## INTERNATIONAL MOBILITY OF HIGHLY-QUALIFIED PEOPLE IN APEC

Surendra Gera (Industry Canada) Thitima Songsakul (Industry Canada)

November 2004

The paper is previously published in *Realising Innovation and Human Capital Potential in APEC*. November 2004. Economic Committee Publication, APEC Secretariat, Singapore. Views expressed in this paper do not necessarily reflect those of Industry Canada.

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## 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 that the demand for highly-qualified people (HQPs) has increased in all countries. An important aspect of this global knowledge-based economy (KBE) is the emergence of a new trend where segments of the highly-qualified labor 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 HQPs 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 HQPs may well be the by-product of globalization.<sup>1</sup> 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. The swift growth in foreign direct investment (FDI) by multinational enterprises, outstripping the growth in international trade, has increased the demand for managers and technical experts at the foreign subsidiaries. The increased scarcity of HQPs is being reflected worldwide by the higher premium paid for these individuals. Not only is international mobility of HQPs on the rise, so also is the migration of high-skilled jobs. Although outsourcing in manufacturing has been occurring for a long time, a relatively new development is the outsourcing of white-collar skilled jobs, such as basic data entry, telemarketing and claims processing (Mann, 2003; McKinsey Global Institute, 2003).

At the same time, business is becoming increasingly international in its outlook and activities. Doing business in a global world has implications for the mobility of HQPs. Exports of products, technology transfers and R&D investment across operations worldwide require the movements of highly skilled professionals. Seeking ways to draw upon scarce specialized resources, firms are shopping for HQPs across continents. Individuals' attitude to mobility are changing as they become better qualified and increasingly seek opportunities to work internationally to improve their incomes and to work in premier global organizations. More people, particularly those in the younger age groups, regard international mobility to be an important part of their skills and career development.<sup>2</sup>

National policy makers increasingly view nations as competing to attract internationally mobile workers in order to improve their innovation performance through R&D investments, the adoption of advanced technologies and the application of knowledge-intensive processes throughout the economy. Head and Reis (2003) 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

The study was completed by a team led by Dr. Surendra Gera, Senior Policy and Research Advisor, and Dr. Thitima Songsakul, Economist, Micro-Economic Policy Analysis Branch, Industry Canada. The authors would like to thank Dr. Samuel A. Laryea, Senior Economist, Human Resources and Skills Development, Canada for providing assistance on an earlier version of this paper. Thanks are also due to Richard Roy for helpful comments and suggestions and Patrick Taylor for technical research assistance. Views expressed in this study do not necessarily reflect those of Industry Canada nor Human Resources and Skills Development, Canada. Comments may be addressed to Surendra Gera (email: gera.surendra@ic.gc.ca)

<sup>&</sup>lt;sup>1</sup> See, for example, Harris (2003) and European Economic Advisory Group Report (2003), henceforth referred to as EEAG (2003).

<sup>&</sup>lt;sup>2</sup> PriceWaterhouseCoopers (2002). Henceforth, in the rest of the paper, this study is referred to as PWC (2002).

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location decisions of FDI, R&D and skilled professionals are jointly determined: success at attracting one resource draws more of each.

Indeed, evidence suggests that the international mobility of HQPs increased during the 1990s. Data show an increase in migration flows during this period, particularly among temporarily migrating HQPs, from Asia to the US, Canada, Australia, and the UK. The mobility of HQPs is also on the rise among OECD countries but appears dominated by personnel with specialty occupations such as IT specialists, advanced students, researchers and managers. Part of the rise in the international mobility of these individuals is related to deliberate policies by national governments of advanced industrialized countries. Strong demand for information technology (IT) and other technical professionals in advanced APEC economies has been a key driver of reforms toward migration rules easing the movements of HQPs. Harris (2004b) argues that advanced industrialized countries now seek to strategically attract the highly-qualified migrants through adjustment of immigration controls in face of a very large, but highly differentiated, queues 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.

Over many previous years industrial country immigration policies have been attacked as promoting a 'brain drain' from a poor South to a rich North. However, more recently, industrial countries have become alarmed about the migration of their highly-qualified individuals. The 'brain drain' is now an industrial country issue (Harris, 2004b). The emigration of skilled professionals from Canada to the US, for example, has often received particular attention from Canadian media and policymakers, in part because of a periodic concern about a "brain drain". Finnie (2001) estimates that 178,000 people left Canada for the US between 1991 and 1996, 30 percent higher than from 1986-91; permanent emigration increasing by 15 percent and temporary emigration doubling. The most striking change is the increase in the number of Canadians entering the US under TN (Treaty National) visa in the late 1990s, reaching an average of 73,000 entries per year during the 1998-2002 period. While weak business conditions in Canada relative to the US, and special factors in sectors such as health services have played a role in the outflows of Canadians, the increase also reflects the growing economic integration of the North American economies under the FTA and the NAFTA (Globerman, 1999). The globalization of firms has also helped fuel the temporary flows to the US; intra-company transferees in the mid-1990s accounted for 5-10 percent of the total flows of Canadian HQPs to the US (OECD, 2002b).

The traditional view of the international migration of HQPs was the "brain drain" perspective, whereby highly-qualified individuals migrated from poor to rich counties, motivated by expected wage gains in the receiving country. The migration of HQPs in this perspective is largely viewed as a zero-sum game with winners and losers. The benefits of the receiving country being, by and large, equal to the costs born by the sending country. Even in models where there are dynamic externalities associated with human capital, the magnitude of the cost-benefit calculations changes, but the migration of highly-qualified workers is still largely viewed as a zero-sum game for participating economies.

A competing perspective on cross-country movement of highly-qualified individuals—"brain exchange or brain circulation" or "globalization of HQP labour market" perspective—holds that movements of HQPs across countries must be studied in the context of globalization. This perspective argues that segments of the international mobility of highly-qualified individuals are linked to technology transfers, FDI, location of MNEs, and two-way flows of knowledge, ideas and technology among trading countries. The highly talented workers are essentially becoming more globally mobile as goods, services and capital have become more globally mobile over time. According to this perspective, the international mobility of HQPs can generate global benefits by improving knowledge flows and satisfying the demand for highly-qualified individuals where that demand is the strongest. This view suggests that greater HQP mobility may well lead to better long-term economic outcomes among the countries participating in that labour exchange (Wildasin, 2003; Harris, 2003 and 2004a; Harris and Schmitt, 2003).

Harris (2004b) argues that deeper integration between economies (regional or bilateral) through trade and FDI may encourage productivity and income convergence across countries over time,

so it is possible that mobility of HQPs might also have this effect. According to this view, the economic policy discussion surrounding the cross-border movement of HQPs must take into account the wide variety of ways the migration of labour affects the economy. In particular, attention must now turn towards the links between these movements, and the institutions regulating them, and the performance in the trade of goods and services; foreign direct investment; human capital formation and MNE location; and income convergence among countries. Harris argues that labour market integration initiatives within free trade areas may carry large benefits to small economies. Addressing these and related key knowledge gaps is required to develop appropriate policy approaches on the migration of HQPs.

This study discusses the key issues surrounding the international mobility of HQPs, while identifying knowledge gaps and directions for policy-relevant research. The paper focuses on four key issues in each of the subsequent section:

- How mobile is the highly-qualified labor force in APEC?
- What are the fundamental (non-policy) drivers of international mobility of HQPs in the global knowledge-based economy?
- What are the costs and benefits associated with cross-country movement of HQPs, and the main factors conditioning these costs and benefits?
- How policy has adjusted, or should adjust, to increased mobility of HQPs in APEC?

Finally, the summary and conclusions are presented in the last section.

## 1. HOW MOBILE IS THE HIGHLY-QUALIFIED WORK FORCE IN APEC?

Getting a firm grip on the magnitude, direction and the composition of the international flows of HQPs is imperative to inform and fashion appropriate policy responses. The increasing globalization and the importance of knowledge-intensive activities is changing skill needs across all industries, and business is placing higher premiums to access internationally mobile talents. A recent European report points out that international mobility of highly-qualified individuals is becoming increasingly important to business as they are expanding their production and marketing activities globally (PWC, 2002). Additionally, a number of recent empirical and theoretical contributions provide support for the linkages between doing business in a more integrated world and requirements for a highly-qualified labour force.<sup>3</sup>

Our aim in this section is to use data to illustrate how international mobility of HQPs has evolved over recent years. First, we define and identify different forms of HQPs mobility that we consider in our discussion. Second, we document trends of recent migratory flows of HQPs in APEC – magnitude, direction, and the nature (temporary versus permanent) of recent aggregate flows and their composition in terms of underlying education/skills. We examine these trends at three different levels: global patterns of HQPs mobility; patterns of HQP mobility in APEC; and the patterns of HQP mobility in the integrated labor market economies such as Canada and the US; Australian and New Zealand and the European Union (EU).

## 1.1 Defining HQPs Mobility

In this study, HQPs are defined as those individuals who are engaged in knowledge-intensive professions such as physicians, nurses, science and technology (S&T) workers, engineers,

<sup>&</sup>lt;sup>3</sup> See, for example, Harris and Schmitt (2003) and Globerman (2001).

information technology (IT) specialists, graduate and post-doctoral students, scholars and researchers, and high-level administrators and managers.<sup>4</sup>

International mobility of HQPs is multi-dimensional. The PWC report (2002) for the European Community argues that it can take many different forms depending upon whether it is motivated by an employer or an individual and whether it is temporary (i.e. lasts for a few months) or permanent (lasts for several years). <sup>5</sup> In the subsequent discussion, we document the following forms of HQP mobility:

- The 'traditional' permanent migration highly-qualified individuals move on a permanent basis from one country to another
- Temporary migration of HQPs such as admissions to the US based on H-1B visa, and TN visa;
- Intra-company transferees generally associated with MNEs
- Foreign students at higher educational levels and temporary visiting scholars and researchers.

## 1.2 International Mobility of HQPs: Global Trends

The readily available data on the global mobility of HQPs is rather limited. Most of the data measures only inflows to the advanced APEC/OECD economies and, as such, provides only an incomplete story of the international mobility of HQPs.

The data show that HQP migration, especially from Asia to major OECD/APEC economies, rose substantially during the 1990s (OECD, 2002b). Furthermore, the increase in HQP migration among APEC/OECD economies was characterized by temporary inflows as opposed to permanent inflows (Guellec and Cervantes, 2002). International mobility of HQPs is also on the rise amongst APEC economies. Table 1.1 shows that APEC economies such as the US, Japan, New Zealand, Canada, and Australia have been major recipients of temporary inflows of HQPs.

		Permanent ('000)	Temporary ('000)
Canada <sup>a</sup>	1998	81.2	38.0
	2001	137.1	49.9
	2002	123.3	41.5
United States <sup>b</sup>	1998	63.5	754.2
	2001	165.8	1,148.0
	2002	163.5	1,083.5

Table 1.1	'Permanent'	and 'Temporar	y' Inflows of HOPs	Selected APEC Economies
	Fermanent	and remporar	y 111110ws 01 nwrs,	Selected AFEC Economies

<sup>&</sup>lt;sup>4</sup> This definition is broader than the definition suggested in the "Canberra Manual" (prepared by OECD's Group of National Experts in Science and Technology Indicators). The Canberra manual defines skilled human resources in science and technology (HRST) as personnel with a tertiary education level in science and technology study or currently employed in a S&T occupation. See OECD (2002c).

<sup>&</sup>lt;sup>5</sup>The PWC (2002) report identifies eight key types of worker mobility from the business perspective in the EU. Some notable new forms of recent worker mobility include the cross-border commuter, whereby an employee commutes from their home to a place of work in another country (on a weekly or bi-weekly basis); the rotational assignee in which an employee commutes from their home country to work in another country for a few months without changing their home; a virtual assignee who assumes business responsibilities which span several countries and works as part of a team located in several countries but does not need to relocate: a virtual assignment often involves extensive business travel to work with colleagues and supported by ICTs; and teleworking whereby an employee, supported by ICTs, works from any location, especially his or her home.

Australia <sup>c</sup>	2000/1	43.4	37.0
	2002/3	56.8	43.0
Japan <sup>d</sup>	1996	n.a.	191.0
	1999	n.a.	240.9
Korea <sup>e</sup>	1996	n.a.	13.4
	1999	n.a.	12.6
New Zealand <sup>f</sup>	2000	5.0	49.2*
	2003	7.8	85.6*

Notes:

- (a) Permanent flow to Canada shows the number of skilled immigrants admitted under the skilled focus program, principals and dependents. Temporary workers are movers with managerial, professional, and technical skilled levels. Source: CIC (Facts and Figures, various years)
- (b) 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). Temporary inflow is in terms of admissions, not persons, under the following visa arrangements: NAFTA-TN, H-1B, Exchange visitors (J1), and intra-company transferees (L1). Source: US-CIS (Statistical Yearbook, various years)
- (c) Australian data on permanent flow reflect the number of people admitted under the skilled migration program. Temporary numbers are in terms of persons admitted under long-stay business visas for skilled workers (3 months to 4 years), and independent executive visas, excluding New Zealand citizens. Source: Population Flows: Immigration Aspects, DIMIA (2004)
- (d) Figures include 12 temporary visa occupation categories associated with high-skilled workers (entries). Source: NSF (2002), Science and Engineering Indicators
- (e) Source: OECD (2001a) Trends in International Migration, Table 1.2
- (f) Skilled permanent-migrants are those with administrative, managerial, and professionals occupations. \*Temporary data refer to the number of work permits and work visas issued to unskilled and skilled workers. Source: New Zealand Tourism and Migration (2000, 2003)

We use three additional indicators to gauge the extent of international mobility of HQPs in the APEC/OECD area.

The first relates to scientists and engineers in the US with a doctorate qualification, who are not US citizens. Chart 1.1 shows the number of non-US OECD/APEC citizens with science and engineering (S&E) doctorates in the US. The data shows that the largest number of foreign-born scientists and engineers come from the UK and Canada; relatively few are from Germany and Japan (OECD, STI Scorecard 2003b). The report points out that if non-OECD countries are taken into account, there are three times as many foreign-born scientists from China and twice as many from India as from the UK. The corresponding shares of foreign-born women scientists vary greatly across countries.<sup>6</sup>

The second indicator looks at the international mobility of PhD student as an indicator of internationalization of both higher education sector and the research system (OECD, STI Scoreboard 2003b). The available data shows that the US has the highest number of foreign PhD students among the APEC/OECD economies (about 79,000), followed by the UK with some 25,000. European students represent 19 percent of foreign PhD students enrolled in Canadian universities. These shares reach 50 percent in Austria and 77 percent in Switzerland (Chart 1.2).

The third indicator shows the movement of intra-company transferees among selected APEC/OECD economies. Temporary migration of intra-company transferees increased sharply in the US as compared to other OECD countries (Table 1.2). These movements are usually for short periods, but may be for several months or reoccur at frequent intervals. Intra-company transferees in the US (L-1 visas) virtually tripled in magnitude between 1995 and 2002. It increased from 112,100 in 1995 to 313,699 in 2002.

<sup>&</sup>lt;sup>6</sup> The OECD, STI Scoreboard 2003 notes two important points. First, internationally comparable data on international flows of scientists and researchers are extremely scarce; and second, the available data only covers inflows and thus provides only part of the picture of international mobility.

## Table 1.2 Intra-Company Transferees in Selected APEC/OECD Economies, 1995–1999

Thousands					
	1995	1996	1997	1998	1999
Canada <sup>a</sup>	na	na	2.1	2.8	2.9
France	0.8	0.8	1.0	1.1	1.8
Japan	3.1	2.8	3.4	3.5	3.8
Netherlands	Na	1.6	2.3	2.7	2.5
United Kingdom	14.1	13.0	18.0	22.0	15.0
United States (visa L-1)	112.1	140.5	na	203.3	234.4

a) Including Mexican and American intra-company transferees entering under NAFTA. Source: OECD-DSTI/STP (2002b)



## Chart 1.1 Non-US APEC/OECD Citizens with S&E Doctorates in the US, 1999

Source: OECD, based on data from National Science Foundation/SRS, SESTAT database, May 2003.



Chart 1.2 Distribution of Foreign PhD students in APEC/OECD Economies, 2000

## Recent Patterns of HQP Mobility within the EU

The data that measures the flows of workers between EU countries on a consistent basis is not available. The available data rather focuses on the share of foreign-born work force. A recent report by PWC (2002) notes that historically, the level of worker mobility in the EU has been low compared to that in the US; and the rate of migration has changed little during the 1990s. Based on the estimates by the European Commission, the PWC report (2002) notes that the annual mobility of EU nationals within the EU is less than 0.4 percent of the resident population (some 1.5 million people) whereas in the US it is about six times greater.

Chart 1.3 shows the share of foreign-born workers in the labor force of the European economies. The relative shares are higher in Luxembourg, Austria and Germany and lower in Spain and Italy. The chart also shows that mobile EU citizens (from other Member States) are more important in Luxembourg, Belgium and Ireland and least important in Greece and Italy.

The PWC (2002) report argues that the way in which these data are collected excludes workers on short-term assignments. Their survey of business firms' expatriate staff suggests that there has been an overall increase in mobility of workers within organizations, and, more importantly, the relative importance of virtual and short-term assignments has increased most significantly (Chart 1.4).<sup>7</sup>

<sup>&</sup>lt;sup>7</sup> The PWC report (2002) defines a virtual assignee "who assumes business responsibilities which span several countries and works as part of a team located in several countries but does not need to relocate: a virtual assignment often involves extensive business travel to work with colleagues (rather than to develop new client or supplier relationships) and is supported by wide use of ICTs".



Chart 1.3 Size and Composition of Foreign Labor Force in the EU, 1998

Source: PricewatershouseCoopers (2002) based on OECD data and OECD Employment Outlook (2001)



Chart 1.4 Changes in International Assignment Type over the Last Two Years

Source: PricewaterhouseCoopers, IAS Survey 1999/2000

## 1.3 International Mobility of HQPs in APEC

## Experience of the Selected APEC Economies: United States

## Inflows of HQPs: Temporary Migrants

The US is the main destination for internationally mobile HQPs. A strong demand by US technology-intensive firms in service-related occupations such as architecture, engineering, surveying and computer-related occupations and the demand by universities for academic faculty and researchers led to increased temporary inflows of HQPs into the US. The data shows that in fiscal year 2002, there were 1.1 million entries of HQPs to the US (the US Citizenship and Immigration Services; US-CIS). The main source of temporary HQP migrants have been APEC economies such as Canada, Mexico, Japan, China, Chinese Taipei and Australia, and non-APEC economies including the UK, India, Germany, France and Brazil. APEC economies (other than the US) contributed 33.3 percent of temporary HQP migrants to the US. Europe, however, has been the main contributor of temporary HQP migrants to the US (43 percent), followed by Asia (26 percent), and North America (Canada and Mexico, together 15 percent).

Chart 1.5 shows top source countries for HQPs admitted on temporary visas into the US for the fiscal year 2002 by country of citizenship. These include H-1B temporary HQPs with specialty occupations such as computer scientists, engineers; exchange visitors including researchers and professors (J1); intra-company transferees (L1); individuals with extraordinary ability or achievement (O1); and NAFTA workers (TN). Canada and the UK are the top two source countries of HQP inflows to the US, followed by India. More than half of HQPs inflows from Canada are via the NAFTA-TN channel, whereas about half of HQPs from the UK enter as intra-company transferees. For India, most of HQP entrants are under H-1B visas.



Chart 1.5 Temporary Inflows of HQPs into the US by Visa Type, Fiscal Year 2002

Note: H-1B visa is for workers with specialty occupations, J1 refers to exchange visitors' visas, L1 is for intracompany transferees, O1 visas are for individuals with extraordinary ability or achievement, and NAFTA workers are admitted under TN. The data are in terms of entries and exclude dependents. *Source: US-CIS, 2002 Yearbook of Immigration Statistics* 

In 2002, three APEC economies—Canada, Japan, and Mexico—were the biggest contributors of HQP inflows into the US; they together made up almost 60 percent of HQP entrants from APEC economies (Table 1.3). Other main sending APEC economies were China and Chinese Taipei, Australia, Korea, and Russia; each contributing more than 20,000 entrants.

		Workers with			Workers with	
Economy	Total	Specialty Occupations H-1B	Exchangeli Visitors J1	ntra-company Transferees L1	extraordinary ability O1	NAFTA-TN visa
Canada	120 190	19 866	6 748	20 320	1 378	71 878
lanan	57 756	13,000	12 684	31 044	741	
Mexico China and Chinese	40,534	15,867	6,894	15,283	669	1,821
Taipei	30,487	15,838	9,795	4,572	282	-
Australia	26,286	7,761	7,990	9,323	1,212	-
Korea	22,947	8,000	9,951	4,769	227	-
Russia	21,506	4,560	15,605	829	512	-
The Philippines	9,110	5,509	1,333	2,077	191	-
New Zealand	7,192	1,980	2,935	2,014	263	-
Peru	6,924	2,990	2,351	1,392	191	-
Chile	5,718	1,978	1,488	2,096	156	-
Thailand	5,476	1,671	3,365	382	58	-
Malaysia	4,908	2,479	871	1,533	25	-
Singapore	4,092	1,938	651	1,468	35	-
Hong Kong,China	2,910	2,005	497	364	44	-
Indonesia	2,514	1,488	591	409	26	-
Viet Nam	917	96	744	77	-	-
Brunei	32	13	6	13	-	-
Papua New Guinea	12	1	8	3	-	-
Total APEC percent of all nations	369,511 33.3 percent	107,327	84,507	97,968	6,010	73,699

# Table 1.3 Temporary Inflows of HQP Migrants from APEC Economies into the US by Visa Type, Fiscal Year 2002

Source: US-CIS, 2002 Yearbook of Immigration Statistics, Table 27

Chart 1.6 shows the trend in inflows of temporary HQPs to the US over the period of 1989 to 2002. The admissions on H-1B and intra-company transferee visas increased sharply in the last five years while the NAFTA-TN and exchange visitors' visas also rose, albeit with a relatively slower pace. In all categories, the entrants declined in 2002 mainly due to the impact of the September-11 incident.<sup>8</sup>

<sup>&</sup>lt;sup>8</sup> The impact of the shock is clearly acknowledged in the 2002 Yearbook of Immigration Statistics.



## Chart 1.6 Trend in Temporary Inflows of HQP Migrants into the US by Visa Type, 1989–2002

Source: US-CIS, 2002 Yearbook of Immigration Statistics

## Profile of H-1B entrants

The admissions on H-1B visas increased sharply from 144,458 in 1997 to 370,490 in 2002, at a growth rate of 23 percent per annum (Chart 1.6). Under the H-1B program, foreign professionals are permitted to work in their field of expertise for as long as three years initially, with extensions not exceeding three years. H-1B petitions must be submitted by domestic employers and their representatives on behalf of non-immigrant workers seeking temporary employment in the US. The maximum stay is six years. Specialty occupations include computer systems analysts and programmers, physicians, professors, engineers, and accountants.

In the fiscal year 2002, there were 197,537 petitions approved (the number exceeds the number of individual workers because of possible multiple petitions). Tables 1.4 and 1.5 show the profiles of H-1B entrants. The typical H-1B beneficiary had the following characteristics: born in India; 30 years old; holding a bachelor's degree; working in a computer-related occupation; and receiving an annual compensation of US\$53,000.

Country of birth	No. of	Median	Median	Bachelor	Master	Computer
	approved	Age	Income	degree or	degree or	related
	petitions	(years)	(dollars)	higher	higher	occupation
				(percent)	(percent)	(percent)
All countries	197,537	30	53,000	98	48	38
India	64,980	29	60,000	99	43	73
China (PRC)	18,841	32	48,000	100	85	28
Canada	11,760	34	70,000	94	39	24
The Philippines	9,295	32	38,000	99	15	17
United Kingdom	7,171	33	68,000	92	36	17
Korea	5,941	34	42,000	98	59	14
Japan	4,937	31	38,000	97	37	9
Chinese Taipei	4,025	31	42,000	99	71	24
Pakistan	3,810	31	50,000	99	50	39
Colombia	3,320	32	38,000	98	29	9

## Table 1.4 Profile of H-1B Beneficiaries by Country of Birth Top 10, FY2002

Source: US-CIS, 2002 Yearbook of Immigration Statistics

Country of birth	No. of	Median	Median	Master	Leading
	approved	age	Income	degree or	Country of
	petitions	(vears)	(dollars)	higher	birth (percent)
	•	0,	( <i>'</i>	(percent)	
All occupations	197,537	30	53,000	48	India (33)
Computer-related	75,114	29	60,000	38	India (63)
Architecture, engineering, And surveying	25,197	31	57,000	48	India (23)
Administrative specializations	21,103	30	41,000	34	India (13)
Education	20,613	34	36,000	75	PRC (17)
Medicine and health	12,920	32	46,000	68	India (20)
Managers and officials	10.610	33	59.000	34	India (11)
Life sciences	6.910	33	38,000	85	PRC (28)
Social sciences	5.547	29	44.000	42	India (13)
Mathematics and physical Sciences	5,443	32	55,000	80	PRC (26)
Miscellaneous professional, Technical, and managerial	4,940	30	53,000	48	India (14)

#### Table 1.5 Profile of H-1B Beneficiaries by Occupation, FY2002

Source: US-CIS, 2002 Yearbook of Immigration Statistics

#### Inflows of HQPs: Permanent Migrants

The discussion in this section considers only the "employment-based preference immigrants" and ignores other categories such as family-sponsored and diversity programs.<sup>9</sup> In particular, the discussion focuses on HQPs such as the priority highly-qualified individuals including people with extraordinary ability, outstanding professors or researchers, and multinational executives or managers (Class 1); professionals with advanced degrees or with exceptional ability (Class 2);

<sup>&</sup>lt;sup>9</sup> There are five classes under the employment-based program: priority highly-qualified individuals including people with extraordinary ability, outstanding professors or researchers, and multinational executives or managers; professionals with advanced degrees or with exceptional ability; skilled workers and professionals (without advanced degrees) and needed unskilled workers; special immigrants (e.g. religious workers, foreign employees of the US government); employment creation immigrants or "investors".

and skilled workers and professionals with bachelor degrees (part of Class 3). During the years 2000 and 2002, on average, 140,000 HQPs immigrated to the US under these categories (Table 1.6).

In terms of the source countries, Asia contributed more than 60 percent of *all* employment-based immigrants to the US in FY 2002, followed by Europe (15 percent). The leading countries were India (24.5 percent), China (11.8 percent), The Philippines (7.2 percent), Canada (5.4 percent), Korea (5.3 percent), The UK (4.3 percent), and Mexico (4.3 percent).

	FY2002	FY2001	FY2000
Class 1	34,452	41,810	27,706
Class 2	44,468	42,620	20,304
Class 3 Subclass- Skilled and Professionals	84,574	81,363	45,167

\* persons, including dependents

Source: US-CIS, Yearbooks of Immigration Statistics, various years

Of all the permanent immigrants to the US in the year 2002, more than 45 percent of those who had jobs were in the professional and executive occupation groups (US-CIS, 2002). Guellec and Cervantes (2002) make two interesting observations. First, while the temporary migration of HQPs into the US increased in the latter part of 1990s, the permanent migration of engineers and computer scientists to the US has decreased substantially since 1992. Second, at the same time there is a surge in inflows of skilled migrants in occupations such as physicians, nurses, and health-related technicians.

## Experience of the Selected APEC Economies: Canada

Although the U.S. is the major beneficiary and destination of global highly-qualified migrants, Canada is also a major recipient of HQPs from the rest of the world. The migration of HQPs into Canada occurs primarily through three distinct but related channels—permanent immigrants admitted under the skilled-focused program, temporary migrants with work permit visas<sup>10</sup> and foreign students in tertiary educational institutions.

The economic principal applicants constitute the bulk of the international highly-qualified migrants to Canada (permanent migrants), because they are selected on the basis of their labor market attributes through the points system. They include highly-qualified individuals and business immigrants.<sup>11</sup> In 2002, 123,379 people were granted skilled-worker immigration and 11,041 people admitted as business immigrants (CIC, 2002). Together they account for more than 60 percent of the total inflow of permanent immigrants admitted in the year. The annual growth rate of skilled immigrants over the period 1998-2002 is about 10 percent, higher than the overall growth of permanent immigration (8 percent).

Data on the profile of skilled immigrants show that the majority of them are highly educated and at their prime working age. In 2002, the skilled immigrant category includes principal applicants (44 percent) and their dependants (56 percent). For principal applicants, 83 percent have a bachelor's degree or above (25 percent with master and/or doctoral degrees). This remarkable increase in

<sup>&</sup>lt;sup>10</sup> Note that persons visiting Canada under short-term business arrangements are not included as part of national employment, but may reflect a small part of temporary movement of high-skilled workers.

<sup>&</sup>lt;sup>11</sup> These also include individuals nominated by the provinces and fast tracked through the system to meet urgent labour market shortages within that province.

education attainment of permanent immigrants to Canada reflects a response to structural shift in demand for higher skills. In addition, more than half of their adult dependants (15 years and older) hold at least a bachelor's degree. In terms of language ability, more than 85 percent of the principal applicants can speak English or French or both, while 56 percent of their dependents cannot speak either of the Canadian official languages. About 60 percent of all skilled immigrants are 25–44 years old. Seventy-five percent of principal applicants are male while 63 percent of dependents are female.

Skilled immigrants into Canada are also classified by 'occupational skill levels' according to their previous employment (which can be different from their actual jobs when they settle in Canada). In 2002, more than 80 percent of skilled immigrants were holding managerial, professional, skilled and technical jobs<sup>12</sup> prior to their landing. More than 55 percent of these skilled immigrants were professionals.

The majority of immigrants to Canada in the last decade came from Asia. For several years, China has been the leading source country of immigrants admitted under the skilled-focus program to Canada, accounting for over 20,000 or 16 percent of the total immigrants in 2002. During the same year, the second, third and fourth largest source countries were India (11 percent), Pakistan (7 percent) and the Philippines (5 percent).

The second source of HQP migrants into Canada includes temporary foreign workers. Temporary foreign workers are in Canada primarily to work, although they may have other permits or authorizations (including NAFTA-TN professional work visa). Temporary inflows of HQPs include workers with professional, executive, and technical skill levels. An annual average of 48,000 HQPs were admitted during 1999–2002, out of which 70 percent are with exceptional skills (i.e. executives and professionals). In contrast to the surge in permanent inflow as described above, the number of temporary inflow of HQPs has been fluctuating in the last couple of years. According to the CIC record, there were 46,063 foreign skilled professionals admitted to work in Canada in 1999. The number increased to 52,446 in 2000, before reducing to 41,488 in 2002. The main source countries in 2002 were the NAFTA partners – the US (23 percent) and Mexico (13 percent) – and the UK (7 percent) and Australia (6 percent) in 2002. Over 70 percent of temporary workers are male.

Thirdly, student migration constitutes a significant part of international mobility.<sup>13</sup> As one of the main players in globalization of education services, Canada receives substantial number of foreign students. Their number has risen substantially in recent years, more than doubling between 1995 and 2001. In 1999, there were about 25,000 foreign students admitted to Canadian universities and colleges (for post-secondary education); the number rose to 29,000 in the year 2000 then levelled to approximately 36,000 in the two subsequent years (CIC, various years). The leading source countries were Korea (20 percent), China (17 percent), Japan (8 percent), and the US (6 percent). In the international arena, 80 percent of all foreign students for higher education study are in the US, the UK, Germany, France and Australia. The number of foreign students per 1000 students enrolled in Canada is 27.9, considerably lower than the OECD weighted mean (37.1). The respective numbers are, 32.4 in the US, 73 in France, and 125.9 in Australia, and 12.4 in Italy (Tremblay, 2002).

#### Canada-US patterns of HQP mobility

Canada is heavily integrated with the US on both the trade and investment front. Moreover, Canada-US labor markets are integrated to a great extent for a sub-set of the labour force. The issue of measuring the migration of HQP in the North American context will continue to be important in the near future. An improved understanding of the magnitude, direction and the composition of the migratory flows between Canada and the US is essential to estimate the longer-term cross-border mobility trends of HQPs.

<sup>&</sup>lt;sup>12</sup> Levels O, A, and B according to the Canadian National Occupational Classification (NOC) system

<sup>&</sup>lt;sup>13</sup> Tremblay (2002) argues that student migration to higher education can be a precursor of subsequent migration of qualified workers particularly in the field of science and technology.

In terms of inflows from the US to Canada, on average, about 5,400 permanent migrants entered every year into Canada over the 1997–2002 period (Table 1.7). However, the inflows of skilled permanent (principal) migrants were quite insignificant - less than a thousand people per year. In comparison, the total temporary inflows from the US have been quite significant over this period – on average, about 23,000 people per year. Temporary inflows of HQPs from the US, on average, are around 20,000 per year. This comprises both NAFTA-TN workers and the non-NAFTA workers in managerial, professional and technical skills categories.<sup>14</sup>

The outflow of highly-qualified professionals from Canada to the US has always been of great interest to Canadian policy makers, particularly because of periodic concerns over brain drain. Data quality is one of the main problems in estimating outflows from Canada. In recent years, a number of efforts have been made to improve these estimates. Statistically Canada has employed three different data sources to provide estimates of the magnitude of the total outflows of HQPs from Canada. These include personal income tax data, the Canadian Census Reverse Record Check (RRC) and the US Current Population

Year	Temporary Inflows <sup>a</sup>					Permar	nent Inflows <sup>b</sup>
	From all	countries		From the US		Fron	n the US
	Total	Skilled	Total US	NAFTA Skilled	non-NAFTA Skilled	Total	Skilled (principal)
1997	75,452	na	23,453	8,194	11,971	5,043	764
1998	79,788	na	23,760	9,073	11,322	4,773	680
1999	85,932	46,063	23,751	7,921	12,368	5,528	712
2000	94,893	52,446	26,407	8,752	13,819	5,815	692
2001	95,555	49,945	23,227	8,080	11,959	5,902	658
2002	87,910	41,488	19,700	6,923	9,766	5,288	556
Average	86,588	47,960	23,383	8,157	11,868	5,392	677

Table 1.7 Inflows of HQPs from the US to Canada, 1997–2002

(a) Numbers of foreign workers are in terms of persons. Skilled workers from all countries are temporary workers with managerial, professional and technical skill levels (i.e., Levels O, A, and B). Temporary inflows from the US, are workers with American citizenship. Skilled workers from the US are NAFTA-TN workers and non-NAFTA workers in skill categories O, A, and B (source: CIC unpublished data).

(b) Total numbers include all skilled levels. Skilled permanent immigrants are principal applicants admitted under the skilled focus program. Source: CIC, various years

Using sample data from the Canadian census (RRC), Zhao, et al (2000) estimate that half of all permanent emigrants and a third of all temporary emigrants chose to move to the US during the period 1986–91 and 1991–96.<sup>15</sup> Similarly, Finnie (2001) estimates that 178,000 people left Canada for the US between 1991 and 1996, 30 percent higher compared to the 1986-91 period; permanent emigration increasing by 15 percent and temporary emigration doubling. Furthermore, Finnie (2001) and Zhao, et al (2000) estimate that the annual emigration to the US in the 1990s was in the 22,000 -35,000 range, or approximately 0.1 percent of the Canadian population.<sup>16</sup> Helliwell (1999), using the US Current Population Survey (CPS) for the years up to 1998, concludes that there is little evidence of a surge in the *net* outflow of Canadians during the 1990s. In fact, both Finnie and Helliwell conclude that there is little evidence of a substantial outflow of Canadian workers to the US through most of the 1990s.

<sup>&</sup>lt;sup>14</sup> The number somewhat understates the amount of skilled workers due to the fact that almost 10% of temporary workers from the US did not declare their skill levels.

<sup>&</sup>lt;sup>15</sup> Similar trends in the outflow of skilled migrants to the US can also be observed for countries such as Germany, the United Kingdom and France (See Guellec and Cervantes, 2001).

<sup>&</sup>lt;sup>16</sup> Interestingly enough, while the share of migration to the US has remained approximately constant between 1986-91 and 1991-96, temporary emigration to other countries has risen just as fast as that to the US in the 1990s. Canadian emigration flows (both temporary and permanent) have shifted from Europe towards Asia in the past decade.

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. McHale's key findings are: (1) by 2002, the stock of Canadians resident in the US approached 935,000 which represented approximately 400,000 or an 80 percent increase in 5 years (1997-2002); (2) the *net* annual outflow to the US appears to be around 50,000 per year; and (3) more importantly, between 1997 and 2002, 116,000 more university trained Canadians aged 25–64 moved to the US, which represented an average outflow of 23,000 annually during the period.

We also look at the outflow data that comes from the US Citizenship and Immigration Services (US-CIS). Chart 1.7 below shows the quantitative importance of the permanent and temporary emigration of skilled Canadians to the US during the period of 1997-2002. The number of Canadians granted permanent residency in the US has been small despite sharp increases in 2000 and 2001. In contrast, the temporary outflow of highly-qualified Canadians is relatively large and has been sharply on the rise during 1997–2002, with a striking rate of 26.6 percent per annum.

The trend illustrated in Chart 1.7 appears consistent with CPS data reported by McHale.<sup>17</sup> A significant part of the recent increase in emigration is accounted for by temporary migrants (i.e. intra-company transfers, NAFTA-TN visa holders, H-1B visa holders and exchange visitors). Table 1.8 shows temporary flows of Canadians to the US under these temporary visa arrangements. An important change is the increase in the number of Canadians entering the US using the TN visa in the late 1990s. Between 1998 and 2002, the average number of TN visa admissions to the US was around 73,000. The temporary outflow of HQPs drops in 2002, part of an overall decline in the migratory flows to the US during this year due to the external shock of the September 11 event.

Intra-company transferees have also been rising rapidly. The other major group of professionals entering the south is under the H-1B program – a nonimmigrant visa issued to foreign professionals in occupations such as computer system analysts and programmers, physicians, professors, engineers, and accountants. The annual flow is smaller in magnitude (about 11,000 annually) than the flow under NAFTA-TN but grew fastest at the rate of 38 percent per annum during the same period (Table 1.8).

The evidence presented above shows that out-migration of highly-qualified Canadians to the US increased in the 1990s and sharply so since 1997. Clearly, there appears to be an upward trend, and a steep one.

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

# Table 1.8 Entries of Canadian-born to the US on Temporary Basis, Selected Classes, 1997–2002

Source: US-CIS, various years

<sup>&</sup>lt;sup>17</sup> McHale's study is drawn from stock data while US-CIS data reports annual flows. The unit of temporary flows is in terms of entries, therefore, it is difficult to compare the figures from US-CIS and McHale's numbers literally. Nevertheless, both sources indicate that there has been a surge of outflows of Canadians to the US in recent years.



Chart 1.7 Outflows of HQPs from Canada to the US, 1997-2002

Note: Permanent outflows to the US are Canadian-born emigrants with professional and executive skills, principals (exclude dependents). Temporary flows are in terms of admissions (entries) of Canadian-born working in the US under the following visa arrangements: TN, H-1B, intra-company transferees, and exchange visitors.

Source: US- CIS, various years.

#### The Composition of the Outflows from Canada to the US

First we look at the composition of such migrants in terms of skill levels. Table 1.9 shows that Canadian emigrants to the US have always had above-average education levels relative to those who stayed home (Card, 2003). Card's analysis shows 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, PhD, 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.<sup>18</sup>

Frank and Belair (1999) report that a survey of 1995 Canadian university graduates found that 1.5 percent of the respondents were residing in the US by 1997, which is fairly consistent with the proportion of Canadians living there. The figure for PhD graduates in the same survey was even much higher – 12 percent of them were living in the US by 1998.<sup>19</sup>

Secondly, in terms of income, the estimates from Zhao, et al (2000) and Finnie (2001) show that Canadian tax filers who moved to other countries, including the US, are more likely to be high-income earners. To illustrate, almost 1 percent of 1995 tax filers who earned \$150,000 or more ceased to reside in Canada in 1996. The fractions are smaller for the lower income earners.

Lastly, the evidence on occupational profile shows that in 1996-97, permanent outflows to the US tend to be concentrated in certain knowledge-intensive professions (Table 1.10). Emigrants in professions such as physicians, nurses, natural scientists and engineers had higher-than-average emigration rates. In particular, for physicians and nurses, the number of permanent emigrants to

<sup>&</sup>lt;sup>18</sup> The data shows the distribution of measured educational levels among emigrants and misses a potentially important dimension of skill, that is unmeasured ability. The loss of human capital would be underestimated if, at any given education level, those who migrate from Canada have a higher ability than others. Card (2003) notes that the issue of unobserved skill differences is complex, and ultimately difficult to resolve.

<sup>&</sup>lt;sup>19</sup> Helliwell (2001) makes some interesting observations on inflows and outflows of PhDs from Canada. He argues that the high numbers of exiting PhDs reflect most of all the global reach of the recruiting for PhD programs.

the US exceeded the number of such immigrants to Canada from all countries (OECD, 2003a). The higher emigration rates of these medical professionals were probably related to the health spending cutbacks enacted by most provinces in those years. Barrett (2001) argues that for physicians, the outflow seems to have abated toward the end of the decade.

	Canadian	s in US.	Canadians in Canada		
	Women	Men	Women	Men	
1940	3.3	5.8	2.0(est.)	3.0	
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	

#### Table 1.9 Outflows of HQPs: Percentage Canadians with a University Degree

\* percent with advanced degree

Source: Card (2003)

#### Table 1.10 Emigration to the US and Total Immigration, Selected Professions

Annual avera	ages, in percent of 1996 labour force by occupation					
	Emigration to the United States <sup>1</sup>			Immigration (total) <sup>1</sup>		
	1986-89	1990-95	1996-97	1986-89	1990-95	1996-97
Physicians	0.25	0.45	0.78	0.69	0.70	0.51
Nurses	0.13	0.31	0.33	0.34	0.39	0.16
Teachers – post-secondary	0.13	0.17	0.13	0.38	0.49	0.35
Teachers – except post-secondary	0.06	0.07	0.06	0.25	0.32	0.23
Computer scientists	0.06	0.08	0.07	0.55	1.53	4.11
Engineers	0.27	0.31	0.27	1.01	2.11	5.21
Natural Scientists	0.22	0.30	0.39	1.28	2.32	6.49
Managers	0.09	0.13	0.12	0.44	0.56	0.70
All other occupations <sup>2</sup>	0.06	0.05	0.03	1.23	0.92	0.72
All occupations	0.07	0.08	0.06	1.06	0.86	0.80

1. Permanent migration

2. Includes cases where occupation was not identified

Source: OECD Economic Surveys: Canada (2003)

One obvious question would be whether the patterns of HQP migration across countries different much compared to those within a national labour market such as the US or Canada? What is the historical perspective of HQP migration in an integrated labour market such as the European Union and Australia?

#### Experience of the Selected APEC Economies: Australia

In post-war Australia permanent immigration has clearly been the dominant thinking and policy regarding international migration. However, in the increasingly knowledge-based Australian economy, internationalization of labor markets and globalization forces more generally, there has been a major shift in policy towards recruitment of HQPs with particular occupational skills, outstanding talents or business skills via temporary entry programs (Hugo, 2002).

## Inflows of HQPs: Temporary Migrants

Temporary residents in Australia include persons approved for non-permanent entry, e.g. top managers, executives, specialists and technical workers, diplomats, business persons, working holiday makers, occupational trainees, entertainers, etc. Their stay is usually longer than three months but not more than four years. In this section, we focus on the "long-stay business" entry, which can be considered "highly skilled". These people include independent executives, intracompany transferees, and professionals.

The business long stay categories include managers and skilled specialists who are sponsored by their companies to work in Australia. These skilled temporary residents must satisfy the requirement for minimum skill and salary levels they receive in Australia. Table 1.11 shows that there were on average about 35,000 persons granted long-stay temporary business visas each year. Major occupation groups are professionals (64 percent), managers and administrators (14 percent), and associate professionals (12 percent). The top five source countries were the UK (31 percent), India (10 percent), the US (8 percent), Japan (6 percent), and South Africa (6 percent). In terms of stock of business long stay residents, there were 56,000 persons as of June 30, 2003. The median duration of long stay business entrants was just over six months. The median age was 30 years.

An independent executive stream of business long stay visa is a non-sponsored visa that enables a person to enter for the purpose of establishing or buying into a business and managing that business. In 2001–02, more than 4,000 independent executive visas were granted. The number increased to almost 5,000 in 2002–03.

#### Table 1.11 Annual flows of Visas Granted for Long Stay Business and Independent Executives

	2000–01	2001–02	2002–03	
a) Long-stay business	37,000	34,000	38,000	
b) Independent Executives	na	4,093	4,943	

Note: that there are occupation-specific visa classes for medical practitioners -2,496 principal applicants in 2002-03, a 30 percent increase over 2001–02. For academics and researchers in educational or research institutions, 1,315 visas were granted in 2002–03, down from 1,819 in the previous year. However, this stream of entry was recently reclassified as subclasses of long-stay business visas in the new legislation introduced in March 2003.

Source: a) Figure 5-23 Long stay temporary business grants, b) numbers given on p.64, from Population Flows: Immigration Aspects, Department of Immigration and Multicultural and Indigenous Affairs, March 2004.

In terms of overseas students in Australia, there were 162,575 visas granted to overseas students in 2002–2003 (a 7 percent increase from 151,894 in 2001–2002). Of these, 32 percent enrolled for higher education and 19 percent went for master and doctorate degrees. The top source economies were China (13 percent), the US (10 percent), Malaysia (7 percent), Korea (7 percent), and Hong Kong, China (6 percent). The stock of overseas students as of 30 June 2003 was almost 73,000.

#### Inflows of HQPs: Permanent Migrants

The majority of skilled migrants who immigrated to Australia were those admitted under the skill program – a points system based on skill evaluation. The skill program is specifically designed to target migrants who have skills or outstanding abilities that will contribute to the Australian economy (DIMIA, 2004). In the fiscal year 2000, there were about 43,000 skilled migrants. The skilled inflows continued to increase to above 57,000 in 2002 (see Table 1.12). Among these people, almost 30 percent of them are considered high-skilled professionals. They consist of

people who were employed as managers, administrators, and professionals. The top three sending countries were the UK, India, and South Africa.

In addition to the skill stream, skilled migrants can enter and settle in Australia via the family migration. During 2000–2002, an annual average of approximately 5,000 individuals in highly-skilled occupations were admitted to Australia under the family migration program. In 2002, 3,500 high-skilled New Zealanders entered and settled permanently in Australia under a different program designated specially to New Zealand citizens.

	2000-01	2001-02	2002-03
Total persons	131,161	121,174	125,860
Top 3 source countries	NZ (27%) UK (10%) China (9%)	NZ (18%) UK (10%) China (8%)	UK (13%) NZ (13%) China (7%)
Skill Program	43,363	51,671	56,782
Top 3 source countries	na	na	UK (21%) India (11%) South Africa (10%)
Occupation Highly-skilled (i.e., managers and administrators, and professionals)	28,305 (22%)	24,858 (21%)	25,532 (20%)
- Family program	4,034	4,770	6,035
- Skill program	15,359	15,486	15,667
- NZ citizen	na	na	3,494

## Table 1.12 Settler Arrivals (As Permanent Additions to the Resident Population)

Source: DIMIA, Immigration Update (Report on FY 2003)

The top occupations of migrants on the basis of employment prior to their arrivals in Australia as reported in (DIMIA, 2004) included computer professionals (3,338 persons, in 2002), accountants (2,568), general managers (1,475), managers and administrators (1,647) and registered nurses (1,374).

#### Inflows from New Zealand

The Trans-Tasman Travel Agreement introduced in 1973 allows both Australian and New Zealand citizens to enter and visit freely, live, work and remain indefinitely without any visa requirements. However, New Zealand citizens are still required to apply for formal permanent residency in Australia if they wish to access certain social security payments.

The 'net' permanent and long-term (longer than 12 months) movement of New Zealanders tends to follow relative economic conditions such as differences in relative real incomes and employment opportunities (DIMIA, 2004). The movement increased steadily until reaching a peak in 2000–01 (Table 1.13).

	Net (persons)	Arrival (persons)
1999–00	30,000	42,000
2000-01	38,949	52,368
2001-02	16,817	30,068
2002–03	11,591	25,179

## Table 1.13 Net and Permanent and Long-Term Arrivals of New Zealand Citizens

Source: Population Flows: Immigration Aspects, Department of Immigration and Multicultural and Indigenous Affairs, March 2004.

As of 30 June 2003, stock estimates show that 460,000 New Zealand citizens were present in Australia. New Zealand citizens coming to Australia permanently do not enter the migration program but are included in settler arrival statistics (see the discussion on permanent migrants).

#### Outflows of HQP migrants

As much as Australia is an immigration country, it is also a country of emigration (Hugo, 2002). There have been substantial departures on a long-term and permanent basis. In 1999-2000 there were 197,846 permanent and long-term departures. The number reached 219,568 in 2002-03. About half of these emigrants are Australian born. (DIMIA, 2003).<sup>20</sup>

The UK is the most popular destination of more than 30 percent of Australian-born permanent and long-term departures, with the US in the second place accounting for about 15 percent. The movement to the two main destination countries is dominated by the highly qualified. Almost 60 percent of those leaving for the UK are in the manager, administrative, professional and associate professional categories, while 72.8 percent of those going to the US are in these occupations (Hugo, 2002).

Table 1.14 provides the total numbers of permanent and long-term departures of Australian-born working in skilled occupations during 1994-2000. The main destinations were the UK, the US, followed by New Zealand; Singapore; Hong Kong, China; and Japan.

<sup>&</sup>lt;sup>20</sup> Permanent departure refers to out-migration of Australians and residents of Australia for indefinite periods of time (with no intention of returning). Similarly, permanent arrivals are movements of Australians or foreigners entering Australia with the intention of staying indefinitely. These arrivals and departures data relate to the movements of travellers rather than the number of travellers. Long-term movement refers to a change of residence that lasts longer than 12 months. Long-term departures refer to Australian residents and overseas visitors (who had stayed in Australia for 12 months or more) departing temporarily with the intention of staying abroad for at least 12 months. Long-term arrivals are the incoming movement of temporary visa holders and the return of Australian residents (who had stayed abroad for 12 months or more) with the intention of staying in Australia longer than 12 months. (DIMIA, Immigration Update FY2003)

Country	Total workers over 1994-2000*	Skilled occupations**		
UK	121,256	57,361 (59.8%)		
		Manager, administrators 9,782		
		Professionals 39,341		
		Associate professionals 8,238		
US	50,818	22,686 (72.8%)		
		Manager, administrators 4,914		
		Professionals 15,063		
		Associate professionals 2,709		
New Zealand	17,303	10,329 (59.7%)		
Singapore	7,876	6,566 (83.4%)		
Hong Kong, China	6,423	5,362 (83.5%)		
Japan	7,418	5,855 (78.9%)		
Malaysia	3,727	3,002 (80.5%)		
Germany	2,677	1,933 (72.2%)		
France	1,934	1,369 (70.7%)		
Other Europe	14,845	9,127 (61.5%)		
Other Asia	19,786	15,190 (76.8%)		
Other rest of the world	35,491	24,720 (69.8)		

## Table 1.14 Long-term and Permanent Departures of Australian-born to Selected Top Countries By Occupation, 1994–2000

\* Note that the numbers are in terms of movement, not persons, and that they are aggregated over the period of six years.

\*\* Skilled occupations refer to manager, administrative, professional and associate professional categories. Source: Modified from Tables 12 and 13 in Hugo (2002)

Like other advanced APEC economies, Australia faced skill shortages in the information technology and telecommunication industries in the second half of the 1990s. Consequently, Australia experienced a substantial increase in the inflow of IT professionals during 1995-2000 although the outflows increased as well (Hugo, 2002). In part, this was due to the high degree of turnover in the global IT work force. Table 1.15 shows the permanent and long-term movement of IT professions between 1995–96 and 1999–2000. The net migration increased substantially during the period mainly due to large number of newly recruited IT personnel from countries like India. In addition, Australia also experienced a significant return of Australian resident IT professionals.

## Table 1.15 Arrival and Departure of Permanent and Long-Term Migrants with Information Technology and Telecommunication Occupations, 1995–2000\*\*\*

Year	Arrivals	Departures	Net Gain
1995–96	5,946*	3,318*	2,628*
1996–97	6,062*	3,912*	2,150*
1997–98	6,189*	4,477*	1,712 *
	4,708* *	3,743**	965**
1998–99	5,507**	3,934**	1,573**
1999–2000	7.007**	4,227**	2.780**

\* Based on wide definition, which includes data processing managers, electrical and electronics engineers, computing professionals, electronic engineering technicians, communications equipment trades, office equipment computer services and sales representatives.

\*\* Based on narrow definition, which is more restrictive and includes information technology managers, computing professionals, and computing supply technicians.

\*\*\* Note that the numbers include both Australian residents and foreigners.

Source: Hugo (2002), Table 18

## Experience of the Selected APEC Economies: China, Japan, Korea, and Mexico

#### Japan

In Japan, the 1989 revision of Japanese immigration laws made it easier for high-skilled workers to enter Japan with 'temporary' visas, which allowed employment and residence for an indefinite period (NFS, 2002). Fuess (2001), as reported in NFS (2002) examines 12 categories of temporary visas associated with highly-qualified individuals in Japan, and notes the growing importance and acceptance of the foreign skilled labor force in Japan. In 1999, 240,936 workers entered Japan under high-skill visa categories – a 75 percent increase since 1992. To compare, this number is roughly 40 percent of the number of Japanese university graduates entering the labor market each year and is about 80 percent of the H-1B entries to the US in the same year.

#### Korea

Data on permanent inflows of skilled foreigners to Korea is limited. Most information is available in terms of temporary workers. According to OECD (2001a), there were 12,600 temporary workers entering Korea in 1999, a 6 percent decrease from three years earlier.<sup>21</sup> HQPs in Korea are classified by visa types – highly-qualified temporary migrants are, for example, professors, language instructors, researchers, special technology instructors. Stock data reported by Jang (2004) show that there were more than 8,000 high skilled foreigners (under visa type E1-E7) and close to 20,000 temporary business people<sup>22</sup> working in Korea in 2004. Almost 40 percent of these skilled workers are from Asia and about 28 percent and 22 percent are from North America and Europe, respectively.

## People's Republic of China (PRC)

Since its economic opening and reforms in 1978, the People Republic of China has engaged in exchanges and relations with other countries. This has contributed to an increase in international mobility of highly-qualified Chinese. The migration flows are mainly to North America, Europe, Japan, Australia, and New Zealand. Studying abroad has been the main form of migration of skilled Chinese, although there is evidence of an increased trend in outflows of technical and professional individuals as well. The main destination Chinese students, has been the US, which absorbs about half of the stock of 400,000 persons studying abroad during the years1978–1999 (Zhang and Li, 2002). Additionally, APEC economies such as Japan (17 percent), Canada (7 percent), and Germany (7 percent) have also attracted Chinese individuals for higher studies.

In recent years, the Chinese government has actively encouraged the recruitment of foreign experts to work in China as well as the returning of highly-qualified Chinese from abroad. According to the State Bureau of Foreign Experts (SBFE) of China, a total of 834,000 foreign experts were working in China temporarily and permanently during 1978-99. The inflows of experts increased at an annual rate of 4.3 percent. In 1999, there were 84,000 foreigners working full-time in China; they include people who are management experts sent on contracts or by foreign investors, and experts in education, science, culture and public health (Zhang and Li, 2002).

## Mexico

Flows of highly-qualified individuals from Latin America tend to go towards European economies and the US. The data show that Latin Americans make up almost 10 percent of the registered foreigners in Italy and 18 percent in Spain in the late 1990s (Solimano and Pollack, 2004).

<sup>&</sup>lt;sup>21</sup> The shortage in manual workers in Korea means that the majority of foreign workers in Korea are likely to be less-skilled and unskilled. As pointed out by an official in the Ministry of Labor, in 1987 a shortage of manual workers was estimated at 100,000. Sixteen years later in 2004, the number of foreign workers in Korea has climbed to more than 400,000. (IPF, 2004)

<sup>&</sup>lt;sup>22</sup> Intra-company transferees (visa D7), investors (D8), and traders (D9).

Since NAFTA, Mexico has emerged an important source of highly-qualified temporary migrants to the US. In 2002, there were more than 40,000 entries of skilled Mexican to the US, almost 40 percent of those entries were workers with specialty occupations (H-1B) and more than 30 percent were intra-company transferees (US-CIS, 2002). Solimano and Pollack (2004) note that there has been a two-way exchange of HQPs, which in part has been the result of foreign investments from European companies who have brought in a number of foreign executives, professionals, and investors working with global corporations and international banks in Latin American economies.

## 1.4 Return Migration of HQPs in APEC

In this section, we focus on the return migration of HQPs. The recent economic downturn that had hit the global IT sector hard, set off a kind of reverse migration – migrants with technical skills either returning to their native countries or moving to jobs in many new Silicon Valleys in India; China; Hong Kong, China; and Chinese Taipei and other fast-growing Asian economies. In North America, many of these reverse migrants were engineers, computer analysts and programmers who were brought to work in expanding high-tech industries in Ontario, British Columbia in Canada, and California and Massachusetts in the US during the peak of the dot com boom in the 1990s. They typically were recruited under special visa arrangements – such as fast-track work authorization for IT foreign workers in Canada and the H-1B program in the US – that aimed to make up for critical skill shortages facing North American companies at the time. Other than returning to their homelands, some of these mobile talents also found jobs in a third country. This pattern of mobility facilitates the international exchange of skills and blurs the notion of sending and receiving countries widely used in the brain drain literature. In other words, mobile HQPs are no longer a country-specific resource.

An empirical study on return migration by DeVoretz et al (2002) shows some evidence on the return of Hong Kong-born people from abroad. Using 2001 Hong Kong, China census data, they show that there were about 86,000 returnees who lived abroad before 1996 and had returned to Hong Kong, China between 1996–2001, out of which almost 40 percent were returnees from Canada and 20 percent from the US. In general, these people are young and recent graduates from overseas institutions. Returnees from Canada were more heavily concentrated in entry-level professions (34 percent), and higher-level professions or managers (40 percent) than those who returned from the US and other APEC/OECD economies.

The evidence on return migration from other countries is quite scattered. Anecdotal evidence reveals cases of HQPs from developed countries returning to India; China; Hong Kong, China; Chinese Taipei; and Russia. A well-known example is India's hi-tech cluster in Bangalore, which attracted about 35000 Indian tech professionals returning from abroad (The Economic Times, 27 July 2004; Siliconindia, June 2003).

A rapidly growing Chinese economy since the 1990s has increasingly attracted foreign-educated and western-trained Chinese nationals back home. These returnees are highly educated, with 90 percent holding a master or doctoral degree from abroad. While some of them go into academic and government careers, most returnees opt for jobs in the business sector, either joining multinational firms or state-owned enterprises, or setting up their own business. The Chinese government established more than 70 business parks to provide more attractive business opportunities for those who returned to set up their enterprises. A successful business cluster situated in Beijing proximity, Zhongguancun, is also known as China's Silicon Valley. Returnees can receive several incentives in setting their companies in these areas, including tax breaks, cheap office space, start-up loans and advice on dealing with the local bureaucracy. In Beijing alone, there are 3,300 new enterprises started by returnees, including some of the economy's largest firms such as UTStarcom (IT equipments) and Sohu (an internet portal). (The Economist, 11 August 2003)

In Chinese Taipei, the immigration laws and regulations on working visas for the high-tech talent were being revised and relaxed in order to attract high-tech skilled workers from overseas.<sup>23</sup> The return home of Chinese Taipei engineers to take up positions at home is also recognized as one of the successful tools in building up effective business networks in the Hsinchu Science-Based Industrial Park (Liu, 2004). The box below gives an overview of the return migration of HQPs from abroad.

## BOX 1.1

## **Return Migration of HQPs in Chinese Taipei**

There has been a significant movement of former emigrants returning to Chinese Taipei since the late 1980s. It is estimated that 33 percent of students graduated from abroad had returned. The return rate is three times higher than that in 1980. According to a survey based on the Chinese Taipei 1990 population census, around 50,000 emigrants returned during the period of 1985–90. About 43 percent of them have at least a college education and more than 30 percent are employed as managers and professionals.

The success of the Hsinchu Science-based Industrial Park (HSIP) has attracted returnees, especially those who are highly educated in science and technology fields. The number of returnees working in HSIP was merely 27 in 1983, 223 in 1989, but rose sharply to 3,265 in 1999 and 4,108 in 2000. With the large concentration of R&D researchers, returnees with doctorate degrees constitute an important part of R&D manpower in the HSIP. During 1990s, US-educated students returned to Chinese Taipei to start new companies or take positions in existing companies in HSIP. By 2000, there were 113 companies (out of the total of 289 companies) established by mainly US-educated engineers, often with professional experience in Silicon Valley.

Many returnees work in Chinese Taipei on a temporary basis. They are characterized as "temporary returnees" or "trans-national workers". This group mainly consists of managers, engineers, investors, and venture capitalists, who often travel between Silicon Valley and Hsinchu. They play a very significant role in business, investment, and research networking between Chinese Taipei and the US. A total of 70 HSIP companies have offices in Silicon Valley, with executives and managers working on both sides of the Pacific.

Source: Luo and Wang (2002)

In Russia, anecdotal evidence reveals many of the highly-qualified Russians who left home to work in the US, especially under the H-1B visas, have returned. A recent media report indicated that Russian expatriates are more than welcome by the homeland high-tech companies as they bring back a unique set of skills, including team working, project management and knowledge of how to work and deal with Westerners. Working experience from abroad is viewed as crucial by the technology companies because most Russian tech firms depend primarily on sales to North America and Europe. (Moscow Times (Russia), 4 June 2003)

# 2. FUNDAMENTAL DRIVERS OF INTERNATIONAL MOBILITY OF HQPS IN THE GLOBAL KNOWLEDGE ECONOMY

The traditional migration literature in the labor 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. On the supply side, higher relative incomes in the host country is a key factor influencing migration decisions while the demand side factors include the use of less expensive migrant workers and skill shortages in specific sectors of the host country. In the most basic migration model, labor is assumed to be fairly homogeneous, and the net outmigration of skilled educated workers is treated as a "brain drain" in which there is a transfer of

<sup>&</sup>lt;sup>23</sup> In addition, the Chinese Taipei government has successfully organized a recruiting mission since 1995 to recruit high-tech talent in the US and Canada. The same operation was repeated in 1997, and 2000 to 2004. (Details at <u>http://hirecruit.nat.gov.tw/english/index.asp</u>)

skilled workers from one country to another, leading to benefits for the country gaining these talents (brain gain) and costs for the sending country (brain drain). The migration of highlyqualified workers is largely viewed as a zero-sum game for participating countries.

In a competing perspective – "globalization of the HQP labor market" perspective – international mobility of HQPs is considered as "Brain Exchange" or "Brain Circulation" where the increased mobility contributes to increased two-way flows of knowledge, ideas and technology (OECD, 2002a,c; Harris 2003). This perspective suggests that a number of important factors have contributed to the recent rise in the international mobility of HQPs. 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 HQPs among advanced countries, although they also play a role in the case of flows from developing countries. Furthermore, factors such as differences in labor 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 (OECD, 2002b). Table 2.1 below, based on the OECD (1998), provides a summary of the key factors that drive the mobility of different occupational groups in the new global economy.

Interestingly, a study on European mobility patterns suggests that individual's attitude to mobility are changing in the new economy as they become better qualified. They are more interested in living and working in another country, particularly those people in the younger age groups (PWC, 2002).

We organize our discussion of the key drivers of the mobility of HQPs under five main headings: technological change, globalization through trade and FDI, research and innovation, increased income and employment opportunities, and changing individual preferences. In order to assess the likely importance of these inter-related factors for the mobility of HQPs what key analytical issues would need to be addressed? To answer these questions, we turn our attention to both theoretical and empirical work in the area.

Occupations	Major Factors
Managers and executives	Takeovers and mergers FDI Process
Engineers and technicians	Economic opportunity in host country Immigration policies R&D activities Personal factors
Academics and scientists	Networking, R&D activities International mobility within academic institutions
Entrepreneurs	Economic opportunity Immigration and taxation policies Capital markets and availability of venture capital
Students at higher education	Job market R&D (postdoctoral research) Financial supports Immigration policies

## Table 2.1 Factors Explaining Mobility of Different Occupational Groups

Source: Harris (2003) based on OECD

## 2.1 Technological Change

Technical change is considered as one of the most fundamental sources of productivity and economic growth in the new global economy (OECD, 2000). Developments in ICT are clearly the most important source of technological change in the 1990s. Most observers agree that the pace of technological change has accelerated and nations that develop and adopt the latest technological innovations can achieve competitive advantages and, eventually improve their productivity performance.<sup>24</sup> Evidence from a number of OECD countries shows that technological change, both "disembodied and "embodied" in capital equipment, especially in ICT have been a key factor in recent growth in total factor productivity (TFP). The evidence from the US, for example, shows that over the 1990-2001 period, investment in IT and transformation of business activities in response to IT investment accounted for 50 percent or more of the rise in labor productivity growth (Stiroh, 2002).<sup>25</sup>

How does technological change affect the international mobility of HQPs? This is a complex question and also an area of uncertainty. It is important to note that the different potential roles of internationally mobile HQPs will be affected in different ways by technology.

First, technological change may shift demand towards highly-qualified workers relative to the less skilled, and raise returns to skill. Higher returns to skills, in turn, act as a significant pull factor in attracting globally mobile HQPs. Much of the recent empirical evidence confirms that the technological change associated with new computer technologies has been skill-biased (SBTC); it has caused a rise in demand towards highly-qualified workers relative to the less skilled (see, for example, Katz and Murphy, 1992; Card and Lemieux, 2001; Boudarbat, Lemieux and Riddell, 2003).<sup>26</sup> OECD (2002b) argues that in recent years, an increased demand for HQPs, driven by the rapid expansion of technology-based activities, has played a major role in the rise of cross-country HQP mobility for some countries. The observed higher returns to education in a number of countries over the last two decades or so, including the US and the UK, also seem to be a major pull factor in stimulating cross-country mobility of HQPs.

Second, technology, especially ICT, may reduce the demand for internationally mobile highlyqualified individuals. The argument goes that the ICT may transform the business activities and open up new possibilities that are cost-effective and do not involve interaction between worker and jobs. For example, the need for virtual labor mobility and telemobility may increase in importance and act as a substitute for physical HQP mobility in many areas. Examples include software engineering, data entry, translation services and distance teaching. According to Harris and Schmitt (2003), call centers in various Canadian cities that serve the entire NAFTA market provide, in essence, a form of mobile labor service. Inexpensive high-bandwidth communications make it feasible for large workforces located and effectively managed anywhere, giving rise to the vision of a continental e-labor market. The need for HQP mobility to facilitate skill transfer could decline if technology is used to deliver new forms of learning, such as, e-learning. Two common examples include university professors who deliver lectures via distant learning technology and doctors located in one city perform surgery in another.

A survey of businesses in the EU countries argues that although the use of new technology will allow greater flexibility for employers and workers, it will not reduce the need for mobile HQPs. Moving forward, a great majority of businesses believe that ICT developments enhance worker mobility. Innovations such as video conferencing facilitate 'virtual' meetings across countries. Yet personal contact remains the optimum way to develop business relationship. Only 18 percent of

 <sup>&</sup>lt;sup>24</sup> See Hanel and Niosi (1998) for a comprehensive survey of the relationship between technology and economic growth.
 <sup>25</sup> Enabling technologies with broad applications through a transmission of the relationship between technology and economic growth.

<sup>&</sup>lt;sup>25</sup> Enabling technologies with broad applications throughout the economy offer considerable benefits over the longer term. What Richard Lipsey has called General Purpose Technologies, "Fifth-wave" technologies include ICTs, bio, nano and environmental/energy technologies.

<sup>&</sup>lt;sup>26</sup> In contrast, Haskel and Slaughter (2002) have shown that for ten OECD countries over the period 1970s and 1980s, sector bias, and not skill bias, was a more important determinant of changes in relative wages. Other studies such as Card and DiNardo (2002) fail to support the SBTC hypothesis for the US.

the all businesses think that advances in technology will mean less need to have mobile workers (PWC, 2002).

## 2.2 Globalization through Trade and FDI

The last few decades have seen a stunning integration of the global economy through trade, FDI and technology. Rapid advances in ICTs accompanied by the sharp drop in transportation and communication costs, and increasing competition for markets, capital and skilled workers have accelerated the pace of globalization of business throughout the world.

The 1990s witnessed a significant increase in global trade. Global FDI flows have grown at a pace that exceeds even the growth in trade. In the 1990s, the nature of FDI has changed markedly, with mergers and acquisitions (M&A) now accounting for more than 85 percent of total FDI (Kang and Johansson, 2001). Over the 1991-99 period, M&A grew more than tenfold mainly in response to the rising importance of economies of scale and technology.

ICTs have been instrumental in making the production of goods and services global. The world's economies are increasingly becoming inter-linked and co-dependent. Mann (2003) notes that looking back, global integration of IT production accounts for about 10 - 20 percent of the dramatic decline in IT hardware prices. These price declines supported additional investment in IT and transformation of businesses, which together contributed to higher productivity and GDP growth in the US.<sup>27</sup>

Interestingly enough, it is suggested that the rising global integration of world markets has brought with it increased mobility of HQPs. The EEAG report (2002) suggests that rising mobility of HQPs is a natural outcome of the increased globalization process. The PWC report (2002) argues that going forward, developments in technology will accelerate globalization, as more and more businesses will be looking to operate on an international basis. This can only lead to an increased demand for internationally mobile highly-qualified workers.

## International Trade and HQP mobility

According to theory, trade may be either a substitute or complement to international mobility of labor. In the standard neo-classical trade model (the Heckscher-Ohlin model), free trade leads to relative and absolute factor price equalization that, by itself, reduces economic incentives for international migration. Therefore, trade and international migration are substitutes. Mundell (1957) and Globerman (1999) argue that, according to this model, free trade between Canada and the US should lower the outflow of highly-qualified professionals from Canada. Of course, the neoclassical trade model is an extreme case because of the stringent assumptions underlying this model. These include: perfect competition, homogeneous product, full employment and complete markets, identical production technologies, the use of same factors of production, constant returns to scale technologies, and instantaneous adjustment to policy changes.

Harris and Schmitt (2003) in their review of recent developments in the trade theory note that when these assumptions are relaxed, on theoretical grounds, pressures to migrate can easily increase with freer trade. Introducing factor specificity, imperfect competition and increasing returns to scale can yield results opposite to the standard H-O model, implying that trade and international labor mobility are complements.<sup>28</sup> Consider, for example, the case of increasing returns to scale at the sector level. Let us assume that the technology used in the labor-intensive sector exhibits increasing returns to scale. The expansion of production in the US through trade

<sup>&</sup>lt;sup>27</sup> Mann (2003) notes that productivity growth might have been 2.5% instead of 2.8% for the 1995-2002 period and that annual real GDP growth might have been 0.3 percentage points lower if global integration of IT production had not occurred

<sup>&</sup>lt;sup>28</sup> Models with technological differences across countries can also reverse the standard result. Other relaxations of the Heckscher-Ohlin setting that can reverse the standard result include adjustment lags, migration costs, risk, and migration networks. For a discussion of these issues, see, for example, Harris and Schmitt (2003), Mercenier and Schmitt (2002), Wildasin (2003), Faini, et al. (1999), and Venables (1999).

liberalization could encourage inflow of migrants to meet the demand in a growing and more productive industry. A general conclusion of this literature is that when trade is based on economies of scale, migration and trade are complements (Markusen, 1983; Markusen and Melvin, 1981).

The empirical evidence on the relationship between trade and the migration of workers in a North American context is only beginning to emerge. Harris and Schmitt (2003) note that the current levels of migration between Canada and the US are quite low in relation to other periods in history. There are some limited forms of labor mobility within the NAFTA countries covering certain types of professionals under the TN visa program.<sup>29</sup> The apparent one-way flow of highlyqualified professionals such as physicians, nurses, natural scientists and engineers from Canada to the US raised considerable alarm as to the possibility of a serious brain drain.<sup>30</sup> There is some empirical evidence to suggest a positive relationship between trade and migration of workers. Gould (1994) found a positive and significant relationship between trade and immigration in the US and similarly Head and Reis (1998) and Head, Reis and Wagner (1998) find it for Canada. Wildasin (2003) argues that large gross internal flows of labor in the US and Canada, despite free trade, is evidence that trade and migration are not substitutes. He suggests that this could also be true in the international context.

The trade and the migration flows data for Canada and the US suggest that they move in the same direction, at least in the short-term. For example, the trade data for the year 2002 shows that the US contributed little over 60 percent of Canada's import of goods and services, and Canada contributed about 18 percent of US import of goods, and 8 percent of US import of services. In a similar fashion, Canada contributed a considerable share of HQPs moving into the US (Table 2.2), in particular the temporarily migrating skilled workers (11 percent). In contrast, 40 percent of all the temporarily migrating skilled workers into Canada came from the US. However, in terms of permanent workers, neither country is a significant source of migrants to the other. One possible explanation is that both Canada and the US receive most of their highly-qualified permanent workers from the emerging industrialized countries, such as China and India.

	US contribution of inflows to Canada	Canada contribution of inflows to the US
All workers		
Temporary	24%	9%
Permanent	est. 2-3%	2%
Skilled workers		
Temporary	40%	11%
Permanent	1%	4%
Coloulation by	a utha wa	

#### Table 2.2 Share of Labour Flows between Canada and the US, 2002

Calculation bv authors

Sources of data: CIC, US-CIS, 2002

The available evidence from the EU suggests that since its creation, significant progress has been made towards intra-EU trade in goods: around 60 percent of Member States' trade in goods with the rest of the EU. However, the movement of workers between Member States has been limited. Although there is some evidence to suggest that there has been an overall increase in mobility of workers within organizations, and the relative importance of virtual and short-term assignments has increased most significantly (PWC, 2002).

<sup>&</sup>lt;sup>29</sup> Globerman (1999) concludes that trade liberalization has had little impact on permanent immigration. However, temporary migration of Canadian professionals to the US has increased somewhat since the FTA. He also suggests that the number of US professional workers emigrating temporarily to Canada has also increased consistently since 1989, although at a substantially slower rate than comparable migration of Canadian TC/TN visa holders.

<sup>&</sup>lt;sup>30</sup> For a discussion of this issue at length, see Finnie (2001) and the references therein.

### Foreign Direct Investment (FDI) and International Mobility of HQPs

In theory, FDI may either substitute or complement international mobility. FDI and HQP mobility may be substitutes if MNEs relocate facilities abroad to access low-cost labor instead of creating jobs locally that might be filled by foreign workers. Evidence from Israel and India illustrates that FDI may also be driven by access to HQPs, including R&D staff (Guellec and Cervantes, 2002). Thus, HQPs and FDI appear to be complementary international flows, with FDI attracted to locations where high skilled labor is plentiful.

FDI and international mobility of HQPs may be complements as MNEs stress the potential need for factor movements, especially the relocation of managers and technical experts, to expedite production rationalization and increased trade following trade liberalization. This perspective suggests that freer trade between Canada and the US, to the extent that it encourages increased intra-industry trade and investment, may increase economic incentives for bilateral migration. Trade liberalization may therefore induce more migration of specialized workers, insofar as FDI requires them (Globerman, 1999).

The data shows that intra-company transferees have increased in the OECD countries over the late 1990s (Table 1.2 in the previous section). This may represent both the increased importance of takeovers, mergers and FDI in the economy, and the shift toward short-term assignments of highly-qualified professionals such as managers and executives (see Chart 1.4). Clearly, we need more empirical research to show a relationship between the location of FDI and MNEs, and the international mobility of HQPs.

The new global economy is witnessing two additional trends: First, the trade and investment in services is rising steadily, and, Second, growth in international outsourcing. In the discussion to follow, we turn our attention to these two issues and examine their implications for the increased mobility of HQPs.

## International Trade and FDI in Services

In the new global economy, there is a trend increase in trade, employment and investment in services.<sup>31</sup> However, barriers to trade and investment in services continue to be an important obstacle to further globalization of the service sector. One concern is with the issue of how trade liberalization in services would affect the international mobility of highly-qualified professionals?<sup>32</sup> Technological change is dramatically changing the landscape of the global financial system. The growth in services trade raises the prospect of a global e-labor markets for some types of professional services. Examples include software engineering, data entry, translation services and distance teaching. We discussed the implications of this issue for the international mobility of HQPs in section 2.1 above. The issue is particularly important in the context of North America and other advanced APEC economies (Harris and Schmitt, 2003).

The globalization of trade in educational services is increasing. This is occurring in two different ways: First, OECD countries are increasingly seeking to attract foreign students at the master's, PhD and the post-doctoral levels, particularly in the field of science and technology (S&T), and facilitating their access to the labor market. Host countries can capture much benefits of student migration. In the US, stay rates of foreign PhD students is extremely high – in excess of 50

<sup>&</sup>lt;sup>31</sup> A number of explanations have been put forward for the growth in service trade and investment. These include: technological change, changes in trade policy, changes in domestic policy ("deregulation") and demand and supply effects, such as increases in the demand for services due to increases in real income or the average education level. It is important to identify the importance of these factors in explaining services trade and investment trends (Copeland, 2003). For a review of global integration of financial service industry, see Neave (2003), a paper prepared for Industry Canada under the Services Research project.
<sup>32</sup> By invoking relevant sections of Modes 3 and 4 of GATS, Whalley (2003) recognizes that changes in

<sup>&</sup>lt;sup>32</sup> By invoking relevant sections of Modes 3 and 4 of GATS, Whalley (2003) recognizes that changes in factor mobility restrictions could be a *sine qua non* to attain significant trade liberalization in services. And with segmented factor markets, especially labor markets, larger effects could be realized if services liberalization, and becomes an indirect conduit for liberalizing domestic factor markets. This latter point is also consistent with relaxed immigration controls, a viewpoint articulated by some countries within the OECD.

percent for Europeans for example (Harris, 2003); and second, cross-border collaboration of higher education and research institutions is rapidly growing. This may act either as a substitute or as a complement to international mobility of students, much as FDI accompanies or substitutes for the migration of highly-qualified individuals (OECD, 2002b).

## Outsourcing in a global economy and the international mobility of HQPs

"The rising integration of world markets has brought with it a disintegration of the production process" (Feenstra, 1998). Cheaper access to information induced by technological change has facilitated the integration and coordination of internationally diverse production processes. Firms are outsourcing either domestically or abroad, a range of manufacturing or service activities, from product design to assembly, from R&D to marketing, distribution and after-sales service (Grossman and Helpman, 2002). They argue that outsourcing of inputs and business services is one of the rapidly growing components of international trade.<sup>33</sup>

Although outsourcing in manufacturing has been occurring for a long time, a relatively new development is the outsourcing of increased variety of services made possible by the new application of the ICTs. For example, call centers have moved to India and elsewhere. Routine back office accounting work, such as handling accounts are also shifting abroad and becoming centralized for global corporations.<sup>34</sup> Does it mean that there will be greater demand for local hires of mobile workers and use of virtual teams and lower international mobility? In a recent article, Mann (2003) argues that an international value chain should increasingly produce not only IT hardware but also software and services. This will, just like hardware, lead to a decline in the prices of software and services and make the overall IT packages affordable for more businesses and other end users. This will promote deeper integration and wider diffusion of IT to new sectors and businesses in the US economy and lead to a greater demand in the US for IT-proficient workers. This suggests that the demand for internationally mobile HQPs will increase in the US. However, evidence on this issue is rather non-existent and more research is required.

## 2.3 Research and Innovation

The OECD growth project and other studies have found a strong link between innovation and growth. Cameron (1998) surveys the empirical evidence on the link between innovation and economic growth in the light of new growth theory and notes two major conclusions. First, innovation makes a significant contribution to output and TFP growth. Evidence shows that typically a 1 percent increase in the stock of R&D leads to a rise in output of 0.05–0.1 percent.<sup>35</sup> Studies also find a strong and significant link between R&D and productivity growth, with the private rate of return to R&D investment being estimated as 10-20 percent, and because of knowledge spillovers social rate of return is found to be much higher, 20-50 percent. Second, there are significant knowledge and technology spillovers between firms, industries and countries. The evidence shows that for small open economies (SOEs) such as Canada, knowledge and technology spillovers from abroad have a larger impact on productivity than spillovers from domestic R&D.<sup>36</sup>

<sup>&</sup>lt;sup>33</sup> As an example of foreign outsourcing, Feenstra (1998), citing Tempest (1996), describes the production process of a Barbie doll. Mattel obtains the raw material for the doll (plastic and hair) in Chinese Taipei and Japan, conducts assembly in Indonesia and Malaysia, buys the molds in the US, the doll clothing in China, and the paints used in decorating the dolls in the US.

<sup>&</sup>lt;sup>34</sup> A series of articles have recently appeared in the US newspapers debating the outflow of US jobs to the countries such as India and China. See, for example, Schumer and Roberts "Second Thoughts on Free Trade", The New York Times, 6 January, 2004; and Reisman, "A reply to Schumer and Roberts", The New York Times, January 9, 2004; Murphy, "Free Trade and Factor Mobility", The New York Times, January 11, 2004.

<sup>&</sup>lt;sup>35</sup> Griffith, et al. (1998) show that R&D may play a different role in small and large economies. In large economies, R&D mainly accelerates of rate of innovation; in small economies, it facilitates technology transfer from abroad.

<sup>&</sup>lt;sup>36</sup> Evidence for Canada also shows that the impact on productivity growth of investment in ICT and of international spillovers linked to import of IT goods is large (Gera, et al. 1999). Firm-level empirical evidence shows that skilled labor is complementary with a cluster of factors including ITC and new products and

OECD (2002b) suggests that research and innovation in advanced countries is a key factor for the international mobility of science and technology (S&T) professionals. This is especially true for S&T professionals in developing countries but also in advanced countries where the environment for excellence in scientific research and innovation exists. Human capital is a key factor in innovation and S&T personnel are increasingly required by an economy more based on research and innovation (OECD, 2000).<sup>37</sup>

Although more evidence is needed on this issues, a host of research and innovation factors seem to be contributing to the mobility of S&T personnel in the 1990s (Guellec and Cervantes, 2002).

First, both the higher level and growth of R&D spending are key to creating increased employment opportunities for S&T graduates in advanced economies. The services sector in the new global economy is becoming increasingly innovative and contributing to increased demand for highly-qualified individuals such as ICT professionals. In Canada, for example, business expenditure on R&D is growing faster in services than in goods-producing industries.<sup>38</sup>

Second, the number of strategic alliances in regard to R&D and technical collaboration between firms has increased, particularly in areas such as ICT and biotechnology.<sup>39</sup> Collaboration and networking are now fundamental to the corporate strategies of firms, and contribute to the mobility of science and technology (S&T) professionals.

Third, OECD (2000) argues that start-up firms play an important role in the innovation process, as they are important sources of new ideas and innovations. The availability and forms of financing, such as venture capital, are of critical importance to innovative and entrepreneurial activity. Stephan and Levin (1999) find that the foreign born account for 25 percent of the founders of start-up enterprises in the US biotechnology sector. Clearly, the climate for innovation plays an important role for the entrepreneur-minded S&T personnel to move abroad for business start-ups and self-employment.<sup>40</sup>

Fourth, industry clusters—the phenomena of same-industry firms locating in geographical proximity—tend to generate agglomeration economies i.e. positive spillovers between firms in the same industry (Porter, 1998). In the literature, entrepreneurship, linkages to a major and growing market, and the availability of skilled labor are identified as three key ingredients in the formation of a cluster (Bresnahan, et al., 2001). Both native-born and skilled workers from abroad move to these locations in order to benefit from employment opportunities. More importantly, MNEs cluster in particular locations due to common causes (i.e., proximity to demand, low-cost inputs etc.) and perhaps to access agglomeration economies flowing across firms.<sup>41</sup> This provides incentive for HQPs to migrate.

<sup>39</sup> A number of studies on the biotechnology industry show that company's commercial success is closely linked to their connections with the scientific community (Darby, et al. 1999).

services (Bresnahan, Brynjolfsson and Hitt, 2002). Technological innovation has accelerated among the OECD economies since the mid-1980s as measured by the surge in patenting activity, particularly in the US. Of the overall growth in patents granted by the US Patent office over the 1992-99 period ICT accounted for 31% and biotechnology for 14%.

<sup>&</sup>lt;sup>37</sup> Nicholson (2003), based on regression analysis of 21 OECD countries over 1971-98, finds that 0.1 percentage point change in business R&D as a percentage of GDP leads to an impact effect of greater than 1.2 percent on level of GDP per capital in steady state. Griffith, et al (1998) show that R&D may play a different role in small and large economies. In large economies, R&D mainly accelerates of rate of innovation; in small economies, it facilitates technology transfer from abroad.

<sup>&</sup>lt;sup>38</sup> In 2002, the share of research originating in services was about 35%, compared to 18% in the 1980s. The share in the US is about 20% and the OECD average is at 15%.

<sup>&</sup>lt;sup>40</sup> A study by Saxenian (2000) shows that nearly a third of Silicon Valley's 1990 workforce was composed of immigrants, two-thirds of them from Asia, primarily China or India. Chinese and Indian engineers started 29% of Silicon Valley's technology companies over the 1995-98 period, up from 13% in the 1980-84 period.

<sup>&</sup>lt;sup>41</sup> A key benefit of agglomeration, arising through external economies of scale, is that clusters promote technological transfers and knowledge spillovers as closer geographical proximity improves communication (Globerman, 2001). Evidence suggests that technologically-intensive industries tend to be more localized than other industries and that spillovers and information flow locally more easily than at a distance (Jaff, et

OECD (2002b) argues that the presence of high technology clusters, innovative industry and centers of excellence for scientific research are important magnets for attracting HQPs. Based on the evidence from OECD surveys, Guellec and Cervantes (2002) note that much international migration of scientists and engineers is in fact highly localized around knowledge-intensive clusters (e.g. Silicon Valley), scientific research areas (e.g. biosciences) and R&D-intensive companies (e.g. Lucent Technologies). In an empirical study of biotechnology industry, Darby and Zucker (1999) find that a close relationship exists between the geographic location of the emergence of new biotechnology enterprises and the location of star scientists.

Fifth, the internationalization of R&D and innovative activities is an important component of the new global economy. The limited evidence on the allocation of R&D activities of MNEs shows that firms conduct R&D in countries where they produce. While there may be special purposes for a MNE firm to locate some of its research facilities abroad, a key explanation is to adapt their products to local conditions (Head and Reis, 2003; Fors, 1998; and Niosi, 1999). Guellec and van Pottelsberghe (2001) present three new patent-based indicators of internationalization of technology reflecting international co-operation in research and the location of research facilities of MNEs. The authors suggest that professionals generating these inventions and the ownership of these inventions have greater incentives for migrating abroad.

Sixth, temporary migration is often motivated by the quality of higher education and research, especially at the PhD level. The US experience illustrates that financial support for academic research activities is a major pull factor. OECD (2001b), based on the evidence from National Science Foundation (1998), reports that more than 75 percent of the 10,000 foreign doctoral recipients at US universities in 1996 reported their university as the primary source of support for their graduate training. According to Statistics Canada, Survey of Earned Doctorates (2003), 17 percent of Ph.D. graduates from Canadian universities indicated that they have had definite plans to work or continue their studies (e.g. postdoctoral) in the US.<sup>42</sup>

We need more research on issues such as, is increased economic integration through trade and FDI a factor driving the mobility of HQPs? What are the mechanisms that would make mobility of skilled workers complementary to trade, FDI, R&D, technology and, more generally, innovation activities? Has greater service market integration lead to higher mobility of HQPs?

## 2.4 Increased Income and Employment Opportunities

Differences in labor market conditions, income and employment opportunities and career prospects have always been a major driver of international mobility of HQPs. And, this was very much true during the 1990s. In the US, for example, higher levels of productivity combined with the unprecedented period of economic expansion through the 1990s resulted in higher wages and salaries, notably at the higher skill levels and attracted skilled professionals from all over the world. Borjas (1994) argues that higher relative wages for skills tend to bias the composition of emigrants towards the highly skilled – a phenomenon characterized as "self-selection" bias.

In the case of Canada and the US, for example, a number of labor market factors may have contributed to the increased outflow of Canadian professionals to the US in the 1990s (OECD, 2003a). First, increased demand for highly-qualified individuals in the US resulted in higher wages and salaries, notably at the higher skill levels where the Canada-US wage gap is the greatest.<sup>43</sup>

al., 1993; Audretsch and Feldman, 1996). An important implication is that personal contacts through conferences, trade fairs, seminars, or sales meetings, are a significant transmission mechanism.

<sup>&</sup>lt;sup>42</sup> A demonstration project for the Survey of Earned Doctorates was conducted by Statistics Canada from November 2002 to June 2003 with the cooperation and support of the University of Toronto and l'Université de Montréal (including HEC Montréal and Ecole Polytechnique).

<sup>&</sup>lt;sup>43</sup> In a study of wage structures over 1981-96 period in Canada and the US, Card (2003) concludes that the combination of declining average wages in Canada relative to the US, widening wage inequality in the US, and constant wage inequality in Canada imply that the economic incentives for emigration have increased for all Canadians, but especially for younger, highly educated Canadians. A recent study for Canada finds that

This led to the emigration of highly-qualified professionals in certain knowledge-intensive professions such as physicians, nurses, natural scientists and engineers to the US.

Second, higher returns to education in the US than in Canada may also contribute to increased flows of highly-qualified professionals from Canada to the US (Card, 2003). A study by Psacharopoulos and Patrinos (2002) also confirms that the average return to an extra year of education (in percent) is lower in Canada (8.9 percent) than in the US (10 percent). These numbers show the proportional impact on pre-tax wages of an extra year of education on average.<sup>44</sup> The phenomenon of higher return to education combined to that of higher productivity in the US may have contributed to the outflow of highly-qualified Canadians to the US.

Third, given the relatively larger size of the US labor market compared to the Canadian market, it offers a greater variety of outlets for job opportunities, particularly for those with specialized skills. According to the Survey of 1995 graduates who moved to the US, work-related factors that attracted them to the US include the greater availability of jobs in a particular field (44 percent), higher salaries (39 percent), chance to gain or develop skills (21 percent), better career advancement opportunities (16 percent) and lower taxes (8 percent).

## 2.5 Changing Individual Preferences

A recent survey of Europeans of working age shows that as individuals' skills and qualifications increase they are keen to seek opportunities outside their home economies. This seems to be particularly true for those in younger age groups, where mobility is sometimes considered to be an important part of their personal development (PWC, 2002). The survey results vary between different groups of the population. For example, a much higher proportion of younger people would like to move than those in older age groups; single people are more inclined to move than married or living together; senior managers/directors are more inclined than those in other occupational groups; those on low incomes are slightly less keen to move; and a slightly higher proportion of men would like to move than women.

What motivates individuals to be internationally mobile? The survey results show, as Chart 2.1 illustrates, the two strongest motivators are to improve their pay and income and to enhance their standard of living. Experiencing life abroad and the development of skills are also significant motivators. Interestingly, the commitment to employer is of least importance as a motivator. It is important that more research be undertaken on issues such as to what extent changes in the incidence of mobility do reflect adjustments in firms' requirements for labor mobility in the global economy or, instead, suggest changes in the structure of incentives or motivations for skilled individuals?

the wage differential between more-educated and less-educated workers has increased substantially from 1995 and 2000 (Boudarbat, Lemieux and Riddell, 2003).

<sup>&</sup>lt;sup>44</sup> In a recent paper, Collins and Davis (2003) argue that if education costs were more highly subsidized and returns to education more heavily taxed in Canada, Canadian effective tax rates (ETRs) would not differ greatly from those in the US. However, there would be strong tax incentive to emigrate. The authors argue that policy initiatives aimed at reducing human capital ETRs in Canada will only have a payoff on the emigration front if they are directed at taxing returns less, rather than subsidizing costs more.

<sup>&</sup>lt;sup>45</sup> Fourth, personal income tax rates are lower in the US than in Canada, particularly for high-income earners. Canadian emigrants in the higher income brackets do not perceive the higher public spending in Canada on health care, tertiary education and other social services as fully compensating the higher tax rates in Canada. A study by Wagner (2000) documents the influence of tax rates on the migration decisions of Canadians to the United States. The findings show that lower US taxes are a significant pull factor attracting Canadians to the US. He estimated that if Canadian and US taxes were identical, migration of university educated workers to the US would have decreased by 41%.



Chart 2.1 What Motivates Individuals to be Internationally Mobile?\*

Source: MORI survey for PricewaterhouseCoopers

## 3. COSTS AND BENEFITS OF INTERNATIONAL MOBILITY OF HQPS

The mobility of HQPs, at internal and international levels, has been a matter of concern to policy makers. While there is less debate on the benefits and costs of internal mobility of HQPs at the national level, the international movement tends to create substantial concern to public and policy makers alike. This is largely due to the "brain drain" – a dominating public view. Concerns remain in the sending countries that a large scale and permanent loss of human capital will increase the gap in growth performance between rich countries and limit the ability to "catch up" in developing countries. (OECD, 2002a) The factor migration literature generally suggests small efficiency gains and strong distributional effects – the migrating factor and host country gain and immobile factors in the source country lose.<sup>46</sup> Harris (2004b) argues that in the "brain drain" model, the welfare impacts are small because the net transfer of highly-qualified individuals in aggregate terms is minute as measured against existing stocks of human capital.

Subsequent research on the mobility of HQPs has moved beyond the traditional brain drain perspective and argued that cross-border movement will not lead to a zero-sum outcome, although the distribution of costs and benefits may remain uneven.<sup>47</sup> Some countries may incur cost in the short run and possibly in the long run. The new view - Brain Circulation perspective – argues that there is a pattern of brain circulation whereby returning migrants may bring along accumulated knowledge, skills, contacts, and access to international best practices. In this model, a cross-border movement of HQPs can generate benefits on a global basis by improving international flow of goods, services, and, more importantly, knowledge. Additional global benefits are possible through the formation of international research/technology networks and better jobs-skills matches (Solimano and Pollack, 2004; Harris, 2004b).

<sup>&</sup>lt;sup>46</sup> Harris (2004a) argues that results may be biased due to relatively small factor movements in recent history expressed relative to total labor force.

<sup>&</sup>lt;sup>47</sup> While redistribution of gains between provinces/states is feasible within a country, the equalization issue is more difficult to deal with in the international context.

Harris (2004b) reviews the welfare economics of cross-border labor mobility under two perspectives – the strategic competition approach and the labor market integration perspective. He concludes that an increased labor mobility raises a number of policy dilemmas. The zero-sum non-cooperative game between countries means that small countries may be potential losers in competing for scarce human capital resources. Alternatively, labor market integration initiatives within free trade areas may carry large benefits to small countries. Initiatives to improve labor mobility for HQPs between small and large economies, such as Canada and the US, or Australia and New Zealand, could prove to be quite important for long run growth of a smaller country.

The literature on labor market integration suggests mutual gains from trade through increased division of labor and other possible beneficial effects such as faster rates of income and productivity convergence between nations or regions (see, for example, Harris, 2004b). Using a CGE model, Iregui (2003) estimates substantial worldwide efficiency gains – 13–59 percent of world GDP – from the elimination of global restrictions on labor mobility of both unskilled and skilled workers. However, when only skilled workers move freely the worldwide gains are smaller, ranging from 3 percent to 11 percent of world GDP, since skilled labor represents a small fraction of the labor force in developing regions. Mercenier and Schmitt (2003), using an illustrative three country model, estimate much smaller net welfare effects from allowing free mobility of entrepreneurs.

In this section, a key objective is to enhance our understanding of the economic costs and benefits associated with international mobility of HQPs beyond the brain drain literature.<sup>48</sup>

## 3.1 Aggregate Welfare Gains of Increased HQP Mobility: Beyond Brain Drain

The literature on mobility of HQPs suggests many channels through which potential welfare gains can be realized. The gains are made possible through increased specialization, human capital acquisition, and knowledge spillovers.<sup>49</sup> More importantly, an increased mobility of workers could lead to a convergence of income levels and productivity across participating countries.

## Increased Specialization

Wildasin (2003) suggests that international mobility of HQPs will improve the aggregate welfare of integrated economies in the same way as internal mobility of workers contributes to a welfare gain in the domestic economy. To the extent that skill specialization is complementary to specialization in goods and services markets, a free mobility of labor gives way to overall efficiency gains. He argues that benefits of free mobility are derived via more efficient allocation of existing stock of specialized human capital as it flows from low productive regions to high productive regions in general is efficiency enhancing<sup>51</sup>, although the distribution of efficiency gains across regions remains uncertain. For example, a one-way flow between two regions can lead to an aggregate net gain, however, the gain to one region may incur at the expense of the other region. Conversely, it is possible that both regions can mutually gain from free mobility of workers if there is an exchange of specialized workers encompassing different skill sets. A brain circulation, thus, leads to higher growth rates through increased specialization and productiver.

<sup>&</sup>lt;sup>48</sup> For a comprehensive treatment of the issues, see Harris (2004b).

<sup>&</sup>lt;sup>49</sup> Another possible channel is via redistribution of risk across factors of production (Wildasin 2003). Greater mobility of skilled labor can shift the distribution of income-loss risk across factors of production, in particular from mobile workers to owners of immobile resources. Theoretically, aggregate gains from optimal risk sharing are generated by allowing income-loss risk to spread from risk-averse workers to relatively less risk-averse (immobile) resource owners. Nevertheless, empirical evidence regarding this argument remains to be investigated.

<sup>&</sup>lt;sup>50</sup> Empirical evidence showing the efficiency-enhancing effect of labor mobility can be found in Hamilton and Whalley (1984), and Topel (1986).

<sup>&</sup>lt;sup>51</sup> Return migration is another factor contributing to gross flows. OECD (2002a,c) argues that skilled migration between advanced OECD countries is often temporary and the source country will benefit upon their return with their new technological competencies, valuable management experience, entrepreneurial skills and access to global networks.

The mobility of HQPs enhances efficiency in knowledge production as it reduces R&D duplication and facilitates innovation. Furthermore, participation in global knowledge industries enables global knowledge workers to acquire access to international science and technology networks through which knowledge is shared and transferred. This bodes well both for the source and host countries.

The impact of an increased mobility of HQPs on product specialization and trade could result in a sending country being left with less skill-intensive production, as reflected in an illustrative static general equilibrium model by Mercernier and Schmitt (2003). However, the outcome may be different if dynamic considerations of product specialization over time are introduced in the model. While not focusing on movement of workers per se, Mann (2003) illustrates that the mobility of the 'work' of skilled labor is playing an important role in changing specialization of production. She uses the example of the globalization of IT services, to show the shift of production from industrialized countries to developing countries<sup>52</sup> and argues that such industrial restructuring is the source of productivity growth across all countries.

### Human Capital Acquisition

The economic impact of the increased mobility of HQPs on human capital accumulation is contrary to the traditional brain drain view. In the new perspective, the out-migration of knowledge workers, in both temporary and permanent forms can increase human capital accumulation in the source country. Mobility of HQPs increases international competition for scarce human capital, resulting in an increased incentive to invest in human capital. In the sending country, returns to human capital rise. This generates incentives for higher rate of human capital acquisition (Wildasin, 2003; Harris and Schmitt, 2003; and Commander, Kangasniemi and Winters, 2003).<sup>53</sup> Findings from Beine, Docquier and Rapoport (2001) provide empirical support for "beneficial brain drain" growth effect for developing countries.<sup>54</sup>

Wildasin (2003) describes another mechanism where mobility tends to increase human capital investment. By enlarging the market size, where labor services can be sold, the risk of incomeloss is minimized and the expected return of personal education investments increases. When workers are freely mobile, the risk of income-loss over their life cycle decreases allowing greater option value of employment opportunity. This positively influences individuals to acquire more human capital.<sup>55</sup> In this model, the impact of free mobility of HQPs on human capital accumulation is positive for all countries.

#### Knowledge Spillovers

Increased mobility of skilled workers facilitates knowledge creation and enhances cross-border knowledge spillovers. Such spillovers benefit both sending and receiving countries in the form of higher innovation, productivity and growth across industries. Brain circulation suggests small country benefits from two-way flow of knowledge workers. A number of recent studies show that spillovers associated with R&D expenditures are substantial. Coe and Helpman (1995) find that international R&D spillovers are of great importance, especially in small open economies (SOEs).<sup>56</sup> The study shows that Canada is a recipient of large spillover effects from US, and more

<sup>&</sup>lt;sup>52</sup> As developing countries increase their share of production of standardized IT products (for instance, semiconductor chips), the advanced economies move on to higher-value products (e.g. microprocessors) and find ways to use their technologies in more productive ways. The idea is in line with Vernon's product-cycle model in international trade literature.

<sup>&</sup>lt;sup>53</sup> More benefit is added up when taken into account the positive external effect of human capital accumulation.

<sup>&</sup>lt;sup>54</sup> Similar argument on beneficial brain drain due to human capital accumulation is also found in several studies, which assume that there is some uncertainty about the ability to move abroad. See a survey by <u>Commander</u>, et al. (2003).

<sup>&</sup>lt;sup>55</sup> Even if an individual has no incentive to acquire more human capital, risk reduction is still beneficial due to expansion of opportunity set, thus larger option value.

<sup>&</sup>lt;sup>56</sup> Eaton and Kortum (1999) show that even for large countries international diffusion of technology is a key factor in productivity growth.

interestingly, global R&D plays an increasingly significant role than domestic R&D for productivity growth in Canada.<sup>57</sup> A recent study by Keller (2002), as mentioned by Harris (2004b), found that the average value of a dollar of US R&D on Canadian productivity growth is 78 percent of the value of a domestic dollar of Canadian R&D. Similarly, Gera, Gu and Lee (1999) demonstrate that R&D spillovers in Canada are primarily international in scope. They also find that international R&D spillovers, particularly from the IT sector, contribute significantly to labour productivity growth across Canadian industries.

Despite the common consent on the economic benefits of knowledge spillovers, the mechanisms transmitting knowledge spillovers remain relatively unknown. Audretsch and Feldman (2003), argue that university research laboratories are a key channel that transmits innovation-generating knowledge to private enterprises. They also note that more recently, a body of research has identified entrepreneurship as another important transmission mechanism.

#### Convergence of Income Levels, Productivity, and Regional Development

In a recent study, Harris and Schmitt (2003) address the question: what is the potential impact of increased labor mobility on the pattern of regional economic activity in a more integrated North American market? The authors suggest that there is no definitive answer. The new theories of trade and geography predict that in some circumstances, increased mobility will lead to regional divergence in economic activity and income levels (Krugman, 1991). Although, the recent work on growth theory suggests the contrary – increased mobility can lead to convergence in income levels and productivity (see, for example, Razin and Yuen, 1997a,b; Harris 2004a).

Supporting the divergence view, the new economic models of firm localization state that firms are attracted by factors derived from operating in close geographical proximity to each other; these are specialized suppliers of inputs, large pools of specialized workers, and knowledge spillovers. This happens largely because of the increasing returns to scale and circular causation effects. The theory predicts that, given low transportation costs, the size advantage of agglomeration leads to higher income growth and productivity as the 'core' region attracting more industries, leaving the rest on the 'periphery'. Factor mobility, thus, reinforces the core-periphery type outcome and provides further incentives for highly-qualified individuals to move to the industrialized core.

In contrast, the convergence of income levels is feasible within a human capital driven model of growth. Razin and Yuen (1997a,b) argue that capital mobility alone can induce convergence in growth rate but *not* in income level. To achieve income level convergence, the mobility of human capital is the key. As skilled workers move from low (real) wage to high wage countries, a rise in wages in the source country leads to a higher rate of human capital accumulation. Higher levels of human capital and knowledge spillovers drive economic growth rates. The process persists until a steady state is reached where real wage per worker and level of human capital are equalized across regions and income and productivity level convergence is achieved. Using data from the US states and EU countries, they find some evidence supporting the income level convergence effects.

Empirical evidence showing the contribution of mobility of HQPs to income convergence within economic unions is mixed. Harris and Schmitt (2003) note that early evidence from the US and EU suggests that actual outcomes are different to those predicted by the new economic geographic models. The experience from the US demonstrates that, where labor mobility is high, and shows that income levels have converged but the pattern of industrial development is relatively uneven. In contrast, the evidence from the EU, where labor mobility is considered low, suggests that income levels across countries vary but industrial patterns are more balanced.

<sup>&</sup>lt;sup>57</sup> A number of studies by Bernstein find similar evidence for Canada (see, for example, Bernstein, 1994). A recent study by Keller (2001) also shows that spillover effects account for 97 percent of the total effect of technology on productivity growth.

## 3.2 Potential Costs Incurred by the Sending Economy

In the traditional brain drain perspective, the economic costs and benefits of mobility are in terms of changes in population size (scale effects). As such, the migration of HQPs is largely viewed as a zero-sum game among countries. When dynamic consideration and heterogeneity of labor are introduced, the costs may change due to the externalities generated over time. Harris (2003) argues that the costs for the country losing human capital arise from two distinct effects: (i) loss in human capital spillovers; and (ii) loss in human capital recipient capacity (which, to some extent, is necessary in absorbing international knowledge diffusion). In addition, there may be associated costs to the sending country in terms of innovation gaps and divergence of income levels and productivity.

#### Loss in Human Capital Spillovers

The idea is based on the notion of increasing returns to scale embodied in the form of "external effect of human capital" (Lucas, 1988). An implication of the Lucas model is that a one-time transfer of human capital between countries could have a long- term effect of raising the income gap. The out migration of highly-qualified people can reduce the growth potential if the observed amounts of human capital transfer are significant enough to impact the average level of human capital in the sending economy. This effect may also generate an increased cost of human capital on those who do not migrate. Large outflows of HQPs could lead to lower returns to public investment in education, including fiscal externality in education (EEAG, 2003).

This argument, however, may not hold in the case of Canada - US. The loss of human capital spillovers due to mobility, as Harris (2004a) argues, is not large in Canada. The reasons are twofold: First, the outflows of highly-qualified Canadians to the US are of limited order of magnitude. Moreover, the evidence indicates that most of the change in the human capital levels in Canada versus the US over time is largely due to changes in the output of education sectors and educational attainment as opposed to migration.<sup>58</sup> Second, there is no consensus on the size of the human capital spillovers. Harris argues that they are extremely small.<sup>59</sup>

#### Reduced Knowledge Absorptive Capacity

The effect refers to the loss in an economy's capacity to absorb international knowledge diffusion.<sup>60</sup> Skilled human capital is a key determinant of the capacity to successfully transfer technological knowledge from abroad. While skilled migration enhances global knowledge creation and spillovers, it may also lower the capacity to capture spillovers in the sending country.

According to Harris (2003), interaction between experts plays an integral role in the transfer of international knowledge in specialized scientific and commercial fields. To the extent, the best and the brightest – the so-called "superstars" are migrating, there may be a larger cost to the sending country.<sup>61</sup>

The EEAG report (2003) highlights that an outflow of skilled professionals may encourage specialization of economic activity away from high-skill intensive sectors. A sending country could

<sup>&</sup>lt;sup>58</sup> Harris (2003) cites Murphy, Riddle and Romer (1996) who point out that Canada had a higher rate of growth of skilled workers during much of the last two decades, which led to a convergence in the human capital intensity of the two economies rather than a divergence.

<sup>&</sup>lt;sup>59</sup> See, for example, Harris (2003). However, a survey of empirical works by Davies (2003) suggests the sizable effect of education externalities (including non-market externalities) that is large enough to justify the use of education subsidy to some extent. However, even based on Davies' study, the current education subsidy could be large enough to compensate for the gap between social and private returns (in other words, these externalities are already taken into account).

<sup>&</sup>lt;sup>60</sup> The literature concerning "absorptive capacity" or the firm's ability to utilize knowledge spillovers is small, but growing (Agrawal, 2002). Other factors identified as determinants of firm's absorptive capacity include connectedness (to other knowledge diffusing institutions and people), and investment in R&D.

<sup>&</sup>lt;sup>61</sup> The superstars constitute exceptional individuals in specific areas. These include sportsmen, executive individuals, team leaders, innovators, and high-technology entrepreneurs. For more discussion on this issue, see Rosen (1982), and Shapiro and Varian (1999).

be left to specialize in medium-technology goods and suffer from an "innovation gap". The outflow of knowledge workers leads to lower rents from innovation in the sending country and negatively impacts entrepreneurship, business formation and the long-term growth potential of an economy. The adverse impacts could be much larger if the movers are from the "superstar" pool. The report argues that business formation in scientific and high-tech areas may be increasingly harmed by the outflow of top scientists. In support of its argument, the report cites a study by Zucker, et al. (1994) that examines the geographical impact of "star scientists" on the birth rates of biotechnology enterprises. The findings show that controlling for measures of overall intellectual capital, the number of star scientists has a strong positive impact on business formation in the local economy.

Mercernier and Schmitt (2003) argue that that free mobility of skilled workers affects production specialization of trading partners and their pattern of trade. Through an illustrative static general equilibrium model, they show that an altered specialization could translate in a transfer of high-tech production between regions<sup>62</sup> that may adversely affect overall innovation rate in the country losing skilled workers. Clearly, more empirical work is needed in this are to validate their findings.

## 4. INTERNATIONAL MOBILITY OF HQPS IN APEC: POLICY IMPLICATIONS

Three major conclusions emerge from the discussion in the previous sections. First, the "brain drain" perspective suggests small efficiency gains and strong distributional effects – the migrating factor and receiving country gain and immobile factors in the sending country lose. This suggests a brain drain from low-income developing countries to high-income developed countries, which is exacerbated when it is the "best and brightest" that leave (Eden, 2004). Harris (2004b) argues that from a policy angle, this perspective implies countries strategically compete to attract HQPs.

Second, the "brain circulation" perspective suggests that international mobility of HQPs creates a two-way flow of knowledge that can benefit both the sending and receiving countries. Additionally, global benefits are possible through an improvement of international flow of goods and services, and through the formation of international research/technology networks. A key policy implication is to focus on policies that increase the cross-border mobility of HQPs.

Third, the economic integration perspective suggests that deeper integration between economies (regional or bilateral) through trade and FDI may encourage productivity and income convergence across countries over time, so it is possible that mobility of HQPs might also have this effect. Harris (2004b) argues that labor market integration initiatives within free trade areas may carry large benefit to small economies. According to this perspective, then that the economic policy discussion surrounding the cross-border movement of HQPs must take into account the wide variety of ways the migration of labor affects the economy. In particular, attention must now turn towards the links between these movements, and the institutions regulating them, and the performance in the trade of goods and services; foreign direct investment; human capital formation and MNE location; and income convergence between countries.

In this section, we examine two sets of policies (i) labor market integration policies within free trade areas such as Canada and the US, EU, and Australia and New Zealand; and (ii) policies either increasing the international mobility of HQPs and/or increasing a economy's ability to attract globally mobile knowledge workers. Harris (2004b) argues that the former set of policies can be thought of as 'free trade in labor services', and the latter as unilateral policies to increase the economy's competitive advantage in skill-intensive knowledge industries. In our discussion, we consider the former set of policies as those relating to trade, harmonization, and deeper economic integration between economies (regional or bilateral) whereas the latter set policies include immigration, domestic labor market, and science and technology, education, and tax and fiscal policies.

<sup>&</sup>lt;sup>62</sup> Their simulation result also shows that the wage inequality between skilled and unskilled workers increases due to trade and globalization. This, in turns, creates incentives for skilled workers to migrate to take advantage of earning differentials.

## 4.1 International Mobility of the HQPs: Policies in the Integrated Labor Market Economies

In recent years, a number of regional and bilateral free trade and investment agreements have come into effect to reduce barriers on trade in goods and services and capital movement. The integration agenda is now moving towards more coordination or integration of the labor markets. Harris (2004b) argues that slowing down of the income and productivity level convergence process between Canada and the US, for example, may partly be due to cross-border barriers in HQPs mobility.

In the discussion to follow, we focus on the experience of four regional agreements governing the international movement of labor. These include the North-American Free Trade Agreement (NAFTA), in particular its provisions on temporary movement of skilled workers; the Schengen Agreement for the European Union; the Australia-New Zealand Trans-Tasman Relations, and some recent implementation of schemes facilitating temporary transfers of business people in APEC.

## Policies towards Canada-US HQP Mobility: the NAFTA

The agreement mainly applies to free trade in goods and services between Canada, the US and Mexico. It is not an exaggeration to view NATFA as two *de facto* arrangements; one governing economic relationships between Canada and the US (as a descendant of Canada-US Free Trade Agreement - CUSFTA) and the other between the US and Mexico. This is partly due to the fact that the economic relationship between Canada and Mexico has not yet fully developed. In the following review, we focus on the labor mobility provisions under NAFTA, which affect a segment of Canada and the US labor market, i.e. the mobility of high-skilled professionals.

The genuine single labor market between Canada and the US is yet to emerge. To date, citizens of one country are required to have residency permits from the residing country in order to work and stay permanently (i.e. a landed immigrant status in Canada or a green card in the US). An exception is made for cross-border movement (temporary entry) of business persons under NAFTA which covers only certain specialty occupations.

Cross-border movement of business persons is administrated under NAFTA Chapter 16. For the US and Canada, this chapter is carried over from Chapter 15 of the previous Canada-US Free Trade Agreement (CUSFTA). The provisions facilitate the cross-border movement of four classes of business persons: Business visitors, Professionals, Intra-company transferees, and Traders and Investors (see detail in Box 4.1).

## BOX 4.1

Chapter 16 of the NAFTA facilitates the cross-border movement of four categories of business persons:

1. **"Business Visitors"** are business persons who plan to carry on any business activity related to: research and design, growth, manufacturing and production, marketing, sales and distribution, aftersales service and general service.

2. "**Professionals**" are business persons who plan to carry out professional activities of the types indicated in NAFTA Appendix 1603.D.1 for an employer or on contract to an enterprise located in a member country other than one's own.

3. "Intra-Company Transferees" are business persons who are employed by an enterprise to perform management or executive functions or who bring specialized knowledge to this enterprise or its subsidiaries or branches established in one of the member countries. The business person must have been employed abroad in a similar capacity by the foreign company for at least one year out of the preceding three.

4. "Traders and Investors" are business persons who plan to carry out trade in goods and services

principally between member countries, or to establish, develop, administer or provide consulting or technical services for the administration of an investment to which foreign capital has been committed or is in the process of being committed.

Accompanying Spouses and Dependents must meet existing immigration requirements for temporary entry. In addition, unless a spouse or dependent qualifies on his/her own merit for an employment authorization under the NAFTA, he/she must go through the regular job validation process applicable to all temporary foreign workers.

The NAFTA Temporary Entry Working Group (TEWG) is mandated to consider the waiver of labour certification tests or procedures of similar effect for spouses of business persons who have been granted temporary entry for more than one year. Canada supports the extension of reciprocal employment benefits under the NAFTA to spouses of business persons (professionals, intra-company transferees and traders/investors) and continues to pursue this issue in the context of the TEWG.

Source: Department of Foreign Affairs and International Trade, The North American Free Trade Agreement, http://www.dfait-maeci.gc.ca/nafta-alena/cross-en.asp

Both the CUSFTA and NAFTA have brought major benefits to Canada. The performance of merchandise trade has been very good, while overall growth in service trade has improved a little, though particular service industries did benefit. FDI between the US and Mexico got a clear boost from NAFTA, a gain of 288 percent in two-way FDI stock between 1993 and 2001. In contrast, two-way FDI stock between Canada and the US increased by 135 percent between 1989 and 2001. Financial integration has also improved between Canada-US and US-Mexico through cross-border mergers and new corporate subsidiaries (Hufbauer and Schott, 2004).

However, when one compares the relative shares of exports and imports in goods and services between Canada and the US or shares of inward and outward FDI, it is clear that the migration shares are far smaller than other economic linkages. Thus, the border matters more for labor flows than it does for trade and FDI. A better understanding of the barriers to labor mobility between Canada and the US, relative to the barriers of trade and investment, is needed<sup>63</sup> To achieve the full benefits of economic integration, some further work remains to be done in a number of areas, including elimination of all non-tariff barriers (such as countervailing and antidumping duties); broadening NAFTA coverage to include agricultural products; reducing the cost to industry of complying with a number of special rules, such as rules of origin; and closer integration of regulatory regimes in North America. The key issue for Canada, Dodge (2003) argues, is to reduce "border risk", that is, guarantee Canadian producers and service providers access to US markets without hassle and expense at the border as borders still do matter. He recommends a number of steps that could help in this respect: a common tariff - that is, a customs union and common border practices for imports from, and exports to, overseas markets; harmonization of trade and commercial policies and regulation; an end to the application of trade remedies within North America; and a uniform policy with respect to federal and state/provincial subsidies.

More importantly, from the US point of view, border security is an important element of deeper economic integration; security integration and economic integration are clearly linked.

Dodge (2003) argues that to realize real welfare gains from the NAFTA, further integration of labor markets must take place. Greater harmonization of policies and adoption of common licensing standards in North America are key to reducing barriers to cross-border mobility. However, this is a complex issue as it has serious implications for existing policies in areas such as the provision of health care and the regulation of public health and drugs, and immigration policy. Hart (2004) suggests that there is still scope for improvement by the two governments to arrive at cooperative solutions in order to lessen the impact of border and non-border related barriers to HQP 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,

<sup>&</sup>lt;sup>63</sup> See, for example, Eden (2004) for the remarks she made at the International Mobility of Skilled Labour Roundtable, Ottawa, Canada, February 27, 2004.

accreditation, and other deterrents to the cross-border movement of the HQPs, or an agreeable way to reducing the impact of differences in labor market and similar regulations.

On the international trade front, policies affecting trade in services will certainly influence the movement of HQPs internationally. An approach towards liberalization of the service supply modes under GATS<sup>64</sup> will reduce barriers to labor mobility. Cattaneo and Neilson (2003) indicate that there exists economic gain from liberalization to all trading partners but the economic impact may vary between nations. They also suggest that studies on the economic impact remain inconclusive and more empirical works are in dire need.

#### Policies towards HQP Mobility: European Union

The principle of the free cross-country movement of people between EU countries had been one of the major goals of the original Treaty of Rome since 1957. However, the implementation had been slow until 1995 when the Schengen Agreement came into full effect. The accord has had a major impact of reducing the border controls on the free movement of people between the 13 EU members plus Iceland and Norway (although, the UK, Ireland, and the 10 new members are not parties of the Schengen Treaty).<sup>65</sup>

The Schengen accord has brought about the freedom of movement of people regardless of their nationality between the member states (see Box 4.2 on key points of the Schengen Agreement). This applies not only to travelers but also workers. Work permits are not required from nationals of member states who seek employment in another member country.

## BOX 4.2

#### Key Points of the Convention Implementing the Schengen Agreement

- Citizens of countries implementing the Schengen Agreement can cross the internal borders of the implementing countries at any point without checks.
- A visa with no territorial restrictions (visitor's or business visa allowing the holder to stay up to 90 days per six-month period, transit or airport visa) granted to a third-country national by one implementing country entitles the holder, for the same purpose and for the duration of the visa's validity, to enter without border checks other implementing countries as well.
- Any third-country national with a residence permit valid in one implementing country may travel on a valid passport, without requiring a visa, for up to 90 days per six-month period to other implementing countries.
- Harmonized visa policies of Schengen countries (common list of third countries whose nationals require visas).
- External border checks according to a common Schengen standard.
- Access by all Schengen countries to the Schengen Information System (SIS) providing personal identity and other data throughout the Schengen area.
- Close police and judicial cooperation.
- Joint efforts to combat drug-related crime.
- Rules determining competence for asylum procedures (now largely replaced by similar provisions in the Dublin Convention of 15 June 1990).

Source: Federal Foreign Office, Government of Germany,

http://www.auswaertiges-amt.de/www/en/willkommen/einreisebestimmungen/schengen\_html

<sup>&</sup>lt;sup>64</sup> In particular for service providers or Mode 4, which is still under negotiation between WTO members.

<sup>&</sup>lt;sup>65</sup> Current members as of 2004 are Austria, Belgium, Denmark, France, Finland, Germany, Greece, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain and Sweden.

The intra-EU mobility of highly skilled EU citizens has been on the rise, albeit in small magnitudes, while the observed movement of the less skilled people has declined. Mobile HQPs are those with specific skills, in particular in the information communication technology field (Hart, 2004). Furthermore, there is an increasing trend of non-EU skilled workers arriving from less developed regions, such as Turkey, former Yugoslavia, Algeria, and Morocco. For the moment, it is still too early to see the effect on labor mobility of the EU enlargement (with ten new members), which took effect in May 2004.

Despite the fact that the labor market for these EU countries is practically borderless, the intra-EU labor mobility remains nominal. An estimate of 0.1 and 0.2 percent of total population per year moved between member states, according to the EU Commission's Social Situation Report 2002. Several factors were identified as causes of low mobility, for example, the reduction in the economic well-being gap between the member countries, the transition to knowledge-based economy, which, arguably, requires less geographical movement of skills, the language and cultural barriers, and the increasing participation of women in the labor market (Hart, 2004).

It is crucial to recognize that the borderless labor market does not imply that countries opt for the same laws and regulations governing professions, taxation, and other social incentives. The issue of harmonization remains sensitive and controversial. In 1997, attempts were made towards the creation of a true single market between EU members. Discussion was made on the plan to promote and encourage longer term labor mobility by removing embedded social dis-incentives (Hart, 2004). It remains an interesting investigation to understand how the EU countries manage to reconcile their different practices on professional accreditation, licensing, and other labor market regulations such as union membership and employment standards.

Up until now, the EU has been quite successful in eliminating the border-related barriers to the free mobility of its people. As Hart (2004) points out the small magnitude of movement does not reflect the strength or weakness of the intra-EU migration scheme. What is important is the institutional change that abolishes barriers, not the extent of its impact on the individual's behavior. The cooperation on free movement of workers necessitates the future cooperation between member states in many other related areas, such as employment benefits, freedom of movement for spouses and dependents, licensing, accreditation, and other labor market practices. The full benefits of bona fide single labor market will only be realized when countries find ways to cooperate in these many aspects. This is to say that a complete harmonization is not a necessary condition to reap full benefits of integrated labor market. This type of cooperation is exemplified by the following case of Australia-New Zealand labor market relations.

#### Policies towards HQP mobility: Australia-New Zealand (Trans-Tasman Relations)

Australia and New Zealand Closer Economic Relations (CER) started with the free trade agreement in 1983. All tariffs and quantitative restrictions on goods trade between the two countries had long been eliminated. The protocol signed later in 1988 brought services trade into CER. Today, almost all Trans-Tasman trade in services is open.

Beyond the principle CER agreement on trade, Australia and New Zealand have entered into deeper economic integration by signing many other agreements and arrangements. We focus on the following agreements, which are mainly related to labor market integration – the Trans-Tasman Travel Arrangement, and the Trans-Tasman Mutual Recognition Arrangement.<sup>66</sup>

Since the 1920s, there has been a free flow of people between Australia and New Zealand under various arrangements. The Trans-Tasman Travel Arrangement (TTTA) introduced in 1973 allows

<sup>&</sup>lt;sup>66</sup> The two economies are deeply integrated in many aspects. Among others, a notable Social Security Agreement is a cost sharing arrangement covering social benefit programs such as aged pensions, disability supports. The Reciprocal Health Care Agreement 1998 deals with access to health care by Australians and New Zealanders. Other agreements on closer economic relations are, for example, the Double Taxation Agreement, the Customs Cooperation Arrangement, the Joint Australia New Zealand Food Standards Code, the MOU on Business Law Coordination, the Joint Accreditation System Australia and New Zealand (JAS-ANZ), and the Open Skies Agreement.

Australian and New Zealand citizens to visit, live, work and remain indefinitely in either country without the need to apply for authority to enter. The TTTA is not a binding bilateral treaty between the two countries, but rather is a series of immigration procedures applied by each country and underpinned by joint expressions of political support. The most recent reaffirmation of the TTTA was the new Trans-Tasman social security arrangements in 2001.<sup>67</sup> In practice, the TTTA has effectively created a borderless labor market between the two nations.

The Trans-Tasman Mutual Recognition Arrangement (TTMRA) represents a significant step in reducing non-border impediments to labor mobility and enhancing freedom of skilled practitioners to work in both countries. Signed in 1998, the objective of TTMRA is to provide that a person who is registered to practice an occupation in either country is entitled to practice an equivalent occupation in the other, and goods that may legally be sold in either country may be sold in the other. Regarding the registration of occupations, the agreement covers all occupations for which some form of legislation-based registration, certification, licensing, approval, admission or other form of authorization is required by individuals.<sup>68</sup>

## **APEC Policies on Business Mobility**

The APEC member economies are committed to enhancing business mobility. Several initiatives were established in order to achieve this goal, for example, works in developing standards to improve the quality and consistency of the immigration services, the Advanced Passenger Information (API) and Advanced Passenger Processing (APP) systems providing convenient border clearance for airline passengers, the APEC Business Travel Card scheme and intracompany transfers (see Box 4.3 on key initiatives of APEC Business Mobility Group). The last two initiatives tend to contribute most to facilitating movement of skilled workers between the member economies.

#### BOX 4.3

#### Key Initiatives of the APEC Business Mobility Group

- The APEC Business Travel Card: express border processing through special airport lanes for cardholders, and multiple entry to participating APEC economies.
- Intra-Company Transfers: A 30-day processing standard for applications for and extensions of temporary residence permits for APEC Intra Company transfers.
- The APEC Business Travel Handbook: up to date information on visa and entry arrangements across the APEC region.
- Advance Passenger Information (API)/Advance Passenger Processing (APP): streamlined border processing for all passengers and increased border security for participating economies through the use of communications technology which enables the border clearance of passengers before they board aircraft.
- Standards, a Key to Building Capacity: Economies have agreed to develop and implement standards in all major immigration areas, as a foundation for improving immigration programs and services.

Source: APEC Business Mobility Group (or the Informal Experts' Group on Business Mobility, http://www.businessmobility.org/key/index.html

<sup>&</sup>lt;sup>67</sup> Under the 2001 bilateral social security arrangements, New Zealand citizens are required to apply to become formal permanent residents of Australia if they wish to access certain Australian social security payments, obtain Australian citizenship or sponsor people for permanent residence. These changes do not affect the Trans-Tasman Travel Arrangement, which remains the primary means by which New Zealand citizens travel to and stay in Australia. (Population Flows: Immigration Aspects, DIMIA, March 2004).

<sup>&</sup>lt;sup>68</sup> A separate mutual-recognition arrangement between the two countries applies for the case of medical practitioners.

The APEC Business Travel Card scheme provides frequent business travelers with visa-free travel and fast-track airport processing when visiting participating economies. Australia, Korea and the Philippines had successfully implemented the scheme since 1998. Today there are 16 participating economies, including Canada; China; Hong Kong, China; and Japan but not the US. The scheme cuts though the red tape of business travel and directly facilitates the cross-border movement of business people.

The initiative on intra-company transfers provides a 30-day processing standard for applications for, and extensions of, temporary residence permits for APEC intra-company transfers of executives and senior managers. In 2001, participating economies agreed to extend the scope of the initiative to "specialists", however there is no common definition for such group. Nevertheless, members agreed that what constituted a specialist would be defined by individual economies.

## 4.2 Policies to Attract HQPs: Unilateral Initiatives in Selected APEC Economies

## Immigration policy

Manufacturing and services activities in the new global economy increasingly rely on the acquisition and deployment of human expertise. As Head and Ries (2003) point out, knowledge workers are one of the most important internationally mobile resources and the international competition for the mobile factor has increased their cross-border mobility. With the emergence of an international skills market, a national ability to train, retain and attract global knowledge workers is a key to sustaining or stimulating a country's economic growth. Competition for these mobile resources has a strong zero-sum aspect to it, at least as perceived by policy makers and the enterprises engaging in the strategic competition game (Harris, 2004b). National governments are competing via various policies for these workers. In this section, we focus on the immigration policies aimed to attract foreign skilled labor.<sup>69</sup>

Traditional immigration APEC economies like the US, Australia, and Canada have comprehensive immigration schemes specifically aimed at attracting highly-qualified migrants on a permanent basis. A program for permanent migration of skilled foreigners is usually based on a points system. Notable pioneers and users of the skill-based points system are Canada and Australia. Table 4.1 reproduced from McHale (2002) provides a broad overview of skill-based permanent immigration policies in Canada, Australia, Germany, the UK, and the US.

Many countries show significant improvement in shortening the length of time taken for application and approval of permanent immigration in addition to reducing speed-retarding red tape. These are important elements in competition for skilled foreigners. Germany and the UK are two notable countries that have showed significant improvement (McHale, 2002). The German government recently passed an immigration reform bill with a points-based system. In the UK, the Highly Skilled Migrants Programme (HSMP) was introduced in early 2002. In Australia, self-assessment of skills before permanent migration application has helped simplify the procedure, while, in Canada, the processing time can take more than 18 months especially for high-volume countries such as China and India.

Greater permissibility of applying for permanent status while working under a temporary working visa is a strong element in attracting HQPs 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).

<sup>&</sup>lt;sup>69</sup> Other attraction policies include tax incentives for foreign skilled workers, lenient regulations on business creation and entrepreneurship, R&D incentives, continuing education incentives such as scholarships and financial assistance for graduate students. The comparative study on these policies deserves a thorough investigation and will not be in the scope of our review here.

	Canada	Australia	Germany	UK	US
Program	Independent skilled workers program	Skill migration (multiple programs <sup>a</sup> )	New immigration law (effective 2003)	Highly skilled migrant program <sup>b</sup> (introduced on pilot basis in Jan.02)	Employment- based preferences (permanent residency)
Number ( percent of total) 1995 2000	81,000 (38%) 118,000 (52%)	24,100 (29%) 44,730 (56%)			85,300 107,000
Сар	No	No	No	No	Yes (140,000)
Points system	Yes	Yes <sup>c</sup>	Yes	Yes	No
Labor market test	No	No	No	No	Yes (with exception)
Selection criteria	Age, language, education, experience, job offer, adaptability	Age, language, education, occupation <sup>d</sup> , experience	<ul> <li>(i) Highly skilled professionals</li> <li>with job offers:</li> <li>qualifications</li> <li>and earnings;</li> <li>(ii) workers</li> <li>without job</li> <li>offers: points</li> <li>system</li> </ul>	Past earnings <sup>e</sup> , education, experience, professional achievement	Job offer (certification from the Department of Labor or no adverse impact on domestic workers required in most cases <sup>f</sup> )
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%)

## Table 4.1 Skilled-focused Permanent Migration Programs in Selected Countries

(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 percent), certification not required; (E2) professionals holding advanced degrees (28.6 percent), certification required; (E3) professional holding bachelors degrees and other workers (28.6 percent), certification required; (E4) special immigrants (7.1 percent); and (E5) employment creation investors (7.1 percent), 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

Attracting highly-qualified foreigners on a temporary basis is becoming increasingly important for countries as a strategy to cope with labor 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 labor shortages (McLaughlan and Salt, 2002). While fewer countries (such as, 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<sup>70</sup>, have modified the existing work permit systems to facilitate entries of IT specialists. In some dynamic Asian economies, such as Singapore, Chinese Taipei, and China, measures have recently been implemented to ease skill shortages in the information and communication sector (OECD, 2002b).

Generally, a job-offer is needed when a highly-qualified foreigner applies for a temporary working visa. While inquiring for a job offer or an employment letter from an employer may not be deemed as impediment to HQP attraction strategy, an official requirement on a "labor market test" or "validation" could be considered a hindrance. 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 gualifications, 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 land immigrant, and that allowing a foreign national to fill the position is unlikely to have a negative effect on the Canadian economy and labor force. Employers of NAFTA-TN workers and software developers are exempted from this process. In the US 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 4.2 presents the defining features of national policies to support and encourage temporary migration of HQPs in Canada, Germany, France, the UK, and the US (reproduced from McHale, 2002).

Many countries have managed to reduce the length of time taken for work permit approval although the UK provides a faster response rate (McLaughlan and Salt, 2002). In Canada, 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.

<sup>&</sup>lt;sup>70</sup> In Germany, the government introduced a "green card" program under which 20,000 computer and technology specialists can work in Germany for up to five years. By 2001, about 10,000 of them had found employment in Germany. OECD – STI Outlook 2002 Ch. 8.

	Canada	Australia	Germany	UK	US
Program	Employment authorization – temporary residents	Temporary (long stay) business entry	IT specialists temporary relief program ("Green Card") <sup>a</sup>	Work permits	H-1B specialty professional workers
Number (2000/01)	86,225 <sup>b</sup>	40,493 <sup>c</sup>	8,000 <sup>d</sup>	82,437 <sup>e</sup>	201,079 <sup>f</sup>
Job offer required	Yes	Yes	Yes	Yes	Yes
Сар	No	No	Yes (20,000 total)	No	Yes (195,000 per year)
Labor 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" <sup>h</sup> )	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	Yes <sup>1</sup>	Yes
Length of visa (max.)	3 years	4 years	3 years	5 years	3 years
Renewable	Yes	Yes	Yes (5 yr max.)	Yes (10 yr max.)	Yes (6 yr max.)
Spouse employment	No <sup>ĸ</sup>	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

## Table 4.2 Skilled-focused Temporary Migration Programs in Selected Countries

(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 30 June 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 the 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 labor 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 labor market test (McLaughlan and Salt, 2002).
- (I) 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: McHale (2002), Table 3

Another effective measure many countries have adopted, is retaining foreign graduates by allowing foreign students to change their visa status at the end of their education and permitting their entry into the labor market. In the US, almost half of new recipients of H-1B visas are students who graduated from US schools. In several APEC/OECD economies such as Australia, Canada, Germany, France (for IT graduates only) and Switzerland, amendments were made to allow students to stay temporarily after the completion of their studies in order to search for jobs in the host country. Measuring the efficacy and success of these attraction policies remains a challenge to most countries. According to McLaughlan and Salt (2002), only a few cases, notably Australia, the US, and Germany, have showed systematic attempts either to collect the necessary data or carry out a full evaluation and follow-up research in this respect. Frameworks for evaluation are only beginning to work out. Criteria for determining success include qualitative assessment of policy objectives, quantitative measurement of outcome against target, public opinion, level of complains from employers, applicants, as well as other stakeholders like trade unions.

In summary, advanced APEC/OECD economies have adopted policies to attract internationally mobile HQPs by (1) encouraging immigration of the highly-qualified through specialized skill-related visa programs; and (2) encouraging immigration of potential HQPs by attracting specialized students.

## Domestic Labor Market Policy

Harris (2004b) argues that greater flexibility of labor markets is consistent with, and generally encourages a more mobile workforce. OECD research shows that the mobility of S&T professionals, for example, between sectors and regions remains low in many countries due to administrative and regulatory barriers. (OECD, 2003b)

Canadian labor markets, for example, are fairly flexible by OECD standards. However, certain institutional problems such as (1) inadequate recognition of foreign credentials, and (2) multiplicity of jurisdictions regarding labor laws create barriers to mobility and affect the successful integration of immigrants into the labor force.

According to OECD (2003a), there is some anecdotal evidence showing that the barriers in credential recognition are greater in Canada than in the U.S. This is partly due to relatively more strict regulations on professions and trades, and also more conservative attitude of Canadian employers towards foreign work experience. The problem of inadequate recognition of foreign credentials in Canada is partly reflected by the fact that the returns to education are lower for foreign-educated immigrants than for the Canadian-born (OCED, 2003a). Similarly, foreign work experience, especially from developing countries, yields little returns in Canadian labor market. Organizations which regulate or license trades and professions may not recognize or be able to properly evaluate their credentials; there are similar issues to consider in non-regulated occupations. The result is that foreign skilled workers tend to be unemployed or underemployed in the Canadian labor market, this impacts subsequent flows of skilled migrants, whether temporary or permanent.

Recognizing that barriers to mobility of skilled workers could generate welfare loss to the economy, the federal and provincial governments have responded to the credential recognition problem. To reduce imperfect portability and information uncertainty of foreign credentials, the Canadian Information Centre for International Credentials (CICIC) was established in 1990. The CICIC works as a national clearing-house and provides referral services to support recognition and transferability of educational and occupational qualifications between Canada and other countries. It also serves as a link for Canadian academic and professional bodies to international organizations and to information centers around the world.<sup>71</sup> At provincial level, programs are set up to support credential evaluation services for certain professions.<sup>72</sup> In addition, some self-regulated professional organizations, such as the Medical Council of Canada and the Canadian

<sup>&</sup>lt;sup>71</sup> See http://www.cicic.ca

<sup>&</sup>lt;sup>72</sup> Ontario, Quebec, Alberta, Manitoba, and British Columbia

Council of Professional Engineers, offer the evaluation of foreign credentials related to their specialties.

The second key institutional barrier to skilled-labor mobility – the problem of multiplicity of jurisdictions regarding labor laws – affects both Canadian-born as much as foreign workers but can be more obstructive for the latter due to their lack of familiarity with the system (OCED, 2003a). In Canada, diversity of provincial standards exists in such key areas as labor markets, financial markets, and the markets for some services. In 1995 an intergovernmental agreement – the Agreement on Internal Trade (AIT) was established. It focuses on reducing trade barriers between provinces and territories and harmonizing inter-provincial standards. Under the labor mobility chapter, restrictions on internal labor mobility have been officially removed since July 2001. For example, all local residency requirements have been eliminated and the mutual recognition agreement on professional certification now covers 97 percent of regulated professional workers (OECD, 2003a). Clearly, there is recognition that the harmonization of regulatory standards in the labor market is the key step in moving towards freer movement of workers both domestically and beyond.

In his speech delivered to the Couchiching Institute on Public Affairs on the economic integration of North America, the Governor of the Bank of Canada stressed that resolving the domestic multiplicity of jurisdiction is the first step towards capturing the full benefit of deeper economic integration within NAFTA. Canada has a non-trivial problem in this regard. In Canada, for example, there are different criteria for professional certification of trades people, different provincial securities regulations and different rules related to transportation. It is very important that we harmonize regulatory standards between provinces in Canada.<sup>73</sup>

Coordination and further implementation of these measures remain a challenge to governments, self-regulated bodies, as well as employers and employees. More research is needed on assessment and evaluation of these policy changes, such as the new immigration act, and how it impacts international mobility of skilled workers.<sup>74</sup>

## Science and Technology (S&T) policy

Science and technology policies are critical to attracting globally mobile S&T personnel. To a large extent, the policies towards science and technologies in most APEC/OECD economies have embraced the notion that the creation, diffusion and use of knowledge has been and will continue to be one of the main factors underpinning their long-term productivity performance.

Canada, for example, has a significant "innovation gap' (Government of Canada, *Achieving Excellence*, 2002). Canada's overall level of innovation capacity is near the bottom in the G-7. Over the past few years, Canada has been reinvesting in S&T and focusing on a number of new initiatives including reforming the organization and governance of universities and public research, support for private-sector R&D and innovation, promoting collaboration and networking among private and public sector organizations, promoting industry-science relations, and sponsoring programs to foster international collaboration in science. Some new infrastructures for research and innovation measures include the creation of the Canadian Foundation for Innovation, Canada's Networks of Centres of Excellence, Research Chairs and enhanced funding for the Granting Councils. Consistent with these efforts, the government has recently embarked on its

 <sup>&</sup>lt;sup>73</sup> Remarks by David Dodge, Governor of the Bank of Canada, to the Couchiching Institute on Public Affairs,
 <sup>7</sup> August 2003 (www.bankofcanada.ca/en/speeches/2003/sp03-11.htm)
 <sup>74</sup> In a comparative perspective, the EU countries also face similar barriers to labor mobility. A recent report

<sup>&</sup>lt;sup>74</sup> In a comparative perspective, the EU countries also face similar barriers to labor mobility. A recent report on the European survey of businesses has identified the key policy-related factors that businesses see as hindering the free movement of workers in Europe. These include the lack of integrated EU-wide employment legislation, differences in tax and benefit systems, pensions, foreign credential recognition, and immigration procedures (PWC, 2002).

Innovation Strategy. In 2002, the Government of Canada released *Achieving Excellence* and *Knowledge Matters* – the foundation pieces for its innovation strategy.<sup>75</sup>

Science and Innovation polices matter for the international mobility of skilled workers. The new infrastructure measures for research and innovation have fostered return migration of top Canadian talents. Some examples of anecdotal evidence are: (1) more than 150 scientists have come back to Canada from universities and institutes in the US, Europe and Australia in the last three years; (2) Canadian Research Chairs have attracted about 840 scientists and social scientists, including about 160 recruited from other countries.<sup>76</sup> Chinese Taipei and Ireland have also succeeded in attracting return migrants and fostering "brain circulation" in S&T professions.<sup>77</sup> At the same time, China and India are developing their own scientific research base and actively recruiting back highly-qualified expatriates.

Obviously, a country's innovation performance is highly endogenous. It depends on a myriad of factors only a subset of which are subject to direct policy influence – e.g. support for R&D or higher education, flexible labor market policies, appropriate intellectual property regimes, etc. Clearly, these policies encourage international mobility of S&T personnel. OECD (2003b) argues that research employment is increasingly becoming more dynamic and involves greater collaboration between universities and private sector firms in the new global economy. Consequently, mobility of S&T personnel is becoming more important to matching supply and demand and diffusing knowledge. To foster mobility of researchers both at the national and international level, it is critical to reduce regulatory barriers and create incentives. Many OECD countries are taking a number of initiatives for fostering the mobility of researchers. Examples include, regulations on dual employment or restrictions on participation in entrepreneurial activities are being removed; creating incentives for mobility between public research and business; competition for research funds; human resource management policies in business and public research institutions that reward mobility in career advancement.<sup>78</sup>

More importantly, there is clear need to coordinate science and innovation policies with migration policies to enhance the attractiveness of APEC economies as a destination for attracting S&T professionals.

## Tax and Fiscal Policy

Tax incentives play an important role in facilitating recruitment of internationally mobile HQPs or developing repatriation schemes for national experts who live or study abroad (OECD, 2003c). Some OECD governments use special tax incentives to attract highly mobile professional and technical workers. For example, in Belgium, highly-qualified professionals including executives and researchers are eligible for a special non-resident tax status which grants a tax exemption for days spent outside the country. A key condition is that employment must be with a qualifying entity such as a scientific research center or laboratory, or business under foreign control and it must be of a temporary nature. Sweden passed a similar law in 2001 to reduce the tax burden on foreign experts that remain in the country for less than five years. The Netherlands uses comparable tax incentives for HQPs. OECD (2003c) notes that these tax incentives have proven to be cost-effective means of recruiting and retaining HQPs.

<sup>&</sup>lt;sup>75</sup> The government's strategy (<u>www.innovationstrategy.gc.ca</u>) is focused on four inter-related priorities: (1) Create and use knowledge strategically to benefit Canadians: promote the creation, adoption and commercialization of knowledge; (2) Increase the supply of highly qualified people: ensure the supply of people who create and use knowledge; (3) Work toward a better innovation environment of trust and confidence, where public interest is protected and marketplace policies provide incentives to innovate; (4) Strengthen communities: support innovation at the local level so our communities continue to be magnets for investment and opportunity.

<sup>&</sup>lt;sup>76</sup> See, for example, Globe article by Anne McIlroy, Science Reporter, March 26, 2003.

<sup>77</sup> OECD/STP/(2002)34

<sup>&</sup>lt;sup>78</sup> See, for example, OECD--DSTI/STP(2003)30, 14 October 2003.

In a Canadian study, Harris (2004b) argues that selective tax incentives be used to encourage Canadians to take up temporary jobs outside the country in knowledge-intensive professions. The study also recommends offering reduced income tax rates to attract HQPs returning from abroad,

## Education Policy

Education structures, organization and functioning in the APEC regions are far from uniform. Each education system has its strengths and weaknesses. Economies with high graduation rates at the tertiary level, which is an indicator of advanced knowledge by the education system, are more likely to be developing or maintaining a mobile skilled labor force. Harris (2004b) argues that a highly skilled labor force is more likely to be mobile than a less skilled labor force. He suggests that global mobility of HQPs could be encouraged in a number of ways. For example, more emphasis could be placed on the year of 'study abroad' option. In Canada, such a scheme is mildly popular with respect to European destinations there are very few undergraduate programs which target either the US or Mexico. The study recommends that federal government could explicitly provide scholarships for such kinds of educational activities. Moreover, support of graduate students studying abroad would also increase the number of Canadians with 'foreign experience'.

## 5. SUMMARY AND CONCLUSION

In the knowledge-based economies of today, HQPs are indispensable to an innovative economy. Reaching the goal of a more innovative economy requires that the highly-qualified workforce is of sufficient quantity and quality to support the expansion of innovative activities by firms. Satisfying this key condition for the labor force poses challenges as HQPs have become increasingly mobile and the market for some segments of highly-qualified workers has become more global. Many industrialized countries compete strategically in attracting these workers. Therefore, in adjusting to new skill requirements, APEC economies must consider their performance in attracting HQPs from the rest of the world and in retaining domestic talents.

Consequently, it has become increasingly important to understand key issues surrounding the international mobility of HQPs in order to adopt the right policy approaches towards it. Attention must now turn towards improving our understanding of the issues such as what are the implications of this new trend for the APEC economies? Would facilitating international mobility for HQPs bring economic benefits to the participating economies?

This paper focuses on four key issues and identifies policy initiatives and potential directions for future research. First, it examines the global trends in the international migratory flows of HQPs. Second, it discusses the fundamental (non-policy) drivers of the increased HQP flows in the new global economy. Third, it reviews the literature on the economic costs and benefits associated with cross-country movement of HQPs and the main factors conditioning these costs and benefits. Finally, we address the question: how policy has adjusted or should adjust to increased international HQP mobility in the new global economy?

Our findings show that international mobility of HQPs has increased significantly in the last decade, especially from Asia to major APEC/OECD economies. Three observations are particularly notable: First, the mobility of HQPs has increased among industrialized APEC economies in the 1990s; Second, the increase in HQP migration is characterized mainly by temporary inflows as opposed to permanent inflows; and Third, there is some evidence on return migration from APEC/OECD economies. Interestingly, the experiences of the integrated labor market economies have mixed experiences. For example, in the North American context, the temporary outflow of highly-qualified Canadians to the US under TN visa increased significantly in the 1990s, particularly during the 1997–2002 period. In contrast, labor market integration in the EU countries does not seem to have led to an increase in flows of workers between regions. Although, there is some evidence of an overall increase in mobility of workers within

organizations, the relative importance of virtual and short-term assignments has increased significantly among the EU countries.

Measuring the scale of the international movement of highly skilled individuals remains a challenge. We need to have a better understanding of the pattern and direction of flows, and the characteristics of movers. We need answers to questions such as are HQPs, much like capital and FDI, becoming more mobile globally than in the past? Are global movements of HQPs becoming more multi-dimensional (brain circulation) than in the past or do they tend to be one-way flows (brain drain)? Are the patterns of HQP migration across countries much different than those within a national labor market such as the US or Canada? What is the history of HQP migration in an integrated labor market such as the European Union?

A recent European report points out that international mobility of HQPs is becoming increasingly important to business as they are expanding their production and marketing activities globally (PWC, 2002). Our findings seem to be broadly consistent with this view. Our analysis suggests that mobility of HQPs has increased in parallel to an increasing importance of technological change, globalization of production and integration of markets through international trade and FDI, location of MNEs, strategic alliances and networks with high-technology global firms and clusters of research and innovation, opportunities for high-technology entrepreneurship and the internationalization of R&D activities of national firms. Our findings also seem to suggest that increased income and employment opportunities, and career prospects and attractiveness of the education and research system coupled with the changing preferences of highly qualified personnel towards working abroad are also key drivers of international mobility of skilled workers in the new global economy.

Overall, there still remain significant knowledge gaps and more research on the fundamental drivers of international mobility of skilled labor is clearly warranted. For example, we need to better understand the underlying fundamental factors driving the international mobility of HQPs. How have these factors changed over time? How do they vary across different groups of HQPs or by sector of activity?

A review of the literature on welfare economics of labor mobility suggests that there are many channels through which potential benefits of international mobility of HQPs can be realized by the participating economies. These are increased specialization of production, increased human capital acquisition, and enhanced knowledge creation and cross-border spillovers. However, the distribution of benefits is likely uneven. Consequently, some sending countries may incur costs in the short run and possibly in the long run. The potential costs may include loss in human capital spillovers, reduced knowledge absorptive capacity, and an increased innovation gap.

There is not much literature on the impact of labor mobility on economic convergence/divergence among integrated labor markets. Evidence from the EU countries and US provides some support to the income levels and productivity convergence effects. In Canada, for example, where interprovincial mobility is large, the evidence does not provide credence to the view that internal migration leads to the actual convergence of regional per capita income. More empirical evidence is clearly needed on the costs and benefits associated with cross-country movement of HQPs. Further investigation on mechanisms or channels through which increased HQP mobility may contribute to convergence is also warranted.

Finally, the policy discussion focuses on two sets of policies (i) labor market integration policies within free trade areas such as Canada and the US, EU, and Australia and New Zealand; and (ii) policies either increasing the international mobility of HQPs and/or increasing country's ability to attract globally mobile knowledge workers. We consider the former set of policies as those relating to trade, harmonization, and deeper economic integration between economies (regional or bilateral) whereas the latter set policies include immigration, domestic labor market, and science and technology, education, and tax and fiscal policies.

A review of the policies in the integrated labor market economies suggests that greater harmonization of policies and adoption of common licensing standards, are key to reducing barriers to cross-border mobility. In the case of Canada-US, for example, Dodge (2003) argues,

that to realize real welfare gains from the NAFTA, further integration of labor markets must take place. Harris (2004b) argues that the slowing down of the income convergence process between Canada and the US, despite the free movement of labor and capital, may partly be due to crossborder barriers in HQP mobility. Clearly we need to know more about the significant regulatory and other barriers to some partial/complete integration of Canadian and US labor markets. On the international trade front, policies affecting trade in services, particularly business services will certainly influence the movement of HQPs internationally. Further liberalization of the service supply modes under GATS will reduce barriers to international mobility of HQPs.

The discussion also examines a selective set of policies such as immigration, domestic labor market practices, trade and science and technology policies as they relate to the international mobility of HQPs. A brief review of the selected APEC economies indicates that advanced APEC/OECD economies have adopted policies to attract internationally mobile HQPs by (a) encouraging immigration of the highly-qualified through specialized skill-related visa programs; and (b) encouraging immigration of potential HQPs by attracting specialized students. In the area of domestic labor market policies, in Canada for example, there is a recognition that the harmonization of regulatory standards in the domestic labor market is the key step in improving the mobility of HQPs both domestically and beyond.

In the areas of S&T policies, many APEC/OECD economies are taking a number of initiatives for fostering the mobility of researchers. There is a clear need to coordinate science and innovation policies with immigrating policies to enhance the attractiveness of APEC economies as a destination for attracting S&T professionals. Recently, many APEC/OECD economies have initiated tax incentives to recruit and retain internationally mobile HQPs. Harris (2004b) recommends offering reduced income tax rates to attract HQPs returning from abroad. He also suggests a number of educational measures to improve global mobility of HQPs. One such measure, for example, could be to place more emphasis on the year of 'study abroad' option.

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