 Inflows of skilled workers under skilled-focused permanent migration programs, selected countries, various years

Country	Year	Inflows of skilled-workers (thousands)	Skilled inflows as % of total permanent inflows
Australia [a]	2000/1	43.4	0.54
	2002/3	56.8	0.54
Canada [b]	1999	92.4	0.52
	2002	123.3	0.54
United States [c]	2000	93.2	0.11
	2002	163.5	0.15

Notes: a) Australia data on permanent flow reflect the number of people admitted under skill migration program. Source: Population Flows: Immigration Aspects, DIMIA (2004)

b) Permanent flow to Canada shows number of skilled immigrants admitted under skilled focus program, principals and dependents. Source: CIC (Facts and Figures, various years)

c) Permanent flows to the US are immigrants with employment preferences including professionals, executives, skilled workers and their dependents (1st, 2nd, and skilled workers in the 3rd employment preferences). Source: US-CIS (Statistical Yearbook, various years).

The flows of skilled Canadians to the US have often received particular attention from Canadian public and policymakers. Much of the concern has focused on the social cost of losing high-skilled workers to the US – the so-called 'brain drain' (Card, 2005; Gera et. al. 2004). Based on the stock estimates, both Finnie (2001) and Helliwell (1999) estimate that migration from Canada to the US has been small through most of the 1990s. However, recent numbers reported by McHale (2002) do not support the joint Finnie-Helliwell contention that the Canada-US outflows were small. McHale extends Helliwell's CPS estimates to include data for the 1999 to 2002 period and finds that by

[8] These programs are generally based on points system. The skilled-focus immigration programs in the UK and Germany were recently implemented, and thus, the data are not available. No such program exists in France.

[9] The discussion here does not focus on return migration of skilled workers. Recently, it has been observed that skilled migrants have either returned to their native countries or moved to other attractive locations in a third country. The limited evidence on this issue suggests that this phenomenon, although important, is relatively small. See, for instance, "International Mobility of Highly-Qualified People in APEC" in APEC (2004).

2002, the stock of Canadians resident in the US approached 935,000 which represented approximately 400,000 or 80 percent increase in 5 years (1997-2002).

More importantly, a significant part of the recent increase in emigration is accounted for temporary migrants (i.e. intra-company transfers, NAFTA-TN visa holders, H-1B visa holders and exchange visitors). Table 4 shows temporary out-migration of Canadians to the US increased sharply during the late 1990s, especially under NAFTA-TN, H-1B and intra-company transferee visas. However, the admissions under NAFTA-TN and intra-company transferees visas have declined somewhat since 2001. The major group of professionals entering south of the border is under H-1B program – a non-immigrant visa issued to foreign professionals in occupations such as computer system analysts and programmers, physicians, professors, engineers, and accountants.

Table 4: Entries of Canadian-born to the US on temporary basis, selected classes, 1997-2002

Year	NAFTA-TN	Specialty Occupations (H-1B)	Intra-company Transferees (L1)	Exchange visitors (J1)
1997	26,794	4,192	7,037	3,698
1998	47,060	7,595	12,001	4,792
1999	67,076	10,235	13,603	5,470
2000	89,220	12,929	19,221	6,322
2001	92,915	16,454	22,838	6,872
2002	71,878	19,866	20,320	6,748
2003	58,177	20,947	15,618	7,309
2004	64,062	23,862	21,593	7,035

Source: US-CIS, various years

In a recent study, Card (2005) shows that Canadian emigrants[10] to the US have always had above-average education levels relative to those who stayed home. He estimates that currently Canadian men living in the US are 2.7 times more likely to hold a university degree than men in Canada. Even more striking is that about 8 percent of Canadian immigrants in the US have an advanced degree (MA, Ph.D., law and medical degree), compared to just over 1 percent of Canadian men. The data suggest a possible sharp increase in the quality of migrants in the 1980s and 1990s. Similar conclusions hold for women (Table 5). On the other hand, Finnie (2004) finds that during 1992-1999 there was a substantial upward trend in return rates of Canadians who lived in the US. The return rates are high for those at higher income levels.

[10] Card (2005)'s analyses are based on census data and represent the 'stock' of emigrants.

Table 5: Outflows of highly skilled to the US (percentage of Canadians with a university degree)

	Canadians in US.		Canadians in Canada	
	Women	Men	Women	Men
1940	3.3	5.8	2.0(est.)	3.0 (est.)
1970	7.6	15.0	---	---
1980	12.7	24.9	7.5	11.8
1990	22.7	33.3	---	---
2000	36.7	44.3	15.2	16.0
2000*	5.0	8.1	0.5	1.1

* percent with advanced degree; est. is estimated number.
Source: Card (2005)

The discussion so far suggests that Canada is performing reasonably well in competition among major OECD countries for attracting immigrants with tertiary education. This conclusion holds on both stock and flow measures. Canada also has large volume of expatriates with tertiary education to other OECD countries. There does seem to be evidence of an emerging trend towards 'brain drain' of Canadians to the US under NAFTA-TN and H-1B visas.

3.4. Benchmarking inflows of foreign students at higher education levels

Foreign students at advanced education levels represent an important part of potential supply of high-skilled workers residing in a host country. They are easily absorbed into the workforce due to their linguistic proficiency associated with a higher level of education, greater ability to adjust, gather and process information, and the possibility of acquiring country-specific knowledge more rapidly (OECD, 2001). For example, a survey conducted in the US covering the sample of 4,200 temporary workers with H-1B visa shows that some 23% of them previously held a student visa (US-INS, 2000).

About 80% of all foreign students at higher education study in only five countries – the US, the UK, Germany, France, and Australia. The US is the main destination of international students at advanced and research intensive levels. For instance, 79,000 students, that is more than half of total foreign PhD students, enrolled in US universities in 2000 (OECD, 2003b), and 24,600 foreigners are post-doc students in science and engineering fields in 2001 (NFS, 2004).

The stock data from OECD (2001) show that Canada seems to be doing poorly in attracting foreign students at higher education levels – only 28 foreign students per 1,000 students enrolled (Table 6). However, the figure reported for Canada includes only non-resident students. Australia has the highest ratio at 126 foreign students per thousand, followed by the UK at 108. Although the US is the main destination of foreign students

in absolute term, the ratio of foreign students to locals is as low as 32 (due to the size effect).

Table 6: Proportion of foreign students at university undergraduate and higher (ISCED5-6), competitor countries, 1998

Country	per 1,000 students enrolled
Australia	125.9
United Kingdom	108.1
Germany	81.6
France	73.0
United States	32.4
Canada*	27.9
OECD weighted mean	*37.1*

* Canada's figure includes non-residents students only.
Source: OECD (2001)

In terms of flows of foreign students at university/college levels, we have very limited cross-country data. Nevertheless, the available data for Canada and Australia show that, Australia outperforms Canada by a big margin. In 2002/3, Australian granted 83,000 student visas to higher education students, out of which above 30,000 are going for Masters/Doctorate (DIMIA, 2002). Canada received about 24,400 university students in 2002 (CIC, 2002).

3.5. Is Canada attracting a "Fair Share" of internationally mobile high-skilled individuals?

To answer this question, we adopt the 'Fair Share" methodology used by Head and Ries (2004). This methodology allows us to position Canada in an international context in terms of its share of globally mobile highly skilled. It also allows us to assess whether Canada is attracting its "fair share" of these mobile talents given its size and level of economic development.

We use the following indicator and call it 'performance measure' (PM):

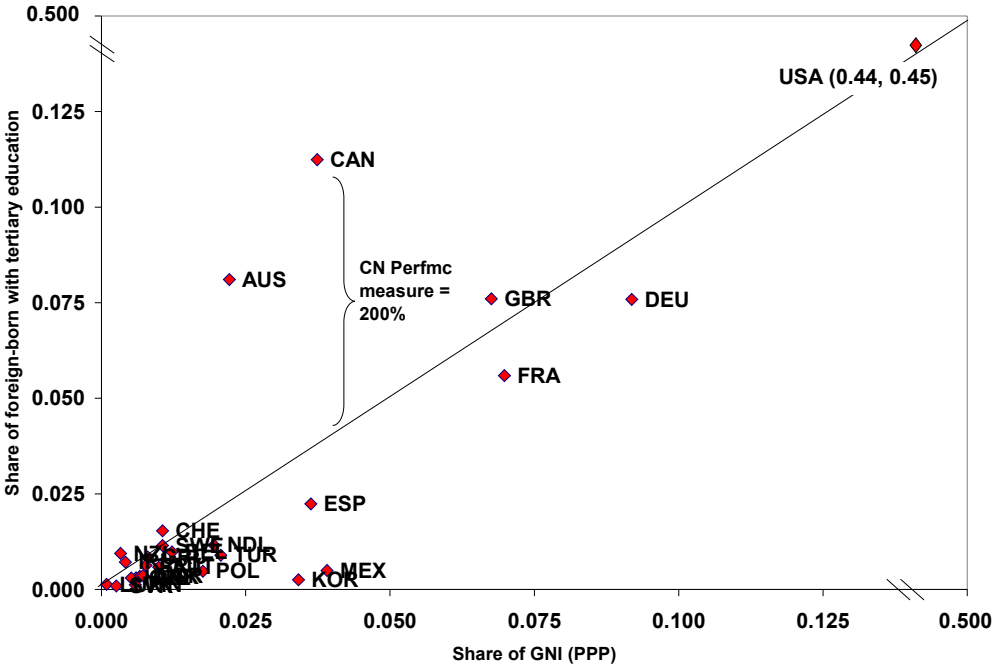
$$PM = \frac{S_i}{GNI_i / GNI_T} - 1,$$

where S_i is country i's share of a parameter of interest such as the number of high-skilled foreign-born or expatriates, GNI_i is country I's gross national income (PPP and exchange rate adjusted), and GNI_T is the sum of GNI across countries. A simple example demonstrates our interpretation of the performance measure. Suppose that country X's share of GNI among OECD countries is 5 percent, then its "fair share" of high-skilled foreign-born workers is also 5 percent. If country X's share of high-skilled foreign-born among OECD countries turns out to be, say, 15 percent, the performance measure of X is equal to 2 [=(0.15/0.05)-1]. This means that country X attracts 200 percent more of high-

skilled foreign-born than it could have, given its share of national income. In other words, country X out-performs its own 'fair' share by 200 percent.[11]

We use the stock data described in the previous section to benchmark a country's performance in attracting high-skilled workers from abroad. In Figure 5, the vertical distance between the country data point and the 45-degree line shows the country's performance measure. The 45-degree line represents the 'fair' share line. Any country above this line performs better than its own share proportional to its national income, and vice versa. Based on this measure, Canada performs very well with its attraction performance measure – as high as 200 percent above its fair share level. Australia's performance measure is the highest at 266%. The UK is attracting little more than its fair share (about 12% more). The US attracts just about its fair share and Germany and France tend to under-perform.

Figure 5 International benchmarking of the stock of foreign-born aged 15+ with tertiary education, OECD countries, 2000-2001



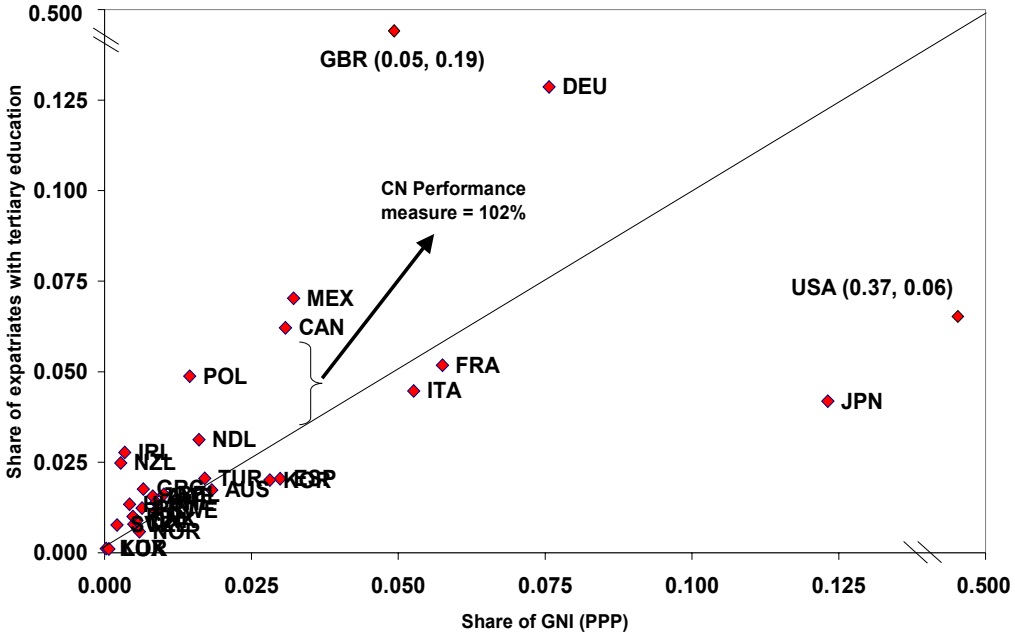
Similarly we examine the fair share measure of the high-skilled expatriates (Figure 6). Countries above the 45-degree line are those that show high number of expatriates than their fair share. Canada's expatriates performance measure is 102 percent (ranking 5th among the competitors) suggesting expatriates from Canada are twice as much than its fair share. Similarly, Germany's performance measure is 70 percent higher than its fair share. Among the competitors, the UK is much worse with 238 percent of its fair share. The US performs best as its expatriates are much lower than the fair share (-84

[11] The notion of 'fair share' does well the job of benchmarking but does not imply economic optimality. More work, possibly in the general equilibrium context, may shed light on the optimal level of performance measure or the optimal mix of skills in an economy.

percent). France and Australia are also doing better than their fair share (-10 and –5 percent, respectively).

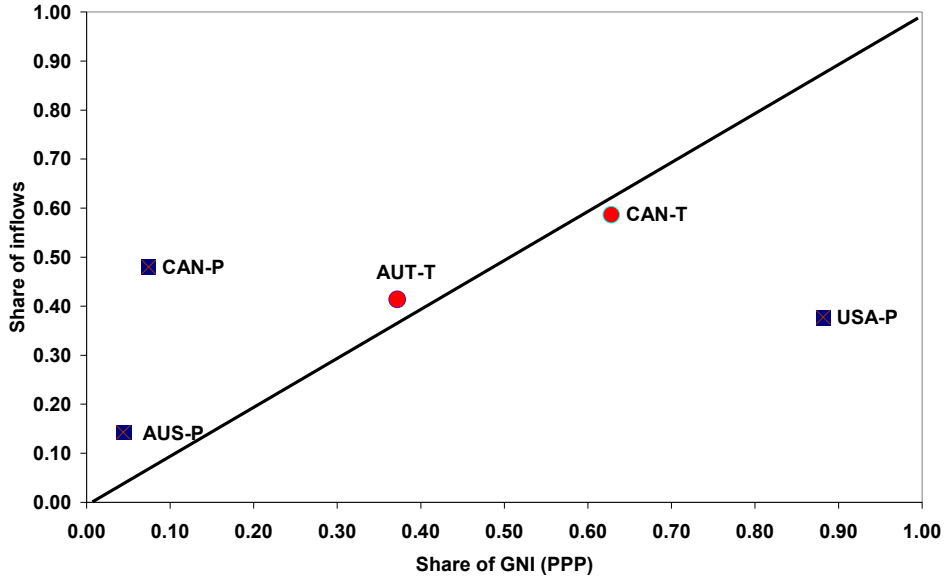
The fair share methodology when applied to the *flow* data reveals that Canada performs exceptionally well as it attract more than 5 times of its fair share of permanent flows.[12] Australia attracts more than double of its share, and the US underperforms – attracts about 60% less than its fair share (Figure 7). In case of temporary flows[13], Canada attracts slightly below its share of temporary inflows (-7 percent) and Australia's performance measure is 11 percent higher than its fair share. The findings of this exercise are to be interpreted with caution due to data limitations.

Figure 6 International benchmarking of the stock of expatriates aged 15+ with tertiary education, OECD countries, 2000-2001



[12] Using flow data of permanent immigration as showed in Table 3.
[13] An attempt is made to compare temporary inflows between Canada and Australia only due to the data incompatibility problem (especially with the US data which is admission-based, see Table 2)

Figure 7 International benchmarking of inflows of high-skilled workers, selected countries, 2000



In summary, evidence based on both flow and stock data shows that Canada performs well in terms of attracting high-skilled immigrants on a *permanent* basis. Attracting skilled immigrants seems to be Canada's strength. However, there seems to be concerns about their integration into the labour market.[14] Canada does not seem to be performing as well in terms of its high volume of expatriates to other OECD member countries. This may reflect Canada's inability to retain high-skilled workers.[15]

In terms of attracting skilled temporary workers, we find that Canada does not seem to perform very well. However, the available data do not allow us for a comprehensive cross-country comparison. Additionally, Canada performs poorly in attracting foreign students at university levels compared to other OECD countries such as Australia.

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[14] Immigrants earnings and employment in 1990s tend to decline despite their rising skill and educations. Institutional problems that led to underutilization of immigrants' skills in Canadian labour market include deficient credential assessment and skill recognition, and lacks of training programs for immigrants. For a detailed literature review and policy direction see Reitz (2005). Furthermore, Canada faces skills challenge in other areas as well. These include relatively low proportion of human resources in science and technology in total employment, low doctoral graduation rates, under-investment of worker trainings and skill development (Gera, Roy, and Songsakul, 2005).

[15] It is likely that to some incoming skilled migrants, Canada is attractive only as the first destination and serves as a gateway to entry in the US. The data, for example, show that an annual average of 2,300 employment-based migrants (with unknown skill levels) entered the US on permanent basis between 1997-2002. These individuals are not Canadian-born but had lived in Canada as their last residence before they emigrated to the US. (US-CIS, various years)

4. Key economic factors influencing country's relative attractiveness

Economic theory would predict that differences in wage levels and returns to education between sending and receiving countries are significant factors creating incentives for the highly skilled to move. OECD (2002b) notes that factors such as differences in labour market conditions, skills premium, job opportunities and career prospects, and attractiveness of the education and research systems continue to be the key drivers of the mobility of highly-qualified individuals in the new global economy[16].

Recent literature has focused on a newer perspective – "globalization of highly skilled labour market" perspective – where international mobility of the highly skilled is considered as "Brain Exchange" or "Brain Circulation". In this perspective, the increased mobility of the knowledge workers contributes to increased two-way flows of knowledge, ideas and technology (OECD, 2002a,c; Harris 2003; and Gera, et.al.2004). This perspective suggests that a number of important factors may have contributed to the recent rise in the international mobility of the highly skilled. These are: technological change, in particular the developments in ICTs, globalization of production and integration of markets through trade in goods and services and FDI, location of MNEs, access to leading clusters of research and innovation, opportunities for high-technology entrepreneurship, technology transfer and the internationalization of the R&D activities of national firms. Guellec and Cervantes (2002) argue that these factors are important for migratory flows of the highly skilled among advanced countries, although they also play a role in the case of flows from developing countries.

Head and Reis (2004) argue that the location decisions of internationally mobile resources such as FDI, R&D, and skilled professionals are jointly determined. The success at attracting one resource draws more of the others. In addition, innovation activities other than R&D, such as commercialization of ideas and technology diffusion, may play a role in attracting entrepreneurs and professionals.

In a recent study, Florida (2004) points out the linkage between the percentage of foreign-born workers and the rise of the 'creative class'. The creative class is referred to workers whose economic function is to create new ideas, new technology, or new content. These include scientists, engineers, architects, educators, artists, as well as creative professions of business, finance, and law. Florida compares the size of the creative class in different countries by using employment data to establish the Global Creative Class Index (GCCI). Figure 8 shows GCCI of selected countries taken from Florida (2004). Canada's position (at 25%) is behind Australia and the UK but ranks better than the US and Germany. We would be interested in exploring whether the

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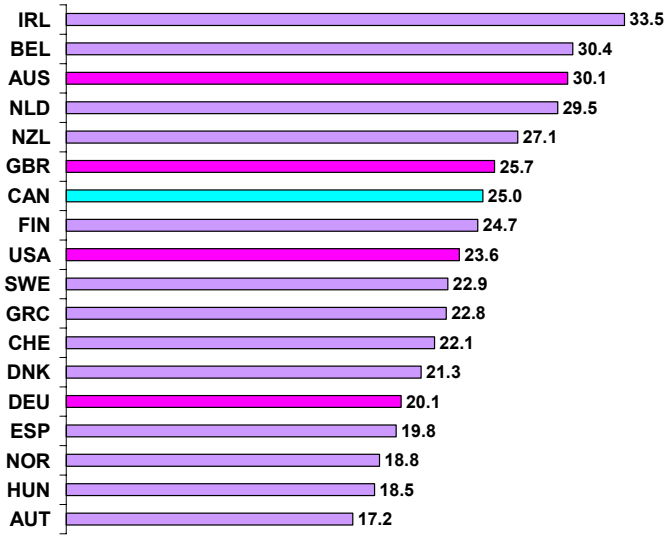
[16] The traditional migration literature in the labour economics tradition treats international migration as driven by "push" and "pull" factors. "Push" factors are the supply side factors affecting the incentives and willingness to migrate; and "pull" are demand side factors that affect the demand for migrants in the receiving country. Borjas (1994) argues that higher relative wages for skills tend to bias the composition of emigrants towards the highly skilled, a phenomenon characterized by 'self-selection' bias. For more discussion, see Gera, et.al. (2004).

relative performance of countries in terms of innovation activity and attraction of foreign skilled workers correlated.

Figure 8 Creative Class Index, selected countries, 2000



Source: Florida (2004)

In light of the above discussion, we perform simple correlation analysis to examine whether the relative performance of countries in attracting skilled foreign workers is correlated with the relative performance in each of factors discussed below[17]:

- GCCI (Florida hypothesis)
- FDI stock (Head and Reis hypothesis)
- Business R&D expenditure (Head and Reis hypothesis)
- GDP per capita
- Innovation performance index (OECD, 2004).

Table 7 presents the computed rank correlations between attraction performance measure and the above variables. The estimates show that three factors – GCCI, FDI-PM, and GDPPC – are found to be significantly correlated with the relative attraction performance of countries. However, the correlation significance is low between innovation performance and attraction measure. The business R&D does not show significant correlation with attraction measure performance. In sum, the results support Florida's hypothesis on complementarity between skilled foreign workers and creative class. They also support Head and Reis hypothesis on complementarity between FDI and skilled human capital. The relative position of economic well-being (GDP per capita) of OECD countries, as expected, is highly correlated to their relative attraction performance

[17] Other factors of interest are, for example, the country's unemployment rates and real wage rates of skilled foreigners. Due to data limitation, we are not able to perform such tests.

measures. Admittedly, more careful work needs to be done on the relationship between innovation performance and the attraction performance of countries.

Table 7 Rank correlations

Factor	Correlations to Foreign-born PM	Observations
GCCI	0.5514**	18
FDI – PM[a]	0.5726**	26
BERD – PM[a]	0.1446	25
GDPPC	0.4534**	27
INNVI	0.2508	25

Note: a) FDI and BERD variables are in terms of performance measure as defined in section 3.4.
** significant at the 5% level, * 10% level

As economic theory would predict, Card (2005) finds that over the 1980s and 1990s, important economic trends have intensified the economic incentives for Canadians to emigrate to the US – particularly young Canadians with at least a university education. As he concludes "The remarkable rise in the relative wages of younger college-educated workers in the US has created economic incentives not just for Canadians but for people from all around the world to move to the US" (Card, 2005, p12).

In summary, the findings show that relative performance of the OECD countries in attracting high-skilled workers is significantly correlated with the indicators such as the percentage of creative class workforce, the inward FDI stock, and GDP per capita. However, weak correlations are observed for the other knowledge-intensive indicators such as the innovation performance index and the business R&D expenditure.

5. Policies on immigration and temporary movement of high-skilled workers

Competition for the mobile human resource has a strong zero-sum aspect to it, at least as perceived by policy makers and enterprises engaging in the strategic competition game (Harris 2003; 2004). National governments are competing through a number of policies targeted on the globally mobile knowledge workers in order to increase the economy's comparative advantage in skill-intensive knowledge industries. In the global competition game, immigration policies are put at the forefront by governments of many developed countries. In this section, we focus on policies across competitor countries as they relate to the permanent immigration of the highly skilled, temporary migration of these workers and foreign students at advanced education levels. We also discuss the NAFTA-TN status governing the Canada-US temporary flows of the highly skilled. Although there are other related policies that play an important role in attracting and retaining high-skilled workers are, for example, labour market regulations and practices (credential recognition etc.); science and technology policies aiming to spur research and

innovation; trade and economic integration policies; and fiscal incentives and taxation policies, these are not the focus of the present discussion.

5.1. Permanent immigration for the highly skilled

Traditional immigration countries like the US, Australia, and Canada have comprehensive immigration schemes specifically aimed at attracting highly skilled migrants on a permanent basis. In the UK, the Highly Skilled Migrants Programme was introduced in early 2002. The German government passed an immigration reform bill with a points-based system in 2003. There is no immigration program for high-skilled workers in France. While many countries opt for a points system in selecting skilled immigrants, the US maintains its employment-based preferences with which the main criteria is a certified job offer. Table 8, adapted from McHale (2002), compares the skilled-focused permanent migration programs in five major OECD countries.

McHale (2002) argues that Canadian points system fares well compared to the counterpart policies in competitor countries, although some competitor's policies might be better in using earnings information as part of selection criteria and in improvement of processing speed. Australia, Germany, and the UK show significant improvement in shortening the length of time taken for application and approval in addition to reducing speed-retarding red tape. In Australia, self-assessment of skills before application has helped simplify the procedure. In Canada, the processing time can take more than 18 months especially for high-volume countries such as China and India.

The major competitor to Canada in this regard is Australia where its reformed immigration policy seems to be more far-fetching and yield a sharp increase in the number of skilled immigrants in the last few years. Australia almost doubled the number of skilled immigrants between 1995 to 2000. The country attracts skilled people from all around the world[18] while Canadian skilled immigrants from Asia dominate the scene.

The US is not a major competitor to Canada in competing for skilled permanent immigrants. This is because the US immigration program focuses more on family reunification and other humanitarian migrants. However, Canada seems to lag behind the US largely in the admissions of high-skilled workers on temporary basis of which is discussed in the next section.

Greater permissibility of applying for permanent status while working under a temporary working visa is a strong element in attracting foreign workers who intend to stay indefinitely. In Canada, Australia, and the US, status change from temporary visa to permanent resident is allowed. In 2002, there were more than 15,000 intra-company transferees, 87,000 temporary workers, and 18,700 students who were converted to permanent resident status in the US (US-CIS, 2002).

[18] The top three senders of skilled immigrants to Australia are the UK, South Africa, and India.

Table 8 Skilled-focused permanent immigration programs, competitor countries

	Canada	Australia	Germany	UK	US
Program	Independent skilled workers program	Skill migration (multiple programs [a])	New immigration law (effective 2003)	Highly skilled migrant programme [b] (introduced on pilot basis in Jan.02)	Employment-based preferences (permanent residency)
Number (% of total) 1995 2000	 81,000 (38%) 118,000 (52%)	 24,100 (29%) 44,730 (56%)	 … …	 … …	 85,300 107,000
Cap	No	No	No	No	Yes (140,000)
Points system	Yes	Yes [c]	Yes	Yes	No
Labour market test	No	No	No	No	Yes (with exception)
Selection criteria	Age, language, education, experience, job offer, adaptability	Age, language, education, occupation [d], experience	(i) Highly skilled professionals with job offers: qualifications and earnings; (ii) workers without job offers: points system	Past earnings [e], education, experience, professional achievement	Job offer (certification from the Department of Labour or no adverse impact on domestic workers required in most cases [f])
Leading source countries in 2000	China (23%) India (10%) Pakistan (8%) Korea (4%)	UK (15%) S. Africa (14%) India (10%) Indonesia (9%)	Not applicable	Not applicable	India (15%) China (13%) Philippines (10%) Canada (7%)

a) Included programs (number in 2000/01): employer nominations (7,510); business skills (7,360);distinguished talents (230); skilled independent (22,380); skilled Australian sponsored (7,200); and 1 November onshore (60).
b)This program is not strictly designed for permanent migration. Initial acceptance is for a period of 1 year. The applicant can then apply to have the visa extended for a further 3 years. At the end of the four years, a migrant wishing to remain in the UK permanently can apply for permanent residence or "settlement". This route to permanent residency is also available to work permit holders, so the difference between the two programs as a means to permanent residency should not be exaggerated. A key difference, however, is that those entering under the HSMP are not tied to a particular employer.
c) A new points system was introduced in July 1999. A new category for skilled independent overseas students was added in July 2001. Applicants with Australian qualifications that apply within six months of completing their studies are exempt from the work experience requirement. No points test applies to the employer nomination stream, though candidates must meet basic requirements.
d) Occupation must be on the Skilled Occupations List (SOL).
e) Points based on past earnings are country specific, with poorer countries tending to receive more points for a given level of pound sterling earnings. For example, someone from Canada would need to have earned £250,000 to receive the maximum 50 points in this category, whereas someone from India would need to have earned £90,000.
f) There are five preference categories(E1) priority workers (28.6%), certification not required; (E2) professionals holding advanced degrees (28.6%), certification required; (E3) professional holding bachelors degrees and other workers (28.6%), certification required; (E4) special immigrants (7.1%); and (E5) employment creation investors (7.1%), must invest between $0.5 million and $1 million depending on geographic area and create at least 10 full-time jobs.

Source: McHale (2002), Table 2

5.2. Policies on temporary movement of high-skilled workers

Attracting highly skilled foreigners on a temporary basis has become increasingly important in many countries as a strategy to cope with labour shortages, especially in sectors such as IT and health. In Europe, temporary migration has been the norm, and schemes have been designed to deal with specific labour shortages (McLaughlan and Salt, 2002). While fewer countries (e.g., the UK and Australia) have a specific scheme aiming at health professionals and nurses, most governments, including those of Canada, the US, Australia, France, and Germany[19], have modified the existing work permit systems to facilitate entries of IT specialists. Even in some dynamic Asian economies, such as Singapore, Chinese Taipei, and China, measures have recently been implemented to ease skill shortages in the IT sector (OECD, 2002).

Generally, a job-offer is needed when a high-skilled foreigner applies for temporary working visa. While inquiring a job offer or an employment letter from an employer may not be deemed as impediment to attraction strategy, an official requirement on a "labour market test" or "validation" could be considered a hindrance. Canada does not fare well in this regard – a slow and cumbersome validation is a major impediment to competitive recruitment of high-skilled foreign workers. For example, in Canada, an employer must give details of the job offer to the government officials including a description of the duties, duration of employment, wages and working conditions, a statement of essential qualifications, and registrations or licenses that the applicant needs. An officer must confirm that the wages and working conditions associated with the job offer are standard for that type of employment, the job cannot easily be filled by a qualified and available Canadian or landed immigrant, and that allowing a foreign national to fill the position is unlikely to have a negative effect on the Canadian economy and labour force. Employers of NAFTA-TN workers and software developers are exempted from this process. In the US (for H-1B visa) and Australia, there is no such requirement, although employers must attest that employment of foreigners will bring benefits or create no harm to the host economy. Table 9, based on McHale (2002), presents the defining features of national policies to support and encourage temporary migration of high-skilled workers in Canada, Australia, Germany, the UK, and the US.[20]

Canada seems to lagging behind the competitor countries, particularly the US and Australia, in this particular policy arena. However, changes in the 2002 legislation were made to speed up the authorization process and, more importantly, to facilitate entry of temporary workers. Fast-track procedures for issuing work permits for certain occupations exist in several countries including Australia, France, and Germany. In addition, many countries have managed to reduce the length of time taken for work permit approval, in particular the UK (McLaughlan and Salt, 2002).

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[19] In Germany, the government introduced a "green card" program under which 20,000 computer and technology specialists can work in Germany for up to 5 years. By 2001, about 10,000 of them had found employment in Germany. OECD – STI Outlook 2002 Ch. 8.

[20] France is not included in the table. We have limited information of the French policies regarding high skilled temporary-workers. In general, any temporary workers enter France with Provisional work permits (APT) granted for nine months and renewable.

Table 9 Policies toward temporary migration of skilled workers, competitor countries

	Canada	Australia	Germany	UK	US
Program	Employment authorization – temporary residents	Temporary (long stay) business entry	IT specialists temporary relief program ("Green Card") [a]	Work permits	H-1B specialty professional workers
Number (2000/01)	86,225 [b]	40,493 [c]	8,000 [d]	82,437 [e]	201,079 [f]
Job offer required	Yes	Yes	Yes	Yes	Yes
Cap	No	No	Yes (20,000 total)	No	Yes (195,000 per year)
Labour market test	Yes (validation required by HRSDC; exception for software developers)	No (but employers must show that the temporary entrant will provide a "benefit to Australia" [h])	Yes (employment agency checks EU worker availability and qualifications / remuneration	Yes (waived for "shortage occupations")	No (but employers must "attest" to no adverse effect on US workers)
Tied to employer	Yes	Yes	No [i]	Yes [j]	Yes
Length of visa (max.)	3 years Renewable	4 years Renewable	3 years Renewable (5yr)	5 years Renewable (10yr)	3 years Renewable (6yr)
Spouse employment	No [k]	Yes	Yes (after 1 year)	Yes	No
Possibility of permanent settlement	Yes (under new law)	Yes	No (but possible under new law)	Yes (after four years)	Yes [l]
Top source countries	US (29%) Mexico (11) UK (7)	UK (30%) India (10) US (8)	na	US (20%) India (19) Philippines (10)	India (45%) China (8) Canada (5)

a) Program was introduced in August 2000 to relieve perceived shortages in the IT sector. Germany also operates a much larger work permit system (333,381 in 2000). The aim of the "Green Card" system was to make the recruitment of IT professionals easier through un-bureaucratic, rapid and transparent procedures (McLaughlan and Salt, 2002).
b) Number is for 2000. The stock of temporary workers with employment authorizations on December 31, 2000 was 88,962 (CIC, 2001).
c) Number is for 2000/01 and includes 3,411 independent executives establishing businesses in Australia. In addition, 3,438 visas were issues to medical practitioners and their dependents and 1,738 visas were issued to people joining educational and research institutions. The estimated stock of long stay business entrants as of June 30th 2001 was 56,000. The median duration of stay of visa holders as of that data was just under six months.
d) Number is for the period from August 2000 to June 2001.
e) Includes only out-of-country work permit approvals (McLaughlan and Salt, 2002).
f) Number is for Fiscal Year 2001 (which begins in October 2000). A further 130,127 petitions were approved for continuing employment (INS 2002).
g) Renewals do not count towards the cap.
h) The benefit can come in various ways: create or maintain employment; expand trade; develop links with international markets; or improve competitiveness. Emphasis is on positive effects rather than the absence of harm.
i) Switching employers is possible without further labour market test. Five-year limit applies to combined employments.
j) Employees switching employers must have new employer apply for a new permit.
k) Spouses can apply for employment authorization on their own merit. Under the Spousal Employment Authorization Program, spouses of workers in engineering, management, technical and skilled grades can receive an authorization without a labour market test (McLaughlan and Salt, 2002).
l) Visa holders can apply for permanent residency while they are in H-1B status. Extensions to H-1B status are possible in one-year increments for those whose visa expires when an application for permanent residency has been pending for more than one year (McLaughlan and Salt, 2002).

Source: Based on McHale (2002), Table 3

Spouse employment is another area where Canada lags to its major competitors. Most countries, except the US, allow spouse employment. In Canada, spouses of temporary workers must apply for employment authorization on their own merit. They must pass the labour market validation as well (although spouses of workers in certain occupation such as engineers and management are exempted from validation).

McHale (2002) points out that possible lessons could be drawn from the policies of our key competitors. His major suggestions include a better use of employer attestations rather than labour market validation following the sample of the US H-1B program; a comprehensive list of shortage occupations that do no require labour market tests following the UK Work Permits program; a replacement of an employee-specific approval with an employer-specific one similar to Australian Long-Stay Temporary Business Visas; and some wage offer requirements like in the Germany Green Cards program rather than the labour market test requirements.

Turning to the bilateral movement of temporary workers between the US and Canada, NAFTA policy on temporary workers plays a very important role. Cross-border movement of business persons is administrated under NAFTA Chapter 16[21]. The provisions facilitate the cross-border movement of four classes of business persons: Business visitors, Professionals, Intra-company transferees, and Traders and Investors. More and more Canadian high-skilled workers use the NAFTA-TN (Treaty Nationals) status to enter the US labour market. The admission was 47,000 in 1998, then almost double to 93,000 in 2001.[22] The reverse flow of skilled workers under NAFTA-TN program, i.e., from the US to Canada, has been rather constant overtime; it fluctuated between 8,500 to 9,500 persons during 1997 and 2001.

Skilled migration shares between Canada and the US are fairly small than other economic linkages such as the relative shares of US-CN exports and imports in goods and services, and the shares of inward and outward FDI (Eden, 2004). This reinforces the point made my Helliwell (1998) that border matters more for labour flows than it does for trade and FDI. There could be economic costs to this as Harris (2004) argues that slowing down of income and productivity level convergence between Canada and the US may partly be due to cross-border barriers in labour mobility. The key issue for Canada, as Dodge (2003) argues, is to reduce 'border risk' that is to guarantee Canadian producers and services providers access to US markets without hassle and expense at the border. Hart (2004) suggests that there is still a scope of improvement by the two governments to arrive at cooperative solutions in order to lessen the impact of border and non-border related barriers to mobility. The future initiative, as Hart (2004) concludes, is in pursuing a more active, bilateral program of regulatory cooperation aiming either at an approach towards mutual recognition to certification, accreditation, and other deterrents to the

[21] For the US and Canada, this chapter is a carried over of Chapter 15 from the previous Canada-US Free Trade Agreement (CUSFTA).

[22] In comparison, Canadian-born skilled workers entered the US under H-1B visas was about 16,000 in 2001 (US-CIS). The major advantages of TN status over H-1B visa include unlimited times of renewals, faster process (one can apply for it at the border), no labour certification required. See a comparison of US temporary entry visas in DeVoretz and Coulombe (2004), appendix 2.

cross-border movement of the high-skilled workers, or an agreeable way to reducing the impact of differences in labour market and similar regulations.

5.3. Immigration policies regarding foreign students at advanced education

Many OECD countries have adopted effective measures to attract and retain foreign students by allowing them to change their visa status at the end of their education and permitting their entry into the labour market. This has proven to be quite effective in the US where almost half of new recipients of H-1B visas were students who recently graduated from US schools. In Australia, Canada, Germany, and France (for IT graduates only), amendments were made to allow students to stay temporarily after the completion of their studies to conduct job search. In the UK, in-country changes into work permit status are much more restrictive relative to the other competitor countries (see Table 10). Recently in Canada, the new initiatives for foreign students were introduced including pilot programs on off-campus work and post graduation work permit extensions.[23]

Table 10 Current regulations in competitor countries on status changing for student visa holders, 2001

	Possibility to change residence status
Australia	Students who have gained Australian qualifications are exempt from the skilled work experience requirement if they apply for a skilled visa within 6 months of completing their diploma. If eligible, students can apply for most permanent visas eg spouse visas and skill under points-tested skilled entry.
Canada	Students can work (with employment authorization) for one year after completion of post-graduate degree (no validation required).
France	Yes in general but students who graduated in IT in France (engineers) can change status with a simple demand.
Germany	Yes after they have successfully passed their examination (new legislation).
The UK	In-country changes into work permit status for students completing degrees in the UK are allowed in certain circumstances. As a general rule, in-country changes to work permit status are not allowed, except for trainees who can apply for a Training and Work Experience Scheme visa. Settling procedures are more flexible for Commonwealth, EEA and EU residents.
The US	Yes but no special procedure.

Source: OECD (2001)

Most competitor countries have similar immigration policies towards allowing foreign students to enter the national labour market. It is not clear where does Canada's policy advantage or disadvantage lie. However, given that Canada does not seem to perform well in attracting foreign students at higher education levels, our policy disadvantage is perhaps beyond immigration policies. Wilson (2002) noted that Canada's major OECD competitor countries have national policies in place to attract international students at higher education level. The education policy plays an important role in attracting top international students. Some examples of such a policy include availability of scholarships and other financial assistance to graduate students, university recruitment efforts, tuition fees, etc. In attracting foreign students at advanced research-intensive level

[23] See more details at http://www.cic.gc.ca/english/study/pilot-projects.html.

(PhD and post-doc), R&D policies, especially for science and technology fields, are also highly relevant.

The US has always been the champion host country in attracting foreign students at higher education. However, for the first time in more than three decades, foreign enrolment in the US higher education institutions decreased, meanwhile, the overall numbers of foreign students have increased in Australia and the UK (Sheehan, 2004c). The report by the Institute of International Education (cited in Newsweek, Nov. 22, 2004) blames the 2.4 percent drop on visa problems, rising tuition, and strong recruitment by universities in other countries. International applications to the US graduate schools fall 32% in 2004. The number of applications of Chinese students dropped by 76%, and 58% decline from India.[24] Florida (2004) links this decline to both the availability of attractive educational and job opportunities in other countries and obstacles related to security tightness in the US. As the international market of higher education has become more competitive and governments of competitor countries are competing hard to gain share in this market, Canada would have to develop newer policy initiatives to attract its fair share of foreign students in the new global economy.

The above discussion highlights one particular area of concern. Canada fails to attract large volume of globally mobile high-skilled workers, particularly those seeking temporary visas. Cumbersome immigration procedure in particular the job validation is considered a major impediment for foreign workers to enter Canada's labour market. Similarly, Canada does not fare well in attracting foreign students at higher education. Certainly, more research is needed for these specific issues.

6. Conclusions

Our analysis point to six main conclusions. First, Canada performs well in attracting highly skilled immigrants both in absolute and relative measures of the stock of foreign-born. It ranks middle among the key competitive countries when the stock of highly skilled expatriates to other OECD member countries is considered. This phenomenon is not unique to Canada. And this seems to provide support for Harris (2004) that 'brain drain' is now becoming an industrialized country issue. Canada fares well in terms of net gains of the highly skilled, ranks second, only behind the US. All the comparator countries including Canada are net beneficiaries from the international mobility of the highly skilled.

Second, Canada performs exceptionally well in attracting *permanent* inflows of high-skilled migrants. However, it does not seem to compete well when *temporary* inflows of the highly skilled are considered. The US remains the prime destination for temporary inflows of globally mobile knowledge workers.

Third, the relative performance of the OECD countries in attracting globally mobile high-skilled workers is significantly correlated with knowledge-intensive and economic indicators such as the percentage of creative class workforce, the inward FDI

[24] March report by the US Council of Graduate Schools, cited in Florida, 2004.

stock, and GDP per capita. In addition, economic incentives such as the sharp rise in relative wages of highly-educated young workers in the US continue to play an important role for increased Canadian emigration to the US.

Fourth, Canada fares well in the arena of immigration policy aiming to attract high-skilled immigrants. However, it is well documented that Canada faces challenges in integrating these individuals into the labour market.

Fifth, Canada's policy on employment authorization of temporary workers is considered a major impediment for high-skilled foreign workers to enter into Canada. A 2002 change in legislation has made some impact to reduce the barrier, but it applies only to certain high-skilled occupations. Studies show that there is *still* room to improve/facilitate the movement of temporary high-skilled workers between the US and Canada via NAFTA-TN program.

Finally, Canada performs poorly in attracting and retaining foreign students at advanced education levels. In our view, it does not seem to be related to Canada's immigration policy for foreign students compared to its competitor countries. Studies suggest that it may be the consequence of other education-policy areas such as tuition fee for foreign students. There seems to be a declining trend in US admissions of foreign students at higher education. A real question is whether Canada can capitalize on such an opportunity.

References

APEC (2004), "International Mobility of Highly-Qualified People in APEC". In *Realising Innovation and Human Capital Potential in APEC.* November 2004. Economic Committee, Asia-Pacific Economic Cooperation Secretariat, Singapore.

Card, David (2005), "Canadian Emigration to the United States", a paper presented at Industry Canada Distinguished Speakers in Economics Series, 15 April 2005.

Citizenship and Immigration Canada, *Facts and Figures*, various years.

Department of Immigration and Multicultural and Indigenous Affairs (DIMIA), Australian Government (2003), *Immigration Update FY2003.*

---------- (2004), *Population Flows: Immigration Aspects.* March 2004.

DeVoretz, D. and D. Coulombe (2004), "Labour Mobility between Canada and the United States: Quo Vadis 2003?". In *Social and Labour Market Aspects of North American Linkages*. Edited by Richard G. Harris and Thomas Lemieux. *The Industry Canada Research Series*. Calgary: University of Calgary Press.

Dobson, Janet, Khalid Koser, Gail Mclaughlan, and John Salt (2001), *International migration and the United Kingdom: Recent patterns and trends*. Final report to the Home Office, December 2001, RDS Occasional Paper No 75, London.

Dodge, David (2003), "Economic Integration in North America". August 7, 2003 remarks to the Couchiching Institute on Public Affairs. Bank of Canada.

Eden, Lorraine (2004), "International Mobility of Skilled Labour: Analytical Issues and Research Priorities". In *Rapporteurs' Comments: Summary of Roundtables,* Skills Research Initiative Working Paper Series. No. 2004. Industry Canada, Human Resources and Skills Development Canada, and Social Science and Humanities Research Council (IC-HRSDC-SSHRC), Government of Canada.

Finnie, Ross (2001), "The Brain Drain: Myth and Reality, What It Is and What Should Be Done". Institute for Research on Public Policy, *Choices*, 7(6): 3-29.

Finnie, Ross (2004), "Leaving and Coming Back to Canada: Evidence from Longitudinal Data". In *Social and Labour Market Aspects of North American Linkages*. Edited by Richard G. Harris and Thomas Lemieux. *The Industry Canada Research Series*. Calgary: University of Calgary Press.

Florida, Richard (2004), "America's Looming Creativity Crisis", *Harvard Business Review*, 82(10), pp. 122-36.

Gera, Surendra, Richard Roy, and Thitima Songsakul (2005), "The Role of Benchmarking and Targets in Canadian Innovation Policy". In *Innovation and Impact: The Next Decade*. Edited by Fred Gault and Louise Earl (Forthcoming).

Gera, Surendra, Samuel Laryea, and Thitima Songsakul (2004), "International Mobility of Skilled Labour: Analytical and Empirical Issues, and Research Priorities", Skills Research Initiative Working Paper Series. No. 2004-D-01. Industry Canada, Human Resources and Skills Development Canada, and Social Science and Humanities Research Council, Government of Canada.

Government of Canada (2001), *Achieving Excellence: Investing in People, Knowledge and Opportunity – Canada's Innovation Strategy*. Ottawa: Government of Canada.

Guellec, D. and M. Cervantes (2002), "International Mobility of Highly Skilled Workers: From Statistical Analysis to Policy Formation". In *International Mobility of the Highly Skilled*. Paris, OECD, 2002:71-99.

Harris, Richard G. (2003), "Costing the Brain Drain: New Perspectives on Labour Mobility", In *Brains on the Move.* Edited by R. Harris, S. Easton and N. Schmitt, Toronto: CD Howe Institute, Forthcoming.

---------- (2004), "Labour Mobility and the Global Competition for Skills: Dilemmas and Options", Skills Research Initiative Working Paper Series. No. 2004-D-02. Industry Canada, Human Resources and Skills Development Canada, and Social Science and Humanities Research Council (IC-HRSDC-SSHRC), Government of Canada.

Hart, Michael (2004), "Is There Scope for Enhancing the Mobility of Labour Between Canada and the United States". Skills Research Initiative Working Paper Series. No. 2004-D-04. Industry Canada, Human Resources and Skills Development Canada, and Social Science and Humanities Research Council (IC-HRSDC-SSHRC), Government of Canada.

Head, Keith and John Ries (2004) *Making Canada the Destination of Choice for Internationally Mobile Resources*. Industry Canada Discussion Paper Number 14, January 2004.

Helliwell, John F. (1999) "Checking the Brain Drain: Evidence and Implications". *Policy Options*, September, Institute for Research for Public Policy, 6-17.

---------- (1998), *How Much Do National Borders Matter?*, Washington D.C.: The Brookings Institution.

McLaughlan, Gail and John Salt (2002), *Migration Policies Towards Highly Skilled Foreign Workers*. Report the Home Office, Government of the UK, March 2002.

McHale, John (2002), "Canadian Immigration Policy in Comparative Perspective". *Canadian Immigration Policy for the 21st Century*. Edited by C.M. Beach, A.G. Green and J.G. Reitz, John Deutsch Institute for the Study of Economic Policy, Queen's University, Kingston.

National Science Foundation – NFS (2004), *Science and Engineering Indicators – 2004*.

Organization for Economic Cooperation and Development (2001), *Trends in International Migration*, *Annual Report 2001 Edition,* Paris.

---------- (2001b), "International Mobility of Highly Skilled Workers: From Statistical Analysis to the Formulation of Policies". COM/DSTI/DEELSA(2001)37, May 30, 2001.

---------- (2001c), *OECD Science, Technology and Industry Scoreboard 2001*, Paris.

---------- (2002) *International Mobility of the Highly Skilled*, Paris.

---------- (2002b), *Trends in International Migration, Annual Report 2002 Edition*, Paris.

---------- (2002c), "STI Outlook 2002 – Chapter 8: International Mobility of Science and Technology Personnel". DSTI/STP (2002)34, July 29, 2002.

---------- (2003), *The Sources of Economic Growth in OECD Countries*, Paris.

---------- (2003b), *OECD Science, Technology and Industry Scoreboard*. OECD 2003 edition, Paris.

---------- (2003c), *Trends in International Migration, Annual Report 2003 Edition*, Paris.

---------- (2004), Counting Immigrants and Expatriates in OECD Countries: A New Perspective, DELSA/ELSA(2004)14.

---------- (2004b), *Benchmarking Innovation Performance and Framework Conditions: Contribution from Denmark and Norway.* DSTI/IND(2004)6.

Reitz, Jeffrey G (2005), "Tapping Immigrants' Skills: New Directions for Canadian Immigration Policy in the Knowledge Economy'. *Choices*, 11(1). Institute for Research on Public Policy.

Sheehan, Jerry (2004), "OECD Science, Technology and Industry Outlook 2004", presented at the OECD Washington Centre, 8 February 2005.

U.S. Citizenship and Immigration Services (US-CIS), *Yearbook of Immigration Statistics*, various years.

Wilson, Gardiner J. (2002), *Strategies to Attract Top International Students and Faculty: A Comparative Study of Select OECD Countries*. A Report prepared by the Canadian Education Centre Network for Industry Canada, Strategic Policy Division, October 9, 2002.

Zhao, John, Doug Drew, and T. Scott Murray (2000), "Brain Drain and Brain Gain: The Migration of Knowledge Workers from and to Canada". *Education Quarterly Review*, 6(3):8-35.