

Vancouver Centre of Excellence



Research on Immigration and
Integration in the Metropolis

Working Paper Series

No. 06-16

**The Education, Immigration and Emigration of Canada's Highly Skilled
Workers in the 21st Century**

Don J. DeVoretz

October 2006

RIIM

Research on Immigration and Integration in the Metropolis

The Vancouver Centre is funded in 2006 by grants from the federal funding partners of Metropolis, which include:

- Social Sciences and Humanities Research Council
- Citizenship and Immigration Canada
- Canadian Heritage,
- Human Resources and Social Development Canada
- Public Safety and Emergency Preparedness Canada
- Royal Canadian Mounted Police
- Canada Mortgage and Housing Corporation
- Status of Women Canada
- Atlantic Canada Opportunities Agency.
- Statistics Canada provides in-kind support.

In addition, the Centre receives grants from Simon Fraser University, the University of British Columbia and the University of Victoria.

Views expressed in this manuscript are those of the author(s) alone. For more information, contact the Co-directors of the Centre, Dr. Don DeVoretz, Department of Economics, SFU (devoretz@sfu.ca) and Dr. Daniel Hiebert, Department of Geography, UBC (dhiebert@geog.ubc.ca).

**The Education, Immigration and Emigration of Canada's Highly Skilled Workers in
the 21st Century**

by

Don J. DeVoretz
Co-Director, RIIM
Simon Fraser University
devoretz@sfu.ca

October 2006

The research assistance of Mr. S. Pivnenko is noted with appreciation. The comments of Lindsay Lowell and the participants at the seminar on *Global Competition for International Students* at Georgetown University's Institute for the Study of International Migration, along with the financial support of the latter are noted with appreciation.

Abstract: This paper traces Canada's history of augmenting its human capital formation through the recruitment of immigrants and foreign students during the post-1967 period to 2005. In this framework Canada's brain exchange with the United States and the rest of the world is estimated in terms of numbers of movers and the values of the embedded human capital. Two separate econometric models are estimated for Canada's demand functions for skilled immigrants and foreign students respectively. An analysis of these demand functions and limited student narratives allow an assessment of Canada's competitive position on the recruitment of highly skilled workers circa 2006.

Keywords: Immigration, Education

*“Is empiricism all you have to offer?”
Rosencrantz and Guildenstern are Dead, Tom Stoppard.*

Part I. Introduction and Issues

Canada has periodically faced real and imagined shortages in highly skilled manpower over the last fifty years.¹ In the period 1955-1965 the size and occupational composition of Canadian skilled emigration to the United States was first documented by Parai (1965). The substantial emigration of skilled Canadians in the late 1950s to the mid-1960s came at a time of capacity limitations in Canadian universities and prior to the advent of Canada’s aggressive pro skilled immigration policy of the 1970s. Thus, this mid-20th century exodus of highly skilled Canadians could not be offset by compensating inflows from the rest of the world and was deemed a serious problem. In order to reverse this skills outflow from Canada substantial changes in both Canada’s education and immigration programmes had to take place over the next two decades. However, the passage of the 1965 United States Immigration Act in effect halted this Canadian exodus of highly skilled as Canadian immigrants were now subjected to a numerical restriction in the United States.

Canada’s constrained capacity to react to a skills shortage dramatically changed in the late 1960s as substantial investment was made in post- secondary education and a new and imaginative immigration policy was put into place after 1967. Education under Canada’s defining legislation, the British North American Act, was a provincial responsibility thus only indirect methods were available to the federal government to expand Canada’s universities and technical schools.² However, immigration by the 1970s was an exclusive jurisdiction of the federal government and subject to the discretion of the Minister of Manpower and Immigration. The title of this ministry was not happenstance since government policy of this period envisioned immigration as a complementary source of skilled manpower. To this end the 1976 Immigration Act was passed to create immigration selection criteria as the cornerstone of Canada’s skilled worker development programme.

¹ In fact, even in the early part of the 19th century there was a skills drain. It was argued that highly skilled Canadian immigrants later moved on to the United States leaving the unskilled immigrants behind in Canada (DeVoretz and Laryea 1998).

² Federal involvement was limited to financial transfers to provinces for higher education with no control of specifically how these funds were to be spent. In the 1980s this federal transfer for higher education became amalgamated with a general transfer to cover education, health and other provincial whims and the role of the federal government in fashioning a higher educational policy was reduced to nil until the late 1990s.

Thus, the combination of expanding domestic university enrollments in the 1970s and 1980s during the baby boom echo years coupled with an aggressive skilled immigration policy alleviated concerns over a skills shortage until the mid-1990s.

By the mid-1990s fears of a skills shortage and a brain drain again appeared in the Canadian economy. The advent of NAFTA, the rise of the IT sector and the associated anticipated demand for engineers drove Canadian policy makers to expand and revise their immigration policies and exhort the provincial governments to expand higher education induced by some increased federal financial transfers. These latter federal financial transfers were in fact given on the supposition that Canadian universities would use these funds to stem the academic brain drain by creating federally financed research professorships and pay competitive salaries. Again, Canada's fear of a continued brain drain to the United States dissipated after 2001. Once more external events halted the decline in Canada's brain exodus as demand for Canadian skilled manpower in the United States declined with the IT collapse (DeVoretz and Coulombe 2005).

Nonetheless, concerns remained over Canada's inability to utilize the growing numbers of highly skilled immigrant arrivals in the late 1990s and early 21st century. In fact, the lack of immigrant economic assimilation led to accusations of immigrant wastage with estimates of \$5 billion in lost productivity owing to this underutilization of skilled immigrants (Reitz 2005). Programmes have been put into place to retrain and certify the credentials of these immigrants who entered during this lost decade of underutilized skilled immigrants with little tangible results. In early 2005, faced with continuing deskilling of its immigrants Canadian policy makers turned to Canadian university graduates as a source of new Canadian skilled immigrants (DeVoretz 2005).

In sum, over the last fifty years one central goal of Canada's immigration policy has been to recruit highly skilled immigrants to both complement domestic educational efforts and to offset a periodic brain drain to the United States and the rest of the world.

The remaining parts of this paper will outline in detail the major trends in Canada's immigration and foreign student programme and analyze the issues outlined above. In particular, Part II will discuss Canada's recent past and contemporary immigration policies as they relate to highly skilled recruitment. Part III will outline trends in Canada's skilled immigration flows during this period. Part IV will report the role of Canada in the rising "brain circulation" phenomena. Part V will outline the history of foreign student enrollment in Canada and related policy issues and through the aid of an econometric model assess foreign student demand for Canadian education. Part VI will

analyze Canada's world-wide competitive position with respect to the recruitment of highly skilled immigrants and students.

Part II. Canada's Recent Historical Immigration Policies

“tap on-tap off” entry criterion: 1976-1988

Canada's historical policy of importing immigrants to foster economic growth has met with criticism from many fronts over the last ten years. Specifically many critics including Jeffrey Reitz (2005) have argued that since the mid-1990s many forces including a lack of skills recognition have led to a deskilling of the imported highly skilled immigrants and resulted in a deadweight loss to the Canadian economy of two billion dollars annually.³ Other critics, including the Conference Board of Canada have echoed these concerns and the media have documented numerous cases of putatively highly skilled immigrants working at low paying unskilled jobs. In fact, Chris Worswick (2004) has analyzed the generally poor economic performance of educated immigrants in the early 21st century and concluded that a drastic change in immigration policy is needed. First, he argues that there should be a temporary halt in immigration flows and next he argues that Canada should return to the “tap on-tap off” policy of the 1980s.⁴

The purpose of this section is to argue that the 1990s represented a watershed in Canadian immigration policy with respect to the recruitment of the highly skilled. Canada's skilled recruitment policy changed from a “tap on-tap off” policy circa 1976-1986 to a uniformly high intake policy coupled with a “fifty-fifty” entry criteria between 1988 and the present (DeVoretz 2006). In other words, the “fifty-fifty” immigration policy of the 1990s implied that the admission of one economic immigrant allowed the possible admission of one extended family member or refugee. This policy change from a “tap – on tap off” policy to a “fifty-fifty” admission's regime represented a fundamental shift in the viewpoint of Citizenship and Immigration Canada (CIC) on how it viewed the immigrant labour market integration process.

The “tap on-tap off” policy circa 1976-1986 was embedded in the creation of the “points system” which first appeared in 1967. It was argued by DeVoretz and Maki (1983) that the first “points system” between 1967-1978 was essentially a test for human capital attributes as opposed to a

³ Deskilling is defined as the deterioration of a skill while in residence in Canada owing to an inability to be employed in that skill.

⁴ See D. J. DeVoretz (1995) who first argued that in the 1980s the “tap on – tap off” policy resulted in immigrant fluctuations ranging from a high of 200,000 to a low of 80,000 over the decade.

manpower policy regime which underlay the “tap on-tap off” policy of the 1976-1988 period (see column 1 Table 1).

The human capital admissions policy circa 1967-78 contained many salient features. First, the total pass mark was low during this period, namely 50 points out of a possible maximum of 100 points (see Table 1). Next, all the necessary 50 marks for admission could be potentially gained without a labour market test from education, age, language and personal suitability criteria. Finally, and most importantly, there existed no yearly immigrant target level circa 1967-1976. Thus, entry levels were byproducts of the number of immigrants that applied and the number that Canada could process.

After 1978 the human capital regime was replaced by a manpower vacancy criterion which implied a “tap on-tap off” policy. At its apex in 1986 (Table 1, column 4) the “tap on-tap off” policy used a labour vacancy criterion were a mixture of experience, vocational preparation, occupational demand, arranged employment and a levels control criteria accounted for 52 out of the possible 100 points. Clearly by 1986 immigrant entry via the economic or selected worker category gateway could not occur with just human capital attributes but the applicant had to also satisfy immigration officials that a job vacancy existed and that he/she could fill it.

Table 1. Canada’s Points System over Time: 1967-2002⁵

	1967	1974	1978	1986	1993	1996	post-1996	2002
Education	20	20	12	12	14	21	16	25
Experience			8	8	8	9	8	21
Specific vocational preparation	10	10	15	15	16		18	
Occupational demand	15	15	10	10	10		10	
Labour market balance						10		
Age	10	10	10	10	10	13	10	10
Arranged employment or designated occupation	10	10	10	10	10	4	10	10
Language	10	10	15	15	14	21	15	24
Personal suitability	15	15	10	10	10	17	10	10
Levels			10	10	8			
Demographic							8	
Relative	0/3/5+	0/3/5				5	5	
Designation	5	5						
Total	100	100	100	100	100	100	110	100
Pass mark	50	50	50	70	67	65	70	75

Source Yan Shi (2004)

⁵ Quebec has a separate selection grid.

Two additional screening devices were put into place in the 1980s to further ensure that the economic or independent immigrant class met Canada's manpower needs under a "tap on-tap off" policy. Of the now 70 points required for admission in the 1980s some occupational points were a necessary, but not a sufficient condition for entry in the independent class. If the potential immigrant's designated occupation was assigned zero points for labour demand by policy makers, then, regardless of the total number of points earned by the immigrant from their human capital characteristics the immigrant would not be admitted.⁶ In the 1982-1985 period these labour market restrictions became even more stringent as previously certified and arranged employment was required before entry was permitted in the economic class.

Table 2. Immigrant Arrivals by Entry Class: 1980-2001

Year of Landing	Immigrant Class			Economic (4)/(1)= (5)
	Total (1)	Refugee (2)	Family (3)	
1980	143,134	43,860	49,180	0.256692
1981	128,641	18,588	50,204	0.334944
1982	121,177	17,518	49,859	0.332029
1983	89,188	13,998	48,701	0.21901
1984	88,273	15,377	43,818	0.213272
1985	84,333	16,770	38,528	0.235831
1986	99,329	19,198	42,236	0.309397
1987	152,002	21,468	53,568	0.414795
1988	161,502	26,737	51,165	0.409605
1989	191,502	36,857	60,630	0.366791
1990	216,402	40,233	74,069	0.342253
1991	232,750	54,053	86,894	0.284062
1992	254,816	52,350	100,668	0.304231
1993	256,728	30,632	112,579	0.316126
1994	224,373	20,455	94,093	0.317043
1995	212,866	28,544	77,325	0.342895
1996	226,050	32,193	68,296	0.411008
1997	216,030	27,662	59,893	0.480204
1998	174,172	25,375	50,799	0.490449
1999	189,921	25,415	55,248	0.494976
2000	227,312	30,532	60,541	0.511806
2001	250,346	28,104	66,641	0.526684

Source: Landed Immigrant Data System (LIDS), Citizenship and Immigration Canada.

Notes: *Refugee Class* includes: Convention Refugee Class, Designated Class, Nominated (Old Act 1952), PDRCC Class, Dependants of a CR8 Refugee, DROC Class, Source Country, Asylum Country; *Economic Class* includes: Entrepreneur Class, Self-Employed Class, Independents and Entrepreneurs (Old Act 1952), Other Independent Class (Skilled Workers), Investor Class; *Other* (not shown in the Table) classes include: Retired Class, Assisted Relative Class, Live-In Caregiver Class, Child to be Adopted, Sponsored (Old Act 1952).

⁶ The occupational groups were defined to a three digit occupational code.

Finally, this “tap on-tap off” was coupled with an explicit yearly quota which by law had to be tabled in the House of Commons in the previous calendar year. This quota resulted in a bizarre restriction on the net number of selected economic immigrants actually admitted. In fact, given sufficient Canadian emigration flows in the 1981 to 1986 period and a meager number of immigrants (see Table 2 column 5) the net inflow could approach zero.⁷ How could this come about? First, the yearly target was set and then the number of immigrants anticipated under the family class for the next year was deducted from this target. Next, a predetermined number of refugees were deducted from this net target figure and then the residual was assigned to the independent/economic immigrant class.⁸ In a year (e.g. 1985) when the government set the yearly target below 100,000 the net number of immigrants in the residual economic class could be nil if Canadian emigration was sufficiently large.⁹

In sum, it could be argued that Canada’s post-1976 to pre-1990 immigration policy with respect to independent or economic immigrants implied a “job vacancy” criterion to earn admission. And as noted this “job vacancy” model had in fact replaced a human capital model which was active prior to 1976 according to DeVoretz and Maki (1983). This “tap on-tap off” policy ultimately led to a near zero net economic immigrant inflows in the mid-1980s.

Post-1990 Entry Criterion: Cinquante-Cinquante

The challenge in this section is to characterize the entry criteria in the 1990s and to provide a model and test for the economic efficacy of this “*cinquante cinquante*” approach since evidence cited above purports to show that Canada failed to select the quantity and quality of immigrants who could successfully integrate into the Canadian labour force after 1990.

The late 1980s witnessed a resurrection in both the total number of immigrants and those who were selected as economic immigrants. Under the then Conservative government the political view of the immigrant labour market moved away from both the “tap on-tap off” and human capital views that had prevailed under successive governments since the mid-1960s. A new entry criterion emerged in the 1990s which allowed the entry of a growing absolute number of economic immigrants who

⁷ In the 1980s it was estimated that 50,000 or more immigrants left Canada yearly.

⁸ The previously constant number of refugees began to fluctuate widely by the mid-1980s and made refugee forecasts unreliable. See DeVoretz and Pivnenko (2004) for a complete analysis of refugee flows during this period.

⁹ For example, in the 1983-1985 period the yearly target was less than 100,000 immigrants and the independent/economic class constituted less than 23% of the yearly target or 19,000 economic immigrants. Clearly with an historical 30% emigration rate more than 19,000 economic immigrants could have left during this period and would have negated these yearly inflows.

possessed financial capital. After 1986, entry was not subject to a labour market vacancy test, but rather entry criteria reflected individual human capital endowments and most importantly past labour market experience (see Table 1).

How these entry criteria actually were applied will be assessed in detail below. At this point, I would like to develop the overall economic philosophy which drove immigrant admissions after 1990 to the present. The Conservative government and the then Minister of Employment and Immigration, Barbara McDougall, in the early 1990s once again returned to Canada's historical position that economic immigrants could act as an engine of economic growth. Ms. McDougall specifically eschewed the view that Canada's labour market consisted of a "lump of jobs" such that one more employed immigrant implied one less job for resident Canadians. This "lump of jobs" concept was the contentious cornerstone of the "tap on-tap off" policy which reigned during the 1976-1988 period. It was felt by the late 1980s that if you could select economic immigrants with complementary inputs, namely financial and human capital, then economic immigrants could create jobs for both themselves and potentially for resident Canadian-born workers. Akbari and DeVoretz (1988) had provided limited empirical evidence to weakly support this view when they found that immigrants on balance created as many jobs as they took in the 1980s.¹⁰

During the 1980s both the Liberal and Conservative governments introduced a series of new entry categories for potential economic immigrants which if exploited could possibly insure a growing labour market demand as immigrant admissions rose. Thus, the entrepreneurial and investment immigrant entry categories were devised in the 1980s and refined in the 1990s to attract putative entrepreneurial immigrants (DeVoretz 1996).¹¹ In addition, particular attention was paid to recruiting through the normal "points system" a large number of managers from Hong-Kong and Taiwan. Although this group had to acquire 67-70 points for entry there was no explicit investment or employment conditions attached. It was hoped that their managerial backgrounds would result in increased employment opportunities as they integrated into existing Canadian firms. Finally, engineers were targeted for admission under the supposition that the IT boom would continue

¹⁰ Of course the details of the Akbari and DeVoretz study were more complex. Labour substitution by immigrants occurred in immigrant intensive labour markets which contained at least 30 per cent or more foreigners in their labour market. The rest of the economy which was highly unionized at the time was largely insulated from the small number of economic immigrants which arrived in the 1980s. Hence the neutral finding on immigrant job displacement.

¹¹ The entrepreneurial entry category required that the prospective immigrant provide employment for himself and at least, one resident Canadian to insure permanent residence status. The investor class entry gate required initially a \$350,000 investment in selected categories but required no job creation.

throughout the early 21st century and that an engineering “shortfall” would occur.¹² This post-1988 recruitment policy all assumed that the targeted economic immigrants would either provide financial capital (investors) or human capital (managers and engineers) and their entrance into their respective labour market would result in an increased demand for resident labour or a rise in Canadian wages or both. The object of a later section of my essay will be to test and confirm or reject this view for selected immigrant occupations.

This radical new view that immigrants could be chosen to increase Canadian employment opportunities was theoretically well grounded but faced many political and institutional difficulties. The political difficulty arose from the explicit existence of the family reunification provision in the still active 1976 Immigration Act which awarded substantial sponsorship entitlements to a successful economic applicant. In short, the spouse and minor children were allowed immediate entry with the successful applicant. In addition, parents and grandparents would also be granted entry after a “means test” was applied to the original principal applicant and conditions on the use of social services were placed on the sponsored relatives.¹³ Given that both spouses in the initially successful economic immigrant household could sponsor their relatives, the logic of the sponsorship provision implied that each successful economic immigrant created four or more potential family class entrants.¹⁴

This potential multiplier effect created a substantial political barrier to the admission of a sufficiently large portion of economic immigrants. Thus, a crucial policy restraint was added in 1995 under the then Minister of Immigration, Sergio Marchi that, regardless of the total yearly target selected, at least fifty percent of the admissions were required to be economic immigrants. To wit, the “*cinquante cinquante*” provision, which allowed in any one year fifty percent economic and fifty percent family and refugee entrants was devised in 1995 and still holds circa 2005. This “*cinquante cinquante*” policy insured that two crucial conditions were met. First, that the growing family class

¹² Dire predictions forecasted a software engineering shortfall in Canada of between 40 to 100 thousand engineers. This of course proved erroneous.

¹³ The current means test requires that the sponsoring household’s income, net of any government transfers exceed the local poverty level or the Low Income Cutoff (LICO) line as reported by Statistics Canada. This is a substantial barrier since circa 2005 for example the required household income before sponsorship exceeded \$45,000 in Vancouver for an immigrant sponsoring family with two children.

¹⁴ Actually, the number of sponsorships per household was potentially much larger. If sponsored parents brought any remaining minor siblings then in turn these siblings when mature could marry foreigners who, in turn, could sponsor further relatives. Thus, the long run multiplier effect under this scenario is very large but undefined. However, if in any one year the number of family members admitted has been capped at fifty percent of the yearly total admissions. Thus Canada has a very long immigrant queue which in 2005 is estimated to be 700,000 claimants.

would be capped in any one year and that potentially a sufficiently large number of economic immigrants would enter Canada to create the necessary jobs envisioned.¹⁵

There is, of course, one crucial restraint on implementing this entire philosophy. In any one year Canada had to pick a realistic overall immigration target such that 50 per cent of the required economic applicants could be recruited. Moreover, the “tap on-tap off” policy of the 1980s could no longer be resorted to if the number of recruited economic immigrants fell since it was no longer politically feasible to reduce the family class. In fact by the 1990s approximately 100,000 family class members had to be admitted each year to respond to the requests of a growing and politically powerful immigrant class. In addition, Canada had a yearly implied quota of around 25,000 refugees according to DeVoretz and Pivnenko (2004). Given this base requirement to admit 125,000 non economic immigrants then 125,000 economic immigrants had to be recruited yearly to satisfy the “*cinquante-cinquante*” criterion. This goal was not always met since appropriate economic immigrants were unavailable or difficult to process and the original overall target was not met. It also must be remembered that the government defined the economic class of immigrants to include independently assessed immigrants, investors and their spouses, thus vastly overstating the size of the economic class. In fact as Table 2 shows the economic class admissions (including immediate family) fluctuated between 25% and 52% between 1981 and 2001. Thus, Canada in reality only loosely approached the 50 percent criterion of economic admissions after 1996.

In sum, the post-1990 immigrant admission policy was predicated on admitting a sufficient number of highly qualified immigrants to insure a growing excess labour demand in their particular occupation which would either raise the wage rates of resident labour market members or increase their employment opportunities. In Part III below I present a theoretical construct which formalizes my main arguments and allows me to deduce a test a set of hypotheses to confirm or reject the success or failure of Canada’s post-1990 immigration policy of recruiting immigrants to induce excess labour demand and foster economic growth.

Skills Composition of Canadian Immigrants

Table 3 describes in detail the exact recruitment practices of Canadian immigration policy makers during both the “tap on-tap off” regimes of the 1980s and the “*cinquante cinquante*” policy of the present period.

¹⁵ The weak economic performance of the family class is documented in DeVoretz and Pivnenko (2004) and justifies the need for a large economic class.

Several patterns emerge from an inspection of Table 3. First, for these seven selected occupations, the grand total of admissions for the period 1980 to 2001 was large (313,766) with the bulk admitted after 1988. Furthermore, it is possible to discern epochs as Canadian policy makers switched admissions from one occupation to another. Between 1987 and 1997 for example, 40,000 immigrants in managerial occupations were admitted which simply reflected the emigrant movement from Hong-Kong and Taiwan during this period.

Table 3. Sample of Immigrant Arrivals by Selected Occupations: 1980-2001

	Managerial and Administrative	Scientists (Natural and Life Sciences)	Engineers and Architects	Nursing, Therapy and Related Assisting Occupations	Teaching Occupations	Professional Occupations in Art and Culture	Professional Occupations in Social Science, Government Services and Religion
1980	2,599	577	1,315	1,048	1,592	853	661
1981	2,848	638	2,249	1,423	1,341	843	732
1982	2,960	704	2,795	1,425	1,421	822	805
1983	2,088	367	1,056	543	1,020	517	665
1984	1,748	289	754	474	989	466	566
1985	1,677	310	743	513	1,092	495	526
1986	2,090	353	980	643	1,159	562	668
1987	4,631	542	1,826	1,112	1,523	784	1072
1988	5,395	590	1,740	1,403	1,390	839	1082
1989	5,471	759	2,058	1,636	1,863	1069	1094
1990	5,794	773	2,410	1,807	2,216	1107	1181
1991	3,916	765	2,296	1,617	2,309	1048	1143
1992	3,652	618	2,323	1,546	1,792	971	1073
1993	3,180	780	3,746	1,413	1,896	1254	1243
1994	2,489	1,378	4,722	1,388	1,445	1330	1479
1995	1,943	1,971	6,262	1,226	1,365	1442	1738
1996	1,950	2,805	8,372	991	1,404	1846	2014
1997	1,697	2,993	9,873	1,028	1,107	1866	2004
1998	1,334	2,478	8,688	805	987	1560	1581
1999	1,732	3,011	11,726	830	1,076	1655	1837
2000	2,510	3,279	15,708	1,111	1,475	2027	2241
2001	3,065	3,292	17,161	1,303	1,689	2078	2647
Total	64,769	29,272	108,803	25,285	32,151	25,434	28,052
					Grand Total		313,766

Source: LIDS 2002

Between 1995-2001 scientists and engineers begin to dominate immigrant inflows with respective totals of 19,829 and 77,790 immigrant arrivals. In other words, 72% (67.7%) of all engineers (scientists) who arrived in Canada during the 1980-2001 period arrived in the last seven

years of my study period. This again highlights the deliberate switch in occupational composition of immigrants over the decade as the presumed private sector's demand grew for these occupations. What is even more interesting to note is the collapse in the immigrant admissions to the public sector in the 1990s with teacher and nursing immigrant admissions averaging around 1,000 yearly.

Thus, the 1990s began with substantial managerial admissions and closed with large admissions of scientists and engineers. But, was the policy response consistent with a growing labour demand in Canada or simply the result of supply changes in China and India? We turn to a modeling exercise to answer this crucial question of whether Canada's immigrant recruitment policy was meeting Canada's demand for skills.

Part III: An Immigrant Policy Model

This model will focus on Canada's demand for highly trained immigrants in selected occupations. The proposed excess demand is recursive in nature and assumes an infinitely elastic supply curve for highly skilled immigrants. I have argued elsewhere that there exists an infinite supply (or at least a large one relative to Canada's demand) of technically trained immigrants for Canada at the prevailing wage.¹⁶ Hence, changes in Canada's excess labour demand in a particular labour market will determine the placement of the immigrant demand curve and determine the next period's equilibrium number of immigrant admissions.

¹⁶ I have argued that this infinite supply argument held over the entire study period for Canada but only the fact that China, more specifically the PRC, lifted its restriction on the emigration of highly skilled Chinese after 1995 could this supply curve remain elastic in this competitive period (DeVoretz, 2003).

Figure 1: Immigrant Excess Demand

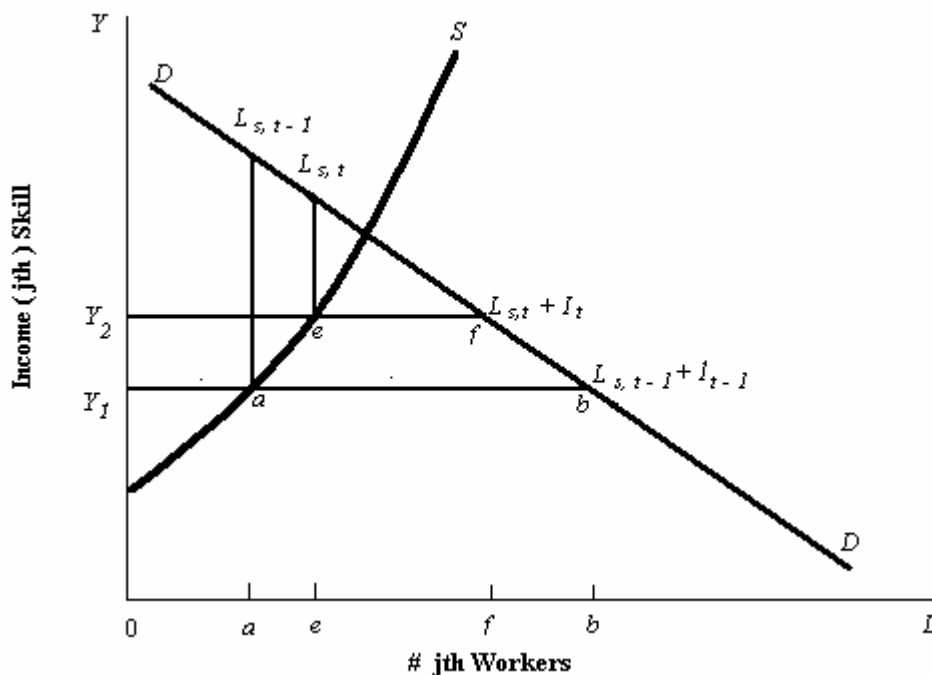


Figure 1 illustrates the comparative statics of the proposed dynamic shortages model in an immigrant demand context. In any one period ($t-1$) given a real income level of (Y_1) there exists a domestic supply of (j th) type skilled labour equal to (oa) which results in a positive excess demand for skilled labour equal to (ab). This excess demand could be filled by more domestic graduates in period (t) equal to (ae) as the (j th) occupational income rises to Y_2 and with an immigrant flow of (ef) given this income of Y_2 . On the other hand, with no increase in either the income level (Y_1) or the domestic supply of labour (oa) in the (j th) occupation, the gap could be totally filled by ($a-b$) immigrants.

Further, I argue that Canadian policy makers attempted to forecast the yearly excess demand (ab) at income Y_1 or (ef) at income Y_2 . My arguments above suggest that a “tap on-tap off” policy would lead to a relatively large (ab) immigrant flow to maintain the prevailing income level of Y_1 . On the other hand, in the post-1990 Canadian world immigrant policy makers would admit (ef) immigrants to insure (ae) a growth in domestic employment and a rise in income to Y_2 .

The above arguments lead me directly to the following Canadian immigrant demand specification for the (j th) highly skilled immigrant:

$$I_{ij,t} = f(G_{j,t-2}, I_{ij,t-1}, (Y_{j,t-1} - Y_{j,t-2}))$$

In short, the absolute number of immigrants admitted to Canada from an (ith) country with the (jth) type of skills in period (t) or $I_{ij,t}$ depends on three exogenous variables which I outline below.

The lagging process built into the model is crucial since as I noted earlier policy makers must by law forecast their desired immigration flows 12 to 18 months in advance of the actual dates of admission. Hence the domestic supply variable or the increased supply of highly skilled graduates in the (jth) occupation is lagged two periods (i.e. $G_{j,t-2}$) This lag would reflect the latest graduate information available to Canadian policy makers when the immigration target was set in period (t-1).

The income variable requires a detailed explanation. The income term is a much debated variable in immigration studies. One view suggests that the income difference over time in the destination country's income is a proxy for the growth in excess demand in the destination country's labour market and hence relevant to this study. We include the relevant Canadian change in occupational income under this rationale. Again we note due to legislative time lags, policy makers only have at their disposal the change in lagged income between periods (t-1) and (t-2) to measure potential excess demand for labour in the (jth) occupation. Hence, it is argued, as lagged income in the (jth) occupation rises, policy makers infer that *ceteris paribus* excess demand in that occupation has grown and immigration levels should rise.

Finally, I introduce $I_{ij,t-1}$ as a statement that if Canadian policy makers lack income or graduate supply information they will simply make contemporary immigration levels a proportion of last years immigrant levels.

Estimations

The data sources and definitions required to estimate this model are contained in Appendix Table A-1. Below I report several versions of my basic model and provide interpretations of the results when appropriate.

Table 4 reports the results for my model stripped to its basic form where contemporary Canadian immigration levels simply depend on past Canadian immigration levels. In other words, this model argues that Canadian policy makers ignored other variables and made a naïve forecast of contemporary demand for immigrants as a proportion of last year's immigrant flow. This modification leads to a distributed lag version of my model which permits either an explosive, decaying or constant immigrant demand over time. The system is driven by λh which is the distributed lagged multiplier which can exceed unity if λh exceeds unity and under this condition will

lead to an explosive system where any positive. $I_{ij,t-k}$ accelerates future immigration admissions by Canadian policy makers.¹⁷ If λ is positive, but is less than unity than the system would decay as Canadian policy makers respond less and less to changes in past immigration levels ($I_{ij,t-k}$). Of course if $\lambda = 0$ then no relationship would exist between immigration today and yesterday as Canadian policy makers ignore the change in the last period's immigration levels. Finally, if $\lambda < 0$ then past immigration (i.e. $I_{ij,t-k}$) admissions are perceived by Canadian policy makers as competition for Canadian resident workers in the (jth) occupation and less immigrants are admitted in the each successive period.

Table 4: Naïve Distributed lagged model: $I_{ij,t} = \lambda^k (I_{ij,t-1} \dots I_{ij,t-n})$

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	P-VALUE	STANDARD COEFF.	ELASTICITY AT MEANS
$I_{ij,t-1}$	.46	.598e-01	7.6	0.0000	.4622	.45
CONSTANT	699	95.32	7.3	0.0000	0.00	0.4036

N= 119 $R^2 = .335$

Source: Author's calculations

Table 4 reports the results for this distributed lagged model. The estimated coefficient for λ equals .46 and is significant. This positive but less than unity value for λ^h indicates that the system is decaying. In other words, contemporary Canadian immigration levels ($I_{ij,t}$) are only partially conditioned (.46) on past levels of immigration ($I_{ij,t-1}$). Moreover, given the estimated value of λ^h (.46) the mean calculated lag between when policy makers set contemporary immigration and past immigration is about 10.2 months.¹⁸ This is a powerful result since it accords with the Canadian institutional requirements that immigration levels must be announced one year in advance which implies that if Canadian policy makers do partially use recent immigration levels to dictate future levels that the lag would be approximately one year.

¹⁷ Given the following estimating lagged estimating equation of $Y_t = \alpha + \beta_0 X_t + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \dots + \beta_k X_{t-k} + \lambda (Y_t - Y_{t-1})$ can be derived as follows. First, assume this equation has k finite lags. Then if I make the Koyck assumption that all coefficients are of same sign (positive) and decline geometrically as: $\beta_k = \beta_0 \lambda^k$ or $\beta_k = \beta_0 (1-\lambda) \lambda^k$, where $\lambda \in (0,1)$ is the rate of decline and $(1-\lambda)$ is speed of adjustment. If we estimate λ we know the rate of decline and speed of adjustment. This is derived as follows:

If $\beta_k = \beta_0 \lambda^k$ then sum of coefficients of lag terms

$\sum \beta_k = \beta_0 (1 + \lambda + \dots + \lambda^k + \dots)$ or $\sum \beta_k = \beta_0 (1-\lambda)^{-1}$.

Then $\lambda = 1 - \beta_0 / \sum \beta_k$

¹⁸ $\lambda / (1-\lambda)$ is the formula to calculate the mean period lag (assuming an infinite number of time periods).

Table 5: Expanded version of Immigrant Demand Model: $I_{ij,t}=f(I_{ij,t-1}, (Y_{ij,t-1}- Y_{ij,t-2}))$

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	P-VALUE	STANDARD. COEFF.	ELASTICITY AT MEANS
$I_{ij,t-1}$	0.47246	0.5920E-01	7.981	0.000	0.4750	0.4679
$(Y_{ij,t-1}- Y_{ij,t-2})$	0.19926E-01	0.7152E-02	2.786	0.006	0.0801	0.0016
CONSTANT	692.61	95.42	7.259	0.000	0.0000	0.3996

N= 119 $R^2 = .66$

Source: Author's calculations

Table 5 expands on the results of Table 4 by arguing that in addition to last year's immigration levels changes in Canadian earnings ($Y_{ij,t-1}- Y_{ij,t-2}$) in the relevant occupation will dictate the demand for a particular type of professionally trained immigrant. The estimated model proves stable and the hypothesized positive sign between Canadian immigration levels and the change in earnings and past Canadian immigration levels is maintained. Increased earnings ($Y_{ij,t-1}- Y_{ij,t-2}$) in the relevant Canadian profession leads to a modest increase (.02) in Canadian immigrant demand in that occupation. Again, this system is not explosive since lambda is less than unity (.47) and the mean period lag remains at 10.5 months.

Table 6 reports the results of the full model which now includes a lagged (two period) Canadian graduation level variable in the relevant immigrant occupation. The inclusion of $G_{ij,t-2}$ does not yield a significant coefficient and the now insignificant income variable ($Y_{ij,t-1}- Y_{ij,t-2}$) obtains the incorrect sign. Finally lambda, the only significant value falls to .18 which implies a mean lag of 2.5 months. Thus, given this implausible result and the insignificance of the coefficients this complete model which incorporates graduates as a substitute for immigrant demand is rejected.

Table 6: Full Dynamic Shortages Immigrant Demand Model: $I_{ij,t}=f(G_{ij,t-2}, I_{ij,t-1}, (Y_{ij,t-1}- Y_{ij,t-2}))$

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	P-VALUE	STANDARD. COEFF.	ELASTICITY AT MEANS
$I_{ij,t-1}$	0.18708	0.5153E-01	3.63	0.001	0.1883	0.1842
$(Y_{ij,t-1}- Y_{ij,t-2})$	-0.12776E-01	0.9654E-02	-1.3222	0.190	-0.0507	-0.0016
$G_{ij,t-2}$	.002002	.002001	.98	0.362	0.0301	0.0298
CONSTANT	0 925.1	.009542	8.0	0.676	0.000	0.5717

N= 80 $R^2 = .66$

Table 7: Cinquante-Cinquante Immigrant Demand Model: $I_{ij,t} = \lambda^k (I_{ij,t-1}^E)$

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	PARTIAL P-VALUE	STANDARD. COEFF.	ELASTICITY AT MEANS
$I_{ij,t-1}^E$	0.36649	0.1763	2.079	0.042	0.252	0.1796
CONSTANT	0.16278E+06	0.1818E+05	8.956	0.000	0.746	0.0000
N= 80 $R^2 = .16$						

One major policy statement of the 1990s asserted that total immigration flows were to be a multiple of the past yearly intake of economic immigrants ($I_{ij,t-1}^E$). Table 7 reports a simple test of this proposition which a strong positive relationship between past economic immigrant inflows and contemporary immigration levels. The system moreover is stable since λ^k is less than unity (.36) with a mean lag of less than a year (i.e. 6 months). This latter point indicates that Canadian policy makers were keenly aware of the need to match economic immigrants to the total flow admitted six months later.

In sum, these various tests of my model indicate that for these select occupations past Canadian economic immigration levels and changes in occupational wage rates conditioned Canadian policy maker's decisions over the size of immigrant admissions for the 1980-2001 period.¹⁹

Part IV: Brain Circulation

I noted earlier that historically Canada has been concerned with its perceived "brain drain". In fact, Canada was viewed itself as an *entrepôt* destination since some Canadian immigrants have historically left Canada to return home or move on to a third country. This "brain drain" was generally seen as a substantial loss to Canada since it was argued that Canadian émigrés were often positively selected (DeVoretz and Laryea 1998).

A more neutral term – "Brain Circulation" – has become the favoured term of the 21st century when discussing the return migration of erstwhile highly skilled Canadian immigrants. Changing mobility conditions across a variety of sending and receiving countries in the mid-1990s led to a new and more general variant of the historical brain drain-gain paradigm, namely the phenomenon of "brain circulation". The literature defines "brain circulation" as a series of sequential movements by highly skilled workers across three or more states (DeVoretz and Ma 2002). These states include the sending region, the initial receiving region (e.g. Canada) and the rest of world. Moreover, the movement may not be temporary. Rather immigrants may reside for substantial periods

¹⁹ Table A-4 reports the results for the complete model for the 1976-1984 period which supports the existence of a "tap on-tap off" manpower policy circa 1976-1984.

in order to acquire citizenship and accumulate human capital in the receiving country before moving again (DeVoretz and Zhang 2004).

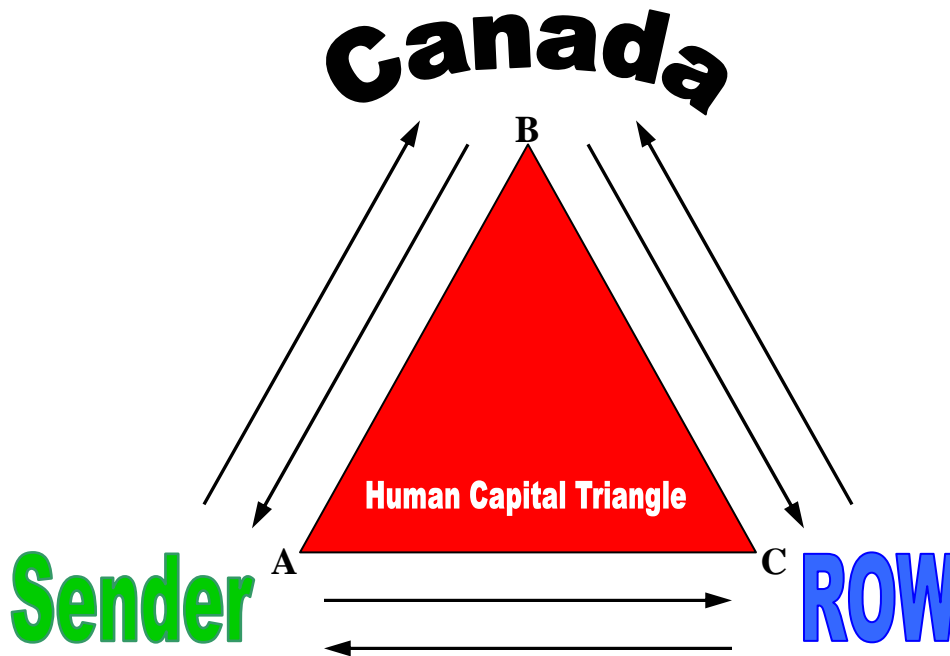
What new forces emerged in the 1990s to reconfigure the erstwhile bilateral brain drain into a multilateral brain circulation phenomenon? First, a robust economy in North America with an expanding IT sector fuelled the demand for highly skilled immigrants. This economic growth alone would have however simply led to a bilateral movement of skilled workers or a typical “brain drain” in the absence of new institutional and legal frameworks.

The first major institutional change which facilitated `brain circulation` was the proliferation of dual citizenship policies which allowed some highly skilled immigrants to move continuously between their erstwhile home country and the receiving country (DeVoretz and Pivnenko 2006). In addition, the second citizenship often conferred even more extensive mobility rights. For example, naturalized Canadian citizens could now enter the United States under a NAFTA or TN visa created especially for trade related migration. In addition, to the traditional mode of permanent movement culminating in citizenship, temporary visas became more plentiful, especially the H1-B in the United States which accelerated the movement of highly skilled immigrants from India and China. These temporary visa holders were then often able to adjust to a permanent status in the United States or move on to the rest of the world.

Another major force emerged in the early 1990s to accelerate “brain circulation” as China (PRC) relaxed its exit requirements to allow highly skilled Chinese to leave for educational purposes with the expectation that at least one-third would return to China. Moreover, constraints in the Chinese educational system, including higher fees and increased competition for admission to the best schools, encouraged Chinese student immigration to North America and Australia. These students often converted their temporary student visas to a more permanent status especially in Australia which facilitated this conversion process. For its part, India instituted partial dual citizenship to Indian foreign citizens and this has lately encouraged Indian “brain circulation”.

In addition, to these immigrant movements for educational purposes, the rise in foreign direct investment to the immigrant’s home country financed by immigrant remittances often required the periodic presence of these immigrant investors, giving rise to transnational households. Thus, with one spouse investing and working in the sending country and one spouse in Canada, the periodic return of the erstwhile Canadian immigrant to Canada was assured and this movement back assured continuous “brain circulation”.

Figure 2



In sum, both these changing supply and demand conditions altered the bi-lateral brain drain flows into triangular movements as depicted in figure 2 under a “brain circulation” regime. This concept of “brain circulation” is in fact, general enough to permit the simple unilateral brain drain (A to B) or transnational movement (A to B to A), as well as true brain circulation with movement from A to B to C and is the world that Canada’s highly skilled immigrants live in.

Motivations to engage in “Brain Circulation”

In the conventional brain drain literature, bilateral movements of the highly skilled were argued to result from a series of push and pull forces in the origin and destination countries. The neo-classical view that higher expected wages in the destination country constituted the main motivation to move was replaced in the “brain circulation” literature by an explanation which appealed to forces inherent in the more modern theory of households. This literature owing to Stark and Lucas (1988) suggested in the 1980s that households in poor countries used migration as one of many strategies to survive in an uncertain environment. Hence, households invested in the individuals’ education and financed their departure for further schooling and employment under the implicit private contract that the individuals would remit monies so that poor households could survive. Thus, this modern home

economics literature did not view highly skilled migration as a simple result of exogenous push and/or pull forces, but as part of households' general investment strategy.

Given the above argument, then skilled immigration will increase when the return from the joint household investment in a family member's education and immigration rises. For example, if immigrant remittances suddenly become more productive in the immigrant sending country due to exchange rate stability or low transaction costs, more immigration will be financed by the immigrant sending country households.²⁰ In addition, if family reunification is made easier in Canada then, as a consequence "brain circulation" will decrease since the imperative for return migration will decrease. On the other hand, if the costs of return migration are reduced via mutually respected dual citizenship policies between the sending and receiving countries, the nature of highly skilled migration will change from a permanent move to a rotating strategy more consistent with the concept of brain circulation.

In addition, a distinction must be made between general motivations to move and the choice to move to a particular country. Immigrant selection criteria and economic and social conditions affect the immigrants' choice of location once the decision to move has been made. If we divide immigrant-receiving regions into destinations providing subsidized general and specific human capital versus those that offer no subsidized human capital, then immigrants will self select into either country based on their taste for risk. It has been noted that the acquisition of human capital in the destination region affects the move-stay choice of skilled immigrants. For example, Canada provides subsidized human capital (language, job skills, health care and credential certification) to risk adverse immigrant arrivals that are attracted to a more equalitarian but lower income economy. However, whether these skilled immigrants now enhanced with subsidized human capital remain in Canada depends on citizenship policies which influence downstream immigration decisions to a third country.

21

"Brain Circulation" also arises due to a series of cross country competing immigration policy initiatives. In a modern context this means that, even if the rate of return for the skilled immigrants' human capital is lower in Canada, but the queuing time is certain and shorter for a move to Canada, the immigrant may choose Canada over the United States, at least in the short run. Thus, immigration motivation is now defined by more than the simple push-pull thesis between the sending and receiving countries. This motivation is now part of a complex strategy. In other words, highly skilled immigrants maximize their net income gain by moving in a sequential pattern; first to an entrepôt

²⁰ See DeVoretz and Vadean (2005)

²¹ See DeVoretz and Pivnenko (2006)

country, (e.g., Canada) which supplies subsidized human capital, and then they consider returning home or moving on to the United States once they became naturalized Canadians to maximize their income prospects.

In the context of brain circulation the role of push and pull forces become blurred. Many traditional pull forces, such as access to subsidized education and the prospect of Canadian citizenship with a passport, initially attract immigrants, but, once acquired, act as a push force to send immigrants home or on to a third country. Thus, discrete push and pull distinctions are no longer relevant; rather, it is the highly skilled immigrants' desire to maximize the rate of return on the acquired human capital that motivates them to stay in Canada (pull) or move on (push) to the United States.

North American Evidence of "Brain Circulation"

We now turn to some evidence in the North American context to highlight Canada's historical experience with the "brain drain". We will conclude with more recent evidence on the alleged Chinese triangular immigrant movement to shed light on a particularly important example of "brain circulation" for Canada.

Central to any evaluation of the potential economic impact of immigrants is an analysis of the type and numbers of immigrants as well as the economic value embedded in them. A simple balance of trade in immigrants would involve a measurement of gross and net flows of immigrants by occupation into and out of Canada. Table 8 reports the immigration and emigration from Canada of selected permanent skilled movers from a "Balance of Trade" prospective. In this case, immigration to Canada represents the number of permanent arrivals in the professional and managerial occupations in a particular year from all countries (including the U.S.) in columns (1) and (2) and the number of yearly leavers of Canadian-born residents to the United States in the same occupations in columns 3 and 4.

Table 8. Balance of Trade in Professional and Managerial Immigration: 1982-2001

	Immigration to Canada		Out-migration to the U.S.		Net Immigration to Canada	
	Professionals ^a	Managers ^b	Professionals	Managers	Professionals	Managers
1982	11,412	2,960	1,690	831	9,722	2,129
1983	5613	2,088	1,627	914	3,986	1,174
1984	4703	1,748	1,628	996	3,075	752
1985	4851	1,677	1,757	928	3,094	749
1986	6125	2,090	1,751	971	4,374	1,119
1987	10,786	4,630	1,848	1,122	8,938	3,508
1988	11,406	5,394	1,867	934	9,539	4,460
1989	12,987	5,465	1,772	1,187	11,215	4,278
1990	14,012	5,792	2,493	1,751	11,519	4,041
1991	12,994	3,913	2,080	1,327	10,914	2,586
1992	12,156	3,650	2,384	1,853	9,772	1,797
1993	15,260	3,180	2,916	2,022	12,344	1,158
1994	17,895	2,486	2,929	1,861	14,966	625
1995	22,154	1,943	2,440	1,415	19,714	528
1996	28,338	1,948	3,581	2,065	24,757	-117
1997	31,059	1,696	2,112	1,390	28,947	306
1998	25,688	1,329	1,222	1,116	24,466	213
1999	32,327	1,730	932	863	31,395	867
2000	41,794	2,508	1,855	1,407	39,939	1,101
2001	46,205	3,064	2,457	2,055	43,748	1,009
Total	367,765	59,291	41,341	27008	326,424	32,283

Sources: Immigrants to Canada: LIDS, 2004 and Out-Migration to US. NBER CPS Merged Outgoing Rotation Group (MORG) 2005.

Notes:

a. Professionals include engineers, natural scientists, university professors, teachers, nurses, physicians, medical technicians and 14 other professional groups. These are the intended occupations as stated upon arrival.

b. Managers are by self definition of immigrants upon arrival that they will be in supervisory capacity.

The “Balance of Trade” in professionals is uniformly positive over the 1982-2001 period. Moreover, after 1986, Canada had a large “balance of trade” surplus vis-à-vis the U.S. in professionals. In fact, over the entire period Canada retained 87 per cent of its professional immigrants and gained 326,424 professionals during the 1982-2001 period.

The same is not true for managers since in many years in the mid-1980s and throughout the 1990s only small positive inflows of managers remained in Canada. In fact, Canada only retained 54 percent of its gross numbers of managers given the emigration flows of Canadian managers just to the United States. Moreover, Table 8 is unable to include on a yearly basis the substantial outflows of

Canadian managers to Hong-Kong (see Table 11).²² The combined outflows of managers to Hong-Kong and the United States would have made every year after 1996 a deficit year if these adjustments could have been made to Table 8.²³

In sum, Table 8 presents a conservative view of Canada's "balance of trade" in brains. Clearly, there was a substantial net inflow of professional immigrants to Canada but only a modest positive flow of managerial immigrants.²⁴

Balance of Payments in Brains

But what is the economic value of the educational resources embedded in the immigrant inflows reported in Table 8?

Table 9 reports the information necessary to calculate a "balance of payments" concept for Canada and answer this query. Column one reports the gross inflow of permanent immigrants in these occupations circa 2001. For the nine occupational groups a total of 49,269 immigrants landed in Canada in 2001. If I follow Coulson and DeVoretz (1992) and value these immigrant inflows in terms of their educational replacement costs in Canada I can construct columns (2) to (9). In other words, assuming that Canada would have produced these graduates in the absence of these immigrants I can value the flow of these resources in terms of two Canadian educational cost concepts. Columns two and three respectively report the educational costs valued at what the Canadian student would have to pay (private total costs) and what Canadian society must pay (social total cost) for the required education to achieve they occupational status denoted in each row. In other words, the 2001 cost (in 1993 dollars) of acquiring an engineering degree for a student is \$83,256 while society (student plus taxpayer costs) invests a total of \$139,333. The difference between the social and private costs is the inherent taxpayer subsidy to achieve an engineering degree and is reported in column 4. For any one

²² Hong-Kong return data is based on the 2000 Chinese Census and thus does not report yearly inflows but just a stock figure for 2000. At a minimum, 3,000 to 10,000 Canadian managerial émigrés left Canada for Hong-Kong in the 1990s (see Table 11).

²³ In addition Table 8 does not include any foreign-born Canadian citizens residing in the United States. The data source used only allowed us to ask where were you born and if you were foreign-born. Thus, if you were Chinese-born but now a Canadian citizen residing in the United States our data source would not pick you up. An independent test using an alternative data source Homeland Security Yearbook of Immigration Statistics 2004 (<http://uscis.gov/graphics/shared/statistics/yearbook/YrBko4lm.htm>) indicates that Table 8 underestimates the true emigration of Canadian residents by 28% for the 1991-2000 period. In sum, using the Homeland Security Yearbook source we estimate that those Canadian emigrants to the United States who declared Canadian nationality equaled 191,987 while those who emigrants who stated they were Canadian-born equaled 137,563.

²⁴ Tables A-6-A and A6-B in the appendix report a detailed breakdown by occupations of the yearly immigrant inflow into Canada.

occupation in 2001, columns seven and eight respectively report the total private and social costs to educate all immigrants who arrived in 2001 in that occupation.

An inspection of Table 9 also reveals several trends under this evaluation technique. First, either under the private cost concept (column 2) or the social cost concept (column 3) there is a great deal of variance in the embodied educational costs by occupation. For example, nurses and medical technicians embody less than half the private or social educational resources as found in university professors or physicians. Secondly, the taxpayer subsidies inherent in this training also varies substantially across occupations indicating that the Canadian society gains differentially from importing for example, physicians versus nurses. Nonetheless, for this one year the gross value of the educational resources embodied in these professions amounted to \$10.8 billion implying a \$4.4 billion taxpayer subsidy.

Table 9: Gross Value of Human Capital Flow in 2001 at Canadian Replacement Costs, by Occupations (1993 Canadian dollars)

Occupations	(1) Number of Immigrants ^a	(2) Private Direct Costs per Student ^b	(3) Social Direct Cost per Student ^c	(4)=(3)-(2) Taxpayers' Subsidy per Student	(5) Private Total Cost per Student ^d	(6) Social Total Cost per Student ^e	(7)=(1)*(5) Private Total Cost for All Immigrants	(8)=(1)*(6) Social Total Cost for All Immigrants	(9)=(8)-(7) Taxpayers' Subsidy for All Immigrants
Manager	3,064	\$62,445	\$139,333	\$76,888	\$102,804	\$179,692	\$314,991,456	\$550,576,288	\$235,584,832
Engineer	16,874	\$83,256	\$179,366	\$96,110	\$133,705	\$229,815	\$2,256,138,170	\$3,877,898,310	\$1,621,760,140
Natural Scientist	2,726	\$94,056	\$209,388	\$115,332	\$153,498	\$287,913	\$418,435,548	\$784,850,838	\$366,415,290
University Prof	309	\$94,056	\$247,832	\$153,776	\$170,338	\$364,523	\$52,634,442	\$112,637,607	\$60,003,165
Teacher^f	771	\$67,810	\$163,920	\$96,110	\$146,335	\$242,445	\$112,824,285	\$186,925,095	\$74,100,810
Physician	674	\$119,356	\$273,132	\$153,776	\$236,047	\$389,823	\$159,095,678	\$262,740,702	\$103,645,024
Nurse	439	\$50,056	\$126,944	\$76,888	\$90,415	\$167,303	\$39,692,185	\$73,446,017	\$33,753,832
Medical tech.	1,517	\$50,056	\$126,944	\$76,888	\$90,415	\$167,303	\$137,159,555	\$253,798,651	\$116,639,096
Other professional	22,895	\$86,856	\$163,744	\$76,888	\$127,215	\$204,103	\$2,912,587,425	\$4,672,938,185	\$1,760,350,760
TOTAL	49,269	N/A	N/A	N/A	N/A	N/A	\$6.404 billion	\$10.776 billion	\$4.372 billion

Notes:

a Citizenship and Immigration Canada Landed Immigrant Data System, annual data. Thus, these are intended occupations.**b** Private direct costs include tuition plus books, fees, lodging and food. Source: Tuition and Living Accommodation, Statistics Canada #81-219.**c** Social direct costs include private direct costs plus federal and provincial government expenditures per student per year.**d** Private total costs per student equals direct costs plus foregone earnings for the relevant time spent in school. All occupations are four (4) years, except (5) years for engineers, six (6) years for scientists and teachers, and eight (8) years for both physicians and professors. Foregone earnings are defined as \$9,248.21 per year for those occupations requiring four years of schooling and \$17,491.29 per year for those occupations that require a post B.A., B.B.A. or B.Sc. Earnings calculated from PUST 1991 Census.**e** Social total costs equal direct costs plus foregone earnings.**f** Based on a post-B.A. two-year educational program.

Tables 10-A and 10-B report the embodied value of human capital in Canada's immigration inflows for the 1980-2001 period based on the social cost concept. Once again, there exists a great deal of variation across the selected occupations. Between 1980 and 1990 (Table 10-A) no one profession dominated the immigrant flows in terms of the value of their educational inflows. Moreover, between 1980 and 1990 only \$26.4 billion dollars (1993 dollars) of educational resources flowed into Canada.

Table 10-A. Total Educational Values at Total Social Cost for All Immigrants to Canada by occupation, 1980-1990, in billion 1993 dollars

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Managers	\$0.47	\$0.51	\$0.53	\$0.38	\$0.31	\$0.30	\$0.38	\$0.83	\$0.97	\$0.98	\$1.04
Engineers	\$0.28	\$0.49	\$0.60	\$0.22	\$0.16	\$0.16	\$0.21	\$0.38	\$0.36	\$0.44	\$0.51
Natural Scientists	\$0.16	\$0.18	\$0.19	\$0.10	\$0.08	\$0.09	\$0.10	\$0.15	\$0.16	\$0.21	\$0.21
University Professors	\$0.18	\$0.12	\$0.12	\$0.10	\$0.09	\$0.11	\$0.12	\$0.13	\$0.10	\$0.15	\$0.15
Teachers	\$0.19	\$0.18	\$0.19	\$0.12	\$0.11	\$0.12	\$0.14	\$0.19	\$0.21	\$0.28	\$0.33
Physicians	\$0.20	\$0.22	\$0.24	\$0.18	\$0.18	\$0.18	\$0.22	\$0.22	\$0.19	\$0.26	\$0.26
Nurses	\$0.11	\$0.16	\$0.17	\$0.06	\$0.05	\$0.05	\$0.07	\$0.12	\$0.18	\$0.20	\$0.21
Medical tech.	\$0.19	\$0.16	\$0.16	\$0.10	\$0.09	\$0.09	\$0.11	\$0.18	\$0.20	\$0.26	\$0.26
Other professionals	\$0.67	\$0.83	\$0.90	\$0.43	\$0.36	\$0.37	\$0.48	\$1.04	\$1.11	\$1.11	\$1.18
TOTAL	\$2.44	\$2.85	\$3.11	\$1.68	\$1.43	\$1.45	\$1.82	\$3.25	\$3.47	\$3.87	\$4.16

Source: Author's computations

Table 10-B illustrates dramatically different trends between 1991 and 2001. First, the total amount transferred during this period exceeded \$64 billion (1993 dollars) in educational resources with over 52% of this transfer occurring in the last four years of the study period. In addition, engineers and the collective category of 'other professionals' dominate these flows and by 2001 these two categories represent more than 80 per cent of the value of the inflow.

In sum, although the 'balance of trade' portrays the dominance of the professional inflow of immigrants during this period it does not accurately portray the dominance in terms of educational resources embodied in selected immigrant occupations, especially engineers in late 1990s.

Table 10-B. Total Educational Values at Social Cost for All Immigrants to Canada by occupation, 1991-2001, in billion 1993 dollars

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Managers	\$0.70	\$0.66	\$0.57	\$0.45	\$0.35	\$0.35	\$0.31	\$0.24	\$0.31	\$0.45	\$0.55
Engineers	\$0.48	\$0.49	\$0.81	\$1.04	\$1.38	\$1.86	\$2.20	\$1.95	\$2.64	\$3.55	\$3.88
Natural Scientists	\$0.21	\$0.17	\$0.21	\$0.38	\$0.54	\$0.78	\$0.83	\$0.67	\$0.79	\$0.82	\$0.79
University Professors	\$0.20	\$0.18	\$0.17	\$0.11	\$0.10	\$0.09	\$0.07	\$0.08	\$0.08	\$0.10	\$0.11
Teachers	\$0.28	\$0.23	\$0.25	\$0.19	\$0.16	\$0.18	\$0.13	\$0.11	\$0.11	\$0.16	\$0.19
Physician	\$0.27	\$0.25	\$0.27	\$0.21	\$0.20	\$0.23	\$0.21	\$0.18	\$0.17	\$0.23	\$0.26
Nurses	\$0.20	\$0.17	\$0.15	\$0.14	\$0.11	\$0.07	\$0.06	\$0.04	\$0.04	\$0.06	\$0.07
Medical tech.	\$0.22	\$0.18	\$0.18	\$0.17	\$0.18	\$0.21	\$0.21	\$0.15	\$0.17	\$0.22	\$0.25
Other professionals	\$1.09	\$1.08	\$1.40	\$1.76	\$2.26	\$2.93	\$3.21	\$2.57	\$3.21	\$4.15	\$4.67
TOTAL	\$3.64	\$3.40	\$4.01	\$4.44	\$5.29	\$6.69	\$7.22	\$5.99	\$7.52	\$9.74	\$10.8

Source: Author's computations

In sum, although the 'balance of trade' portrays the dominance of the professional inflow of immigrants during this period it does not accurately portray the dominance in terms of educational resources embodied in selected immigrant occupations, especially engineers in late 1990s.

Table 11 completes my analysis by reproducing Table 8 in value terms to report Canada's 'Balance of Payments in Brains' for the 1982-2001 period.²⁵ It should be noted that this table is constructed under the assumption that immigrants to Canada and Canadian emigrants are perfect substitutes. The first two columns in Table 11 represent the weighted value (at social total costs) of the immigrant inflows of all professionals and managers who immigrated to Canada during the 1982-2001 period. The last two columns deduct for values of the outflows to the United States of Canadian-born residents in these two occupational categories. For managers, over 45% of the embodied value of the educational content of these immigrants from the rest of the world to Canada is lost to the United States. alone. In fact, for the 1994-1999 period the net values for human capital in managers is close to zero or negative since I have omitted the substantial additional outflows of Canadian managers to Hong-Kong and foreign-born Canadian citizens residing in the United States. The trends in professionally trained immigrants are very different since almost 90% of the educational value embodied in these immigrants remained in Canada over the study period.

²⁵ The calculations embedded in Table 4 assume that immigrants and emigrants in the same profession are perfect substitutes.

Table 11. Balance of Payments in Human Capital Flows for 1982-2001 (1993 Canadian dollars)

	Gross Social Total Cost (millions)		Net Social Total Cost (millions)	
	Professionals	Managers	Professionals	Managers
1982	\$2,525.49	\$304.30	\$2,151.49	\$218.87
1983	\$1,242.17	\$214.65	\$882.11	\$120.69
1984	\$1,040.78	\$179.70	\$680.50	\$77.31
1985	\$1,073.53	\$172.40	\$684.71	\$77.00
1986	\$1,355.47	\$214.86	\$967.97	\$115.04
1987	\$2,386.96	\$475.98	\$1,977.99	\$360.64
1988	\$2,524.16	\$554.52	\$2,110.99	\$458.51
1989	\$2,874.04	\$561.82	\$2,481.90	\$439.80
1990	\$3,100.88	\$595.44	\$2,549.17	\$415.43
1991	\$2,875.59	\$402.27	\$2,415.28	\$265.85
1992	\$2,690.14	\$375.23	\$2,162.56	\$184.74
1993	\$3,377.06	\$326.92	\$2,731.75	\$119.05
1994	\$3,960.19	\$255.57	\$3,312.00	\$64.25
1995	\$4,902.71	\$199.75	\$4,362.74	\$54.28
1996	\$6,271.24	\$200.26	\$5,478.76	-\$12.03
1997	\$6,873.40	\$174.36	\$6,406.01	\$31.46
1998	\$5,684.79	\$136.63	\$5,414.36	\$21.90
1999	\$7,154.01	\$177.85	\$6,947.76	\$89.13
2000	\$9,249.07	\$257.83	\$8,838.56	\$113.19
2001	\$10,225.24	\$314.99	\$9,681.50	\$103.73
Total	\$81,386.94	\$6,095.35	\$72,238.12	\$3,318.82

Notes: a. Professionals and Managers defined per Table 1.

In sum, under either the ‘balance of trade’ or balance of payments’ concepts two overarching trends appear. Canada was a large net importer of professional skills, especially engineers in the 1990s while managers were difficult to retain.

We now turn to the underlying economic forces which rationalized Canada’s vast recruitment of professionals across a changing occupational composition.

As already noted DeVoretz and Laryea (1998) have argued that Canada has traditionally recruited offshore immigrants to replace earlier Canadian-born emigrants to the United States. In other words, Canada has compensated for the loss of domestically trained emigrants to the United States by importing skilled immigrants from the rest of the world (see Table 8). In the 1990s there was considerable debate about the existence of a Canadian “brain drain” to the United States. However, the loss of Canadian-born skilled immigrants appear to be more than offset by the importation of skilled labour from the rest of the world. Nonetheless, there were important

exceptions to this observation that can be revealed by devising a two-part analytical framework of managed and market-driven labour markets.²⁶

In the managed labour markets (nurses, teachers, physicians) there was a Canadian “brain drain” that went largely uncompensated by world imports. In the market-driven labour market foreign inflows of skilled immigrants to Canada have more than compensated for the skilled outflows, except managers, to the United States. The imbalance in these two labour markets, a positive net inflow in the market-driven sector and the deficit in the managed labour market led observers to conclude that Canada did not suffer from a brain drain. However, this conclusion may be premature. A careful evaluation of the credentials of the presumed highly skilled immigrants to Canada in either the market-driven or public sectors indicated that immigrant credentials often did not match the Canada-trained leavers (DeVoretz and Iturralde, 2000). Hence, in reality there was a substantial pre-2001 brain drain in the public sector and for managers.

What push and pull forces led to this “brain circulation” to the United States in the 1990s, and are these forces still active in 2006? First, immigration policy between the United States and Canada changed with the advent of the TN-1 visa under the NAFTA accord. Canadian skilled emigration to the United States had been in a period of quiescence in the 1980s partly due to the inability of Canadians to enter the United States with a permanent visa; this changed with the advent of a TN-1 visa. Secondly a stagnant Canadian public sector pushed medical professionals to leave Canada to seek employment in the United States. Finally, higher post-tax income in the United States encouraged Canadian managers and professionals to leave in the late 1990s.

The collapse of the knowledge sector in North America and the post-911 security climate has substantially reduced any brain circulation from Canada to the United States by erstwhile Canadian immigrants. Also, the use of TN visas has been restricted to a subset of Canadian-born citizens since some naturalized Canadians now face complicated visa requirements.²⁷

²⁶ Examples of Canadian managed labour markets are nurses, physicians, teachers, and other public sector employees whose employment depends on public sector financing decisions. The Canadian market driven labour market would consist of all other professions.

²⁷ For example, Canadian citizens born in Iran, Pakistan and other Middle Eastern and selected African countries cannot simply use a TN visa for entry into the United States.

Evidence of Chinese “Brain Circulation”

New research presents evidence on the emergence of a Chinese Canada-Hong-Kong “brain circulation”. Two studies conducted by this author, one quantitative and the other interview based provide evidence on both the size and the selectivity of this early 21st century example of “brain circulation”.²⁸

Table 12 which is drawn from Hong Kong and Canada Census data depicts the differential human capital, employment and earnings characteristics between Chinese immigrant stayers in Canada and movers to Hong Kong.²⁹ The returning Chinese Canadians resident in Hong-Kong are much younger (62% under age 39), more educated (50.5% with a University education) and earned 2.2 times more mean monthly wages than their Hong-Kong born reference group. However, the Chinese immigrant staying population in Canada has an occupational distribution more heavily concentrated in the lower professional ranks and managerial categories.

Thus, by 2001 the Canadian return migration process to Hong Kong was highly selective with the youngest (except children) and most educated Chinese emigrating from Canada leaving a less educated and less productive staying segment in Canada.

²⁸ See DeVoretz, D. and K. Zhang (2004) for details of the quantitative study.

²⁹ The stayers are defined as Hong-Kong-born immigrants with permanent residence status in Canada circa 2001. Hong-Kong returnees from Canada are defined as Hong-Kong residents with Canadian citizenship circa 2001 who had lived in Canada in the previous five year period.

Table12. Characteristics of Hong Kong-Born Returnees and Stayers in Canada: Circa 2001

	Returnees To Hong Kong from					Hong-Kong Born Stayers in Canada*	
	All		Canada	USA	Others		
Total	85793	100.0%	33676 (39.3%)	17778 (20.7%)	34339 (40.0%)	6955	100.0
Age:							
0-19	8236	9.6	9.4	4.4	11.1	1506	21.7
20-29	32430	37.8	37.5	39.4	37.6	1272	18.3
30-39	19990	23.3	21.5	26.1	23.8	1745	25.1
40-49	12354	14.4	14.9	14.4	14.1	1630	23.4
50-59	6263	7.3	8.5	8	6.3	413	5.9
60	6434	7.5	8.1	7.7	7.1	389	5.6
Sex:							
Female	42811	49.9	53	48	49	3519	50.6
Male	42982	50.1	47	52	51	3436	49.4
Relation to Head of Household:							
Head	29170	34.0	33.5	35.9	33.9	1966	28.3
Spouse	14756	17.2	18.2	18.0	16.3	1634	23.5
Children	32430	37.8	38.2	37.1	37.7	2741	39.4
Maid	86	0.1	0.0	0.0	0.1	n/a	n/a
Others	9351	10.9	10.1	9.1	12.0	614	8.8
Education:							
Primary School or less	9180	10.7	9.2	6.4	13.1	392	6.4
Secondary School & Diploma	31314	36.5	40.3	23.6	37.5	4201	68.2
Local Uni. Degree	12612	14.7	15.3	15.8	13.9	1571	25.5
Overseas Degree	32687	38.1	35.2	54.2	35.5		
Occupation:							
Low Skill	13509	26.7	25.8	16.9	30.2	1068	27.7
Assistant Professional	15584	30.8	33.7	29.8	29.2	951	24.7
Professional	10726	21.2	16.9	28.4	21.9	1038	26.9
Managerial	10777	21.3	23.6	25.0	18.7	796	20.7
Total	50596	100	100	100	100	3853	100.0
Earnings:							
1-5,999	2682	5.3	5.1	4.4	5.6	2382	45.7
6,000-9,999	5970	11.8	10.0	8.3	14.1	739	14.2
10,000-14,999	12345	24.4	26.7	17.6	24.7	753	14.5
15,000-19,999	7994	15.8	17.0	17.6	14.7	552	10.6
20,000-29,999	8348	16.5	18.3	17.5	14.8	525	10.1
>=30,000	13256	26.2	22.8	34.6	26.0	256	4.9
Total	50596	100.0	100.0	100.0	100.0	5207	100.0
Median (HK Dollar/month)		16520.38	16500.00	20000.00	15500.00		7091.03
Mean (HK Dollar/month)		25543.01	23314.00	33682.00	24657.00		10234.78
Gini Coefficient**		.11.	.13	.55	.15		.34

Source: 2001 census data, Department of Census and Statistics, Hong Kong SAR, PRC.

Notes:

* 2001 Canadian census public use individual Microdata files, For earnings, sample selected: aged 15 and over; income > 0; adjusted to 2000 real CND dollar value; exchange rate as on Dec. 31, 2000 at CND\$1 = HK\$5.20777.

** Author's calculation.

Implications of Return or Onward Migration

Under the old regime of permanent settlement and limited circulation, Canada's investment in immigration integration yielded social and economic rewards from the presence of long term immigrants which aided Canada's development and treasury. This may no longer be the case, as Canada must now share the benefits of immigrant relocation and increased education with the rest of the world.³⁰ Given the size of Canadian immigrant remittances and return migration it is now possible to argue that both the immigrant sending and receiving countries share in the immigrant's prosperity which is the major implication of "Brain Circulation" theory.³¹

Section V. Foreign Students in Canada

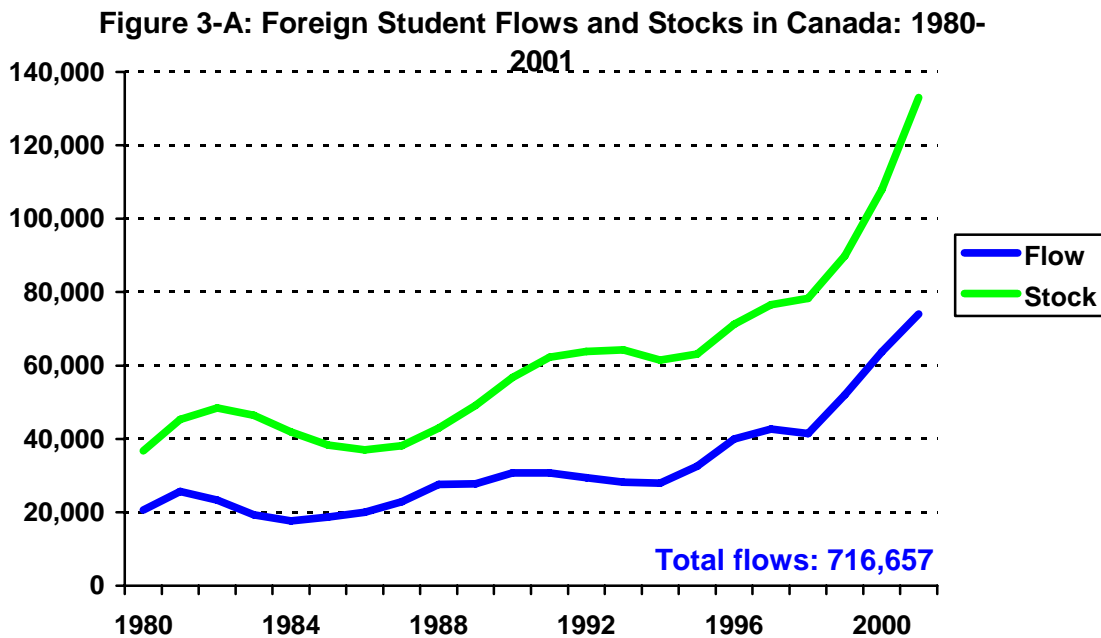
A fraction of Canada's highly skilled inflow originates as Canadian graduates who apply whilst in Canada or after returning to their home country. Until May 2005 foreign students who were resident in Canada with temporary student visas had to leave Canada to apply for permanent residence status. However, this rule did not imply that students actually left Canada while awaiting a more permanent status. In fact, many students delayed graduation after applying for their landed status, and then applied for a temporary working visa to support themselves and reside in Canada while the processing took place over a 14 month period. However, revised Canadian immigration legislation circa 2005 has eased the conversion process of foreign students to permanent residency status. Foreign students whether undergraduates or graduate students can now remain in Canada with a temporary working visa if they obtain employment anywhere outside of metropolitan Toronto, Montreal or Vancouver. In this section I will describe Canada's post 1980 flow of foreign students and with the aid of a demand model analyze the factors which influence the size and distribution of foreign students in Canada. Next, armed with this model and the eased conversion rules for foreign students I will analyze the implications of changing foreign student admissions legislation on the size of the future foreign student enrollments in Canada.

³⁰ Remittances in particular have substantially grown in the last decade and they now surpass foreign aid as a source of development funds for many countries (Straubhaar and Vadean, 2005).

³¹ See DeVoretz and Vadean (2005) for estimates of Canadian immigrant remittances.

Descriptive Statistics

Figure 3-A portrays the total number of foreign students in residence on a flow and stock basis for the period 1980-2001.³² Several patterns emerge. First, Canada until the mid-1990s had only modest inflows of foreign students. Between 1980 and 1994 the annual flows averaged less than 30,000 students per year. Only after 1995 did both the flows and hence the stocks of foreign students rise to more impressive totals. In fact, over the 1990s both the flows and stocks of foreign students doubled. However, after 2001 Canada's intake of foreign students as measured by either flows or stocks decreased.



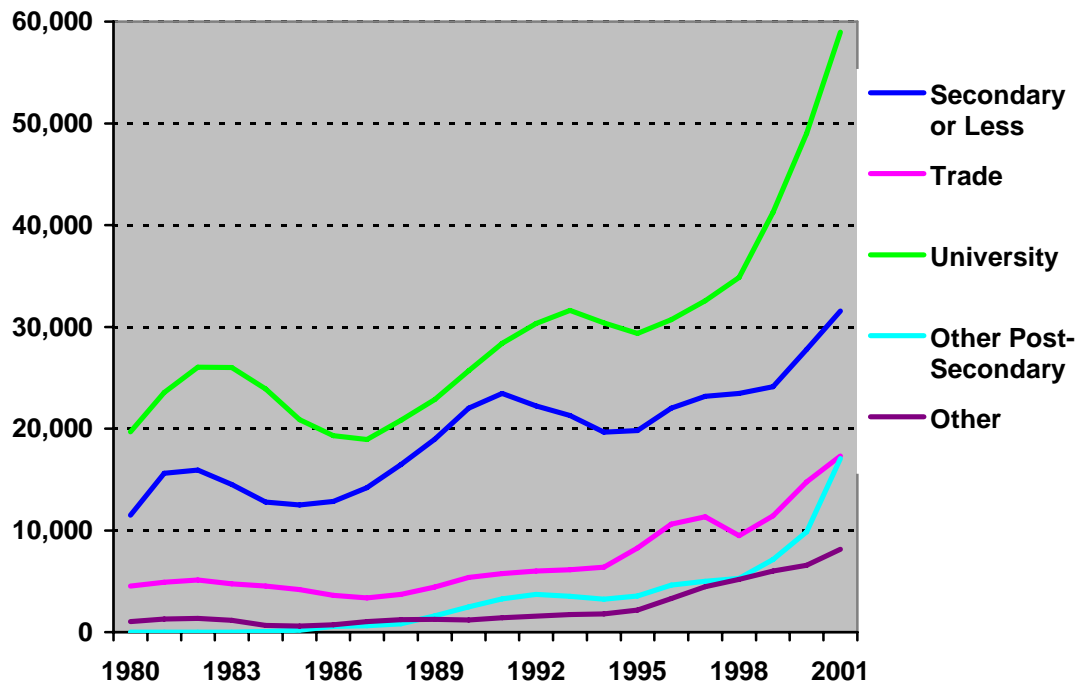
Source: Foreign Students in Canada 1980-2001, Priorities, Planning and Research Branch, Citizenship and Immigration Canada

Figure 3-B decomposes these aggregate flow figures by source region and better represents the source of the post 1990 dynamics. Two countries; China and South Korea emerge as major senders in the 1990s. In fact, in a five year period (1996-2001) China experienced an 14 fold increase in arrivals while South Korea during the 1994-2000 period had a similarly large increase. By 2001 these two countries were sending 24,917 of the total 73,979 students sent to Canada. In addition, France and Japan also experienced exceptional growth in the 1990s. In sum,

³² See Table A-7 for a more complete accounting.

Canada receives the majority of its student arrivals from a few select countries and this increase in levels has only been a recent phenomena which has substantially declined since 2001.

**Figure 3-B: Foreign Student Stocks in Canada by Level of Study:
1980 - 2001**



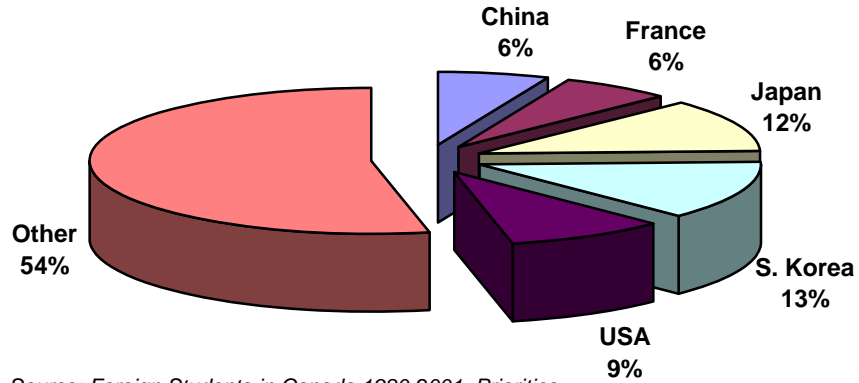
Source: Foreign Students in Canada 1980-2001, Priorities, Planning and Research Branch, Citizenship and Immigration Canada

Figures 4 and 5 more clearly delineate source country trends for Canada's foreign student enrollments before and after 2001. The four largest source countries Japan (12%), South Korea (13%), China (6%), France (6%) and USA (9%) represented 46% of the 1991-2001 student arrivals.

However, after 2001 the geographical composition of foreign student arrivals to Canada becomes much more Asian. South Korea (21%) and China (15%) grew substantially such that these two Asian countries plus Japan constituted 45 percent of the period's arrivals.

Figure 4: Source countries for international student arrivals to Canada in 1991-2001

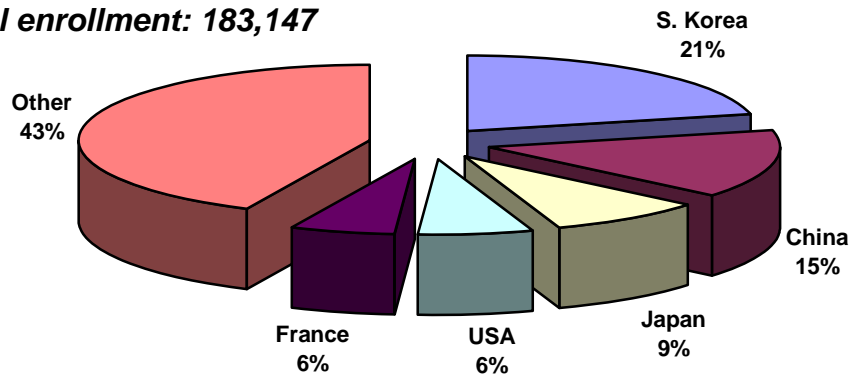
Total new enrollment: 462,595



Source: *Foreign Students in Canada 1980-2001, Priorities, Planning and Research Branch, Citizenship and Immigration*

Figure 5: Source countries for international student arrivals to Canada in 2002-2004

Total enrollment: 183,147



Source: *Facts and Figures 2004. Immigration Overview: Temporary Residents, Citizenship and Immigration Canada*

In sum, between the 1991-2001 period and 2002-2004 period the average number of foreign student arrivals to Canada rose from 46,200 annually to over 61,000 in the latter period. This rise clearly was driven by a shift in source countries. Both the growing size in foreign student enrollments and the geographical shift in source countries will latter present a challenge to model and rationalize this growth pattern. However, it must be remembered that these

aggregate figures conceal the educational destination of these foreign students. I now turn to an analysis of the foreign student choice of levels and fields of study while in Canada.

Table 14 reveals the foreign student enrollments by level of study for the 1980-2001 period. By 2001 the majority of foreign students in Canada (76%) or 101,454 were enrolled in post secondary schooling. Of these 58,979 or 44% were enrolled in Canada's universities. However, this foreign student total represented only 12.5% of Canada's total University enrollment for 2001.

	Secondary or Less	Trade	University	Other Post-Secondary	Other	Total
1980	11,507	4,518	19,677	0	1,049	36,751
1981	15,595	4,910	23,538	0	1,272	45,315
1982	15,933	5,111	26,013	0	1,353	48,410
1983	14,506	4,751	25,992	5	1,173	46,427
1984	12,793	4,506	23,906	61	661	41,927
1985	12,488	4,186	20,872	198	612	38,356
1986	12,838	3,612	19,322	550	728	37,050
1987	14,202	3,375	18,941	636	1,025	38,179
1988	16,440	3,696	20,828	804	1,209	42,977
1989	18,952	4,427	22,861	1,611	1,255	49,106
1990	22,020	5,355	25,683	2,472	1,192	56,722
1991	23,452	5,746	28,368	3,264	1,426	62,256
1992	22,235	5,984	30,325	3,701	1,570	63,815
1993	21,280	6,113	31,627	3,513	1,721	64,254
1994	19,661	6,382	30,398	3,231	1,785	61,457
1995	19,802	8,255	29,352	3,549	2,173	63,131
1996	22,009	10,611	30,693	4,620	3,309	71,242
1997	23,177	11,328	32,560	4,980	4,472	76,517
1998	23,469	9,475	34,862	5,260	5,191	78,257
1999	24,100	11,421	41,256	7,131	6,002	89,910
2000	27,781	14,757	49,006	9,851	6,566	107,961
2001	31,568	17,291	58,979	17,046	8,138	133,022

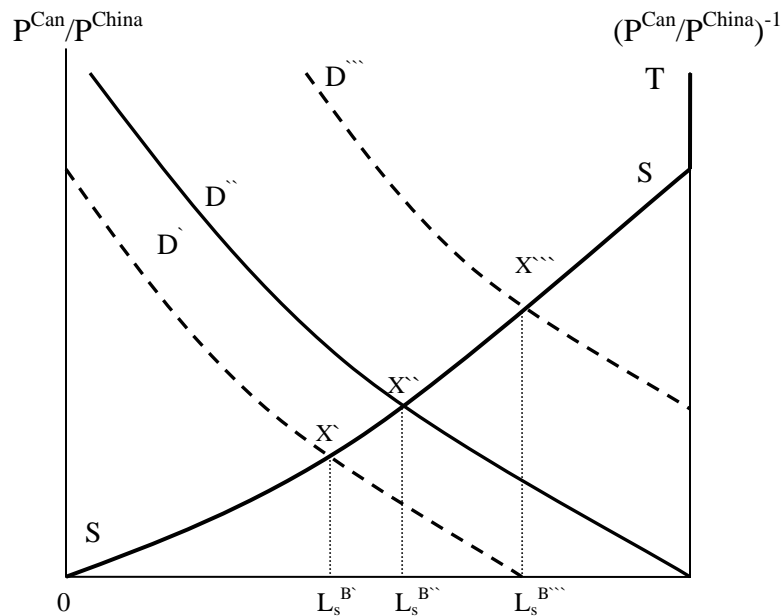
Other significant trends appear in Table 14. In the 1995-2001 period foreign student university enrollment increased by 91 per cent from 30,693 in 1996 to 58,979 in 2001. Foreign student enrollment in trades also had a substantial rise (62 per cent) over the same period. In sum, for the decade of 1991-2001 post-secondary foreign enrollment in Canada grew by 261 per cent from 38,804 to 101,454.

The core question is what conditioned this substantial increase from a small base of foreign enrollment during the 1990s? I develop a model below which should provide some insights into the factors which conditioned this development.

A Model of Foreign Student Demand in Canada

I argue that the foreign demand for higher education in Canada consists of a two stage decision process. First, the (ith) student decides to study in Canada or the rest of the world and then after deciding to study in Canada chooses a Canadian school. Figure 6 presents a schematic view of this decision process.

Figure 6. The Market for Canadian Foreign Students



The source country in this case is argued to be an underdeveloped country (e.g. China) supplying a generic type student. The supply curve for this (ith) supplying country is mapped by $SS'T$ and is a positive function of the inverse of the price ratio of Canadian education to Chinese education or $(P^{Can}/P^{China})^{-1}$. As the relative price of quality adjusted Canadian education falls either due to the depreciation of the Canadian dollar or a rise in the Chinese price of education P^{China} then a greater supply of quality adjusted Chinese students arrive in Canada.

In any one period the total supply of Chinese students to the world of (ith) quality is assumed to be (OT) .³³ These students will be distributed across Canada and the rest of the world as the inverse of the price ratio of Canadian education to Chinese education changes. For example at a low inverse price ratio where X^* is the equilibrium $(0 - L_s^B)$ students arrive in Canada and the rest of the world would receive the residual supply of Chinese students or $((OT) - (OL_s^B))$. In a similar fashion as the relative price of quality adjusted Canadian education falls then X^* or X^{**} become alternative equilibria. In each case, Canada receives successively more of the total amount of China's qualified students $(0 - L_s^{B^{**}})$ and $(0 - L_s^{B^{***}})$ and the rest of the world receives fewer $((OT) - (OL_s^{B^{**}}))$ and fewer $((OT) - (OL_s^{B^{***}}))$ Chinese students.³⁴

In sum, as the demand for Canadian education rises less foreign students are supplied to the rest of the world and vice-versa in any one period.

What exactly determines both the intercept and the slope of the demand curves depicted in Figure 6? Equation 1 gives an implicit functional form for the foreign student demand functions and states the relevant price and income arguments as implied by Figure 6.

Eq. 1 $D_{it}^m = F(P_{m,t-1}, P_{ij}^m, Y_{ij} : P_{ij}^{ROW})$ where

$P_{m,t-1}$ = Canada-wide average annual direct costs of university for a student from an (ith) country or the tuition cost and subsistence costs divided by exchange rate of the (ith) country in period (t-1).

$P_{ij,t-1}^m$ = cross price or cost of university in Canadian province (m) relative to price of university in (jth) province for student from (ith) country in period (t-1).

Y_{ij} = real income of students from an (ith) country deflated by the exchange rate and cost of living in the (jth) Canadian province.

$D_{i,t}^m$ = number of student from an (ith) country enrolled in Canadian schools in period (t).

P_{ij}^{ROW} = the cost of a Canadian education in (jth) province of Canada for a student from an (ith) country divided by the average tuition for a university in the rest of the world (U.S.A.) converted to Canadian dollars.

³³ See DeVoretz (2003) on arguments which determine the slope and intercepts of foreign student supply curves for China and other south Asian countries.

³⁴ This requires that the relative price of Chinese education to the rest of the world remains fixed for this outcome to hold.

A shift in the demand from (D' to D'') in Figure 6 for Canadian education results from a change in one or more of the variables P_{mj} , Y_{ij} , and P^{ROW}_{ij} . For example, as the income Y_{ij} rises in the sending country the ability to finance foreign education rises. However, there is a second effect occurring as (Y_{ij}) rises in the home country since as the immigrant sending country's income rises the reward derived from this Canadian training will rise if the foreign student returns.³⁵ This will also stimulate demand and cause the demand curve to shift to the right. In addition, if the relative price in another jurisdiction or (P^{ROW}_{ij}) rises then D' will shift to D'' . Finally if the exchange weighted price in the particular Canadian province ($P_{mj,t-1}$) under consideration rises (falls) then there would be a reduction (increase) caused by a movement along any one demand curve.

One major assumption that this model makes is that all students who are accepted obtain student visas. In fact, the actual demand curves are conditioned by the state of acceptance of either the nation state or the individual universities in any one jurisdiction. If the student visa acceptance rate rises for Canada then the slope of the supply curve rises. However, if the university acceptance rate within a Canadian province rises then this would lead to a rise in the demand curve. The joint effects of these two shifts would be revealed by greater numbers of students being enrolled in any province (or country) with a higher relative tuition.

Stylized Facts

Prior to presenting my econometric estimates I will report below some trends in the model's key variables.

Figure 7 depicts the movement in the crucial exchange rate variable for Canada's major student sending countries. The long term exchange rate trends vis a vis the Canadian dollar are clear for China and Japan who respectively experienced long term depreciation and appreciation of their currencies. For example the South Korean Won was relatively stable until 1997 when the "Asian meltdown" decreased the value of the Won. The Japanese Yen also depreciated in 1997 but only after a substantial long term rise after 1985.

³⁵ See DeVoretz and Zhang (2004) for an example of this effect for Hong Kong students returning from Canada.

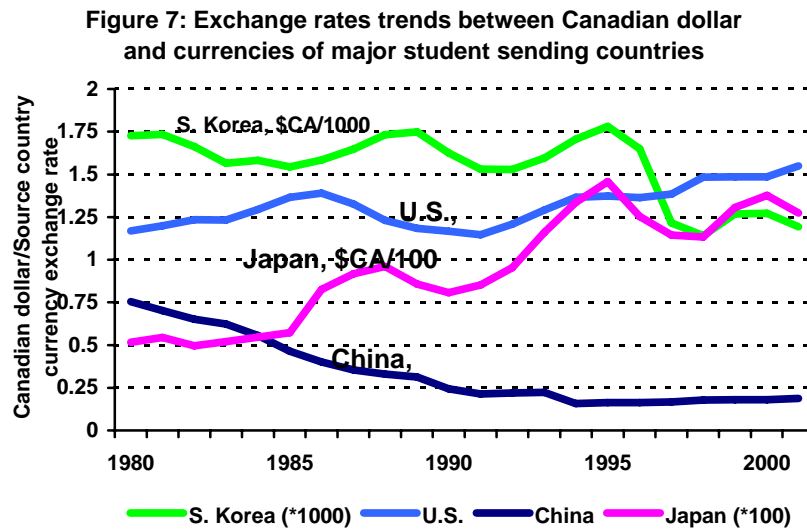
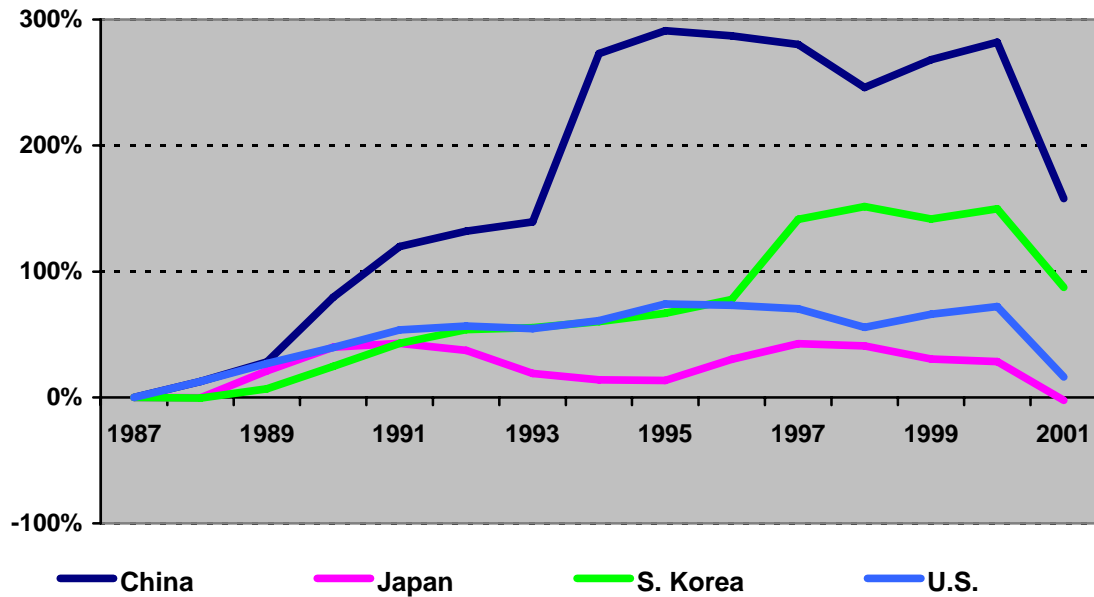


Figure 8 provides further information on the combined effects of nominal tuition fees in Canada weighted by the exchange rate for prospective students from Canada's major sending countries. China experienced a three fold increase in the exchange weighted tuition largely due to its substantial decline in the value of Yuan (see Figure 7). In addition, the South Korean exchange weighted tuition rose after the Won's 1997 devaluation. Japan and the United States experienced stable or rising currencies and hence the exchange weighted tuition fees for these countries rose only slightly over the period.

Figure 8: Growth of annual tuition fee for foreign students in Canada (average for Ontario, Arts programs), calculated on source countries' currency equivalents, relative to 1987 level



In sum, Figures 7 and 8 depict a great deal of variation across countries and time in my model's two price related variables. It is also obvious that the home country income variable varied substantially across Canada's student sending countries. Thus, given these substantial variations in my model's key variables I now turn to my empirical estimates.

Empirical Estimates

As noted above, I have broken down the decision process into two parts. First, I posit that foreign students look to a global set of conditions; exchange rates, visa acceptance rates, relative country tuition fees and then choose a country to study in. Once this choice has been made the student then chooses a school in the elected country. Given this methodological approach I first estimate a Canada-wide model and report the results in Table 15.

Table 15. Lagged Canadian-wide Demand Model $D_{ij,t}=f(D_{ij,t-1}, Y_{ij,t}, P_{m,t-1})$

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	P-VALUE	STANDARD. COEFF.	ELASTICITY AT MEANS
$D_{ij,t-1}^m$	0.8113E-01	0.3798E-01	2.13	0.035	0.0814	0.0798
Y_{ij}	.20039	0.1881E-01	10.84	0.000	0.733	1.2013
$P_{m,t-1}$	-0.12613	0.3308E-01	-3.81	0.000	-0.355	-0.1092
CONSTANT	-972	354	-2.74	0.007	0.000	-0.3438

N= 105 $R^2 = .67$

Table 15 reports the first level of the decision process namely the demand for Canadian education for Canada's five major sending regions for the period 1981-2001.³⁶ Given the strong secular growth in the foreign student demand in education I follow the methodology of DeVoretz and Maki (1983) and add the lagged demand for foreign education by the (ith) country in (t-1) or ($D_{i,t-1}^m$) to my demand equation.

The results reported in Table 15 confirm my model's predictions. The source country's income level (Y_{ij}) is positively related to enrollment growth. In fact, for every one percent rise in the source country's income level the (ith) country's demand for Canadian education rises by 1.2 percent. In other words, as Canada's source countries' income levels grow so will the foreign student demand. The exchange weighted tuition fee in Canada ($P_{m,t-1}$) is negatively related to foreign student demand as predicted. However, the price elasticity is very small (-.10) indicating that aggregate foreign demand for Canadian education is price inelastic. In other words, a one percent rise in the average tuition cost of Canadian education only causes a one-tenth of one percent decline in demand. Clearly, under these conditions a price rise will increase the total tuition revenue derived by Canadian educators. In sum, the demand for Canadian education by foreigners is seen as price-inelastic and a luxury good by foreign students.

³⁶ These source countries are the five largest senders to Canada and they include, Japan, South Korea, China, France, USA, Hong-Kong and Malaysia.

Table 16. Lagged North American-wide Demand Model $D_{i,t}=f(D_{i,t-1}, Y_{ij,t}, P_m, P_{ij}^{ROW})$

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	P-VALUE	STANDARD. COEFF.	ELASTICITY AT MEANS
$D_{ij,t-1}$	0.13863	0.4295E-01	3.22	0.002	0.139	0.1364
Y_{ij}	.20434	0.2204E-01	9.28	0.000	0.681	.7536
$P_{m,t-1}$	-0.14578	0.3801E-01	-3.82	0.000	-0.680	-0.1262
P_{ij}^{ROW}	-2290	1330	-1.723	0.880	-0.170	-0.7147
CONSTANT	-974	1319	.7389	0.462	0.074	0.3438

N= 105 $R^2 = .56$

I offer an expanded version of the aggregate Canadian foreign student demand model in Table 16. Here I incorporate the possibility of cross-border competition with the United States in the North American wide model which includes the relative price of attending school in the United States vis a vis Canada or (P_{ij}^{ROW}). The expanded demand system with a United States price variable is stable with all the earlier arguments maintaining their signs and significance levels. However, the introduction of this United States price competition in the Canadian demand equation moderately affects the demand for Canadian education by foreigners yielding a price elasticity of (-0.71). In other words, a one percent rise in Canadian tuition relative to United States tuition reduces Canadian demand by seven tenths of one percent.

Thus, if I combine both the own price effect ($P_{m,t-1}$) and the cross price effect (P_{ij}^{ROW}) the full effect of North American foreign student price competition can be seen. For example, a ten percent rise in Canada's domestic education price induced via either currency appreciation or a tuition increase or both will lead to a 8.4 per cent decline in Canadian enrollment.

I now turn to the second stage of the demand analysis and I present my estimated internal Canadian provincial demand function.

Table 17. Lagged Canadian-wide Demand Model $D_{i,t}=f(D_{i,t-1}, Y_{ij,t}, P_m, P_{ij}^{ROW})$

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	P-VALUE	STANDARD. COEFF.	ELASTICITY AT MEANS
$D_{ij,t-1}$	0.87591	0.4272E-01	17.62	0.000	0.263	0.0599
$LP_{m,t-1}$	-0.71485-01	0.3678	-0.194	0.000	-0.0065	-0.1262
P_{ij}^{USA}	-6498	2019	-3.219	0.002	-0.0997	-0.9001
CONSTANT	6409	1993	3.215	0.298	0.000	0.9905

N= 110 $R^2 = .78$

Two important observations are derived from Table 17. First, lagged enrolment by provinces ($D_{ij,t-1}$) explains contemporary enrollments. In addition, the negative sign for the coefficient of the exchange rate between Canada and the United States (P^{USA}_{ij}) indicates that as the value of the United States dollar rises then any individual Canadian provinces will receive more foreign students. The lagged provincial differences in tuition fees ($LP_{m,t-1}$) obtains the correct sign but is not significantly related to inter-provincial foreign student movement.

Qualifications and Narratives

Ideally the above analysis should recognize the role of Canadian government foreign student admissions policies. Current Canadian acceptance policy is quite complex but is driven by the criteria of financial viability and the probability that the student will return home.³⁷ In order to capture the effects of government policy a variable for acceptance rates should be incorporated into my model. However, data on this variable is limited and thus this variable could not be formally tested in the model. Nonetheless, I report below in Figures 9 and 10 recent foreign student acceptance rates by various geographical subdivisions to give a hint at the inherent deterrence effects of Canadian foreign student acceptance policies.

³⁷The most common reasons for rejection are lack of documentation, failure to show adequate proof of ties to the applicant's country of residence, insufficient funds for the trip, insufficient proof of personal financial stability, false declarations, misrepresentation, or prior infractions under Canada's immigration laws (Canada,2005).

Figure 9: Canada - Foreign Student Application Approval Rates by Citizenship, 1998-2005

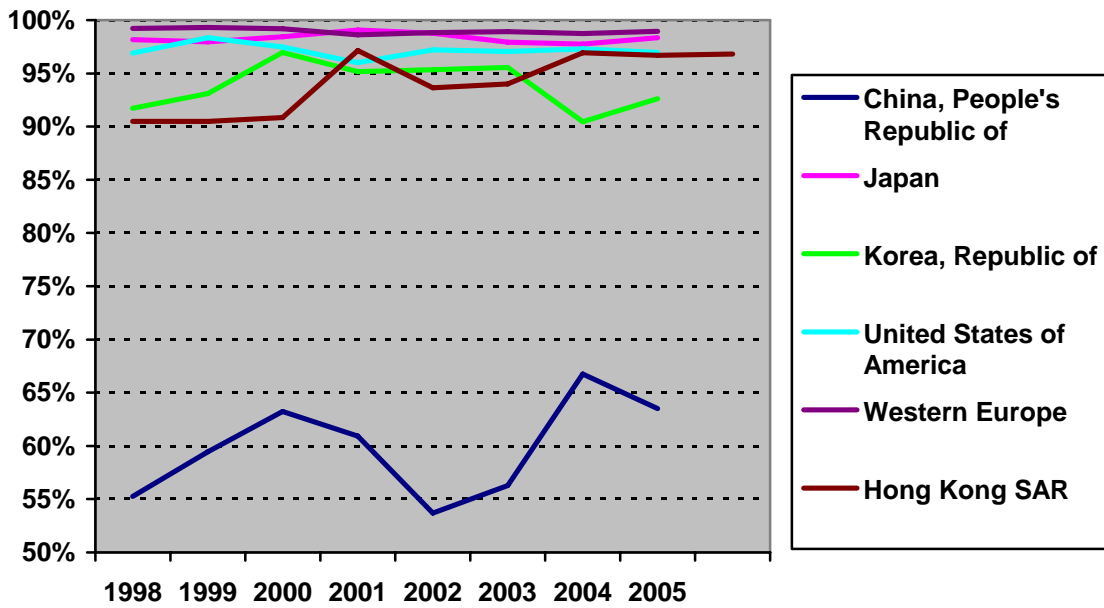
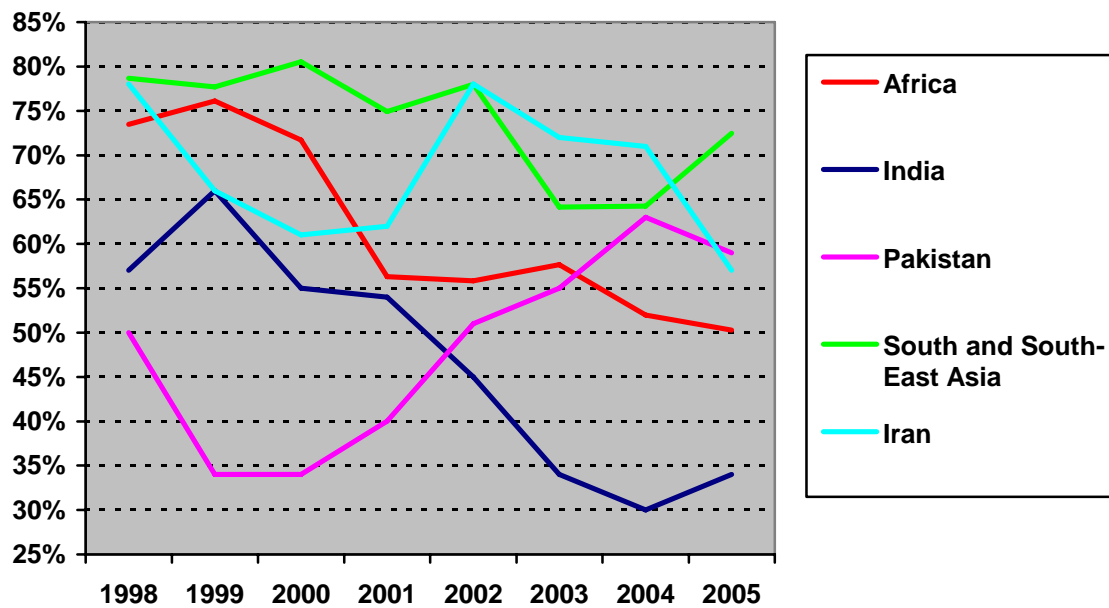


Figure 9 concentrates on Canada's major foreign student source countries as defined by the student's citizenship. Students from the United States, Japan and Western European have a greater than 90% rate of visa issuance once they receive a bone fide acceptance at a Canadian school. However, China (PRC) has rarely exceeded a 60% student acceptance rate. What accounts for this vast difference amongst Canadian major sending countries? The issuance of any Canadian temporary visa is predicated on the assumption that the visa recipient will return home. Lack of evidence in the Chinese case that the student will return has kept the acceptance rate down. This evidence takes the form of a waiting job to return to, substantial assets in China or a spouse in China. In addition, a lack of history of PRC foreign student arrivals has tempered Canada's acceptance rates.

Figure 10 illustrates that with the curious exception of Pakistan all post 2001 acceptance rates from a variety of third world sourced countries have collapsed. In fact with the exception of South and Southeast Asian foreign student applicants all of the applicants in Figure 10 are now below 60%. In particular Indian applicants are refused two out of three times by 2005.

Figure 10: Canada - Foreign Student Application Approval Rates by Citizenship, 1998-2005



This brief analysis indicates that my model must be truncated into two worlds. All the countries represented in Figure 9 except China live in a freely competitive environment with no market interference by the Canadian government in the foreign student market for Canadian education. However, for China and all the countries appearing in Figure 10 Canadian government student visa issuance largely invalidates the application of my naive model. The model must in short be revised when more data is available into a two stage decision process for students with Chinese citizenship or citizenship in countries depicted in Figure 10. A model to explain the actual number of student arrivals in Figure 10 (plus the Chinese) requires a more sophisticated model which incorporates the determinants of visa acceptance rates.

Given the acceptance difficulties faced by many non-western student visa applicants I report two representative narratives (Appendix B) which outline the sophisticated strategies employed to overcome these visa hurdles. Both the interviewed students entered Canada in the late 1990s and have subsequently achieved permanent residency status and hold full time jobs in Canada. The Chinese female student clearly states a two stage strategic strategy which the following quote illustrates:

“Therefore, in my case, immigrating to Canada was the intention before I left China. The main reason we choose Canada over the U.S. is that it was easier to obtain the landed immigrant status in Canada.... However, my ex-husband and I did talk about the possibility of moving on to the US after acquiring landed immigrant status.”

This strategy clearly illustrates the strategy implied by the triangular model proposed in Figure 2. Moreover, it is interesting to note how this student perceived the difficulty of the student-immigration process.

“In general, I was lucky..... Everything went quite smoothly and there were no obstacles. As of today, I am still happy with my decision to become a Canadian citizen.”

The male Ukrainian student’s strategy echoes the Chinese student's intentions when he states:

“My decision to apply to a graduate school in North America was based not only on my career aspirations but also on the prospect of immigration.”

His choice of Canada over the United States was apparently easy and he states:

“Nevertheless, I came to Canada not by choice, but rather by way of opportunity. While several US graduate schools gave their admission offers, none of them offered full financial aid. “

However, he felt the conversion process within Canada was difficult since it involved finding a job in his field for eighteen months (the processing time for conversion to a permanent visa status) and few employers would hire him on this basis.

The lessons to learn from these two narratives is that world-wide (China and Eastern Europe) Canada remains a competitive alternative for foreign student entry when conversion to citizenship status is of paramount importance.

Section IV: Conclusions

This essay explored the role of Canadian immigration and foreign student admission policies in meeting Canada’s demand for highly skilled workers. In the modern setting of the 1980s through the opening of the 21st century Canadian immigration policy has been substantially revamped. First, in terms of either the number of immigrant arrivals or the value of their embodied capital Canadian immigrant inflows changed dramatically from the 1980s until 2001. The supply driven entry from Hong-Kong of managers and investors was supplanted by the emergence from China

(PRC) of engineering and associated professionals as immigrants after 1995. These trends were an outgrowth of two explicit immigrant demand philosophies including the cautious “tap on-tap off” policy of the 1980s and expansionist “*cinquante cinquante*” policy of the 1990s. In addition, Canada moved from a “brain gain” immigrant receiving country in the 1980s to a “brain circulation” participant in the late 1990s as some highly talented Canadian immigrants became émigrés. This “brain circulation” persists in the early 21st century.

This flexible and modern Canadian immigration policy however has not been a robust “engine of growth” for Canada as in the past. First, many of the recruited managers of the 1980s left in the 1990s for the United States or returned to Hong Kong. Next, Canada’s heavy recruitment of engineers was less than selective as a “credential crisis” emerged in the 21st century along with oversupply conditions. Thus the recent expansionary immigration policy of the 1990s has left Canada with a legacy of highly trained immigrants whose credentials are either not recognized or do not match Canadian standards.

Canada’s foreign student entrance policy pales in comparison to Canada’s expansionary record in the worker recruitment field. First, until the mid 1990s Canada’s university level foreign student programme was modest and only in the later part of the 1990s did the total number in residence in any one year across all fields exceed 100,000. Again, the Peoples Republic of China (PRC) was a leading supplier after 1995. This again points to the fragility of Canada’s foreign student recruitment programme which relies on both the existence of a generous exit visa programme in China as well as favorable Chinese economic conditions to continue to induce student immigrants to choose Canada. In fact, my econometric analysis indicates that this market is very competitive. In order for Canada to remain competitive Canada’s exchange rate and tuition and student subsistence costs must remain below that of the United States if Canada is to attract a growing supply of students especially from less developed countries.

What future policy directions are available to make Canada more competitive in recruiting workers and students? In the short run Canada can revamp its immigration policy to more closely align itself with Australia’s policy by recruiting Canada’s highly skilled immigrants from its foreign student population. Recent policy initiatives (May, 2005) indicate that Canada may be partially moving in this direction as it grants more generous work permits to foreign student graduates.³⁸ This recruitment of foreign students would alleviate the credential

³⁸ Foreign students circa 2005 can be granted two year work permits if they find a job outside of Vancouver, Toronto or Montreal. During this two year period they can apply for permanent immigration status and earn the all important Canadian job experience to hasten economic assimilation.

recognition problem and minimize the reported linguistic and cultural impediments that current overseas recruited immigrants face (DeVoretz, 2005). Next, combining its immigration recruitment programme with rapid ascension to Canadian citizenship will hasten the success of both worker immigrants and foreign students. Simply put, reducing the time required to obtain citizenship from three years to two and allowing time in Canada under a temporary visa to qualify for citizenship will both increase Canada's choice and number of immigrants. This should lead to substantial productivity increase for student immigrants when they self-select into citizenship (DeVoretz and Pivnenko, 2006).

Finally, it should be noted that Canada has been adept at changing its source countries for recruiting skilled immigrants. In the past when Canada faced a recruitment dilemma it simply refocused on new source countries (DeVoretz, 2003). More aggressive student and mature immigrant recruitment from eastern and central Europe can be accomplished quickly given the flexible structure of Canada's immigration act. These refocusing of recruitment activities will insure a robust immigration policy circa 2006 and beyond.

References

- Akbari, S. A. and D. J. DeVoretz. 1988. *The substitutability of foreign-born labor in Canadian production circa 1980*. Ottawa: Canada Employment and Immigration.
- Arrow K. and W. Capron. 1959. Dynamic shortages and price rises: Scientist case. *Quarterly Journal of Economics*, May.
- Canada. Department of Manpower and Immigration, Canada. 1976. *The Immigration Bill*.
- Canada. 2005. <http://www.dfait-maeci.gc.ca/latin-america/caracas/visa/visas-en.asp#9>
- Coulson, R. and D. J. DeVoretz. 1989. Human capital content of Canadian immigration: 1966-1987. Paper presented at the 16th Conference on the Use of Quantitative Methods in Canadian Economic History, Toronto.
- DeVoretz, D. J. 2003. Asian Skilled Immigration Flows to Canada in the Early 21st Century: A Supply-side Analysis. In *Canada's Foreign Policy Dialogue and Canada-Asia Relations*, edited by Y.P. Woo. Vancouver: Asia Pacific Foundation of Canada.
- . 2005. Brief to the House of Commons Standing Committee on Citizenship and Immigration. Vancouver Centre for Excellence, Research on Immigration and Integration in the Metropolis, Commentary Series 05-01.
- . 2006. Immigration Policy: Methods of economic assessment. *International Migration Review* 40, no. 2 (Summer).
- DeVoretz, D. J. and D. Coulombe. 2005. Labour Market Mobility between Canada and the United States: Quo Vadis? In *Social and Labour Market Aspects of North American Linkages*, edited by T. Lemieux and R. Harris. Calgary: University of Calgary Press.
- DeVoretz, D. J. and C. Itturalde. 2000. Probability of Staying in Canada. Vancouver Centre for Excellence, Research on Immigration and Integration in the Metropolis, Working Paper Series, No. 00-06.
- DeVoretz, D. J. and S. Laryea. 1998. Migration and the Labour market: Sectoral and Regional effects in Canada. In *Migration, Free Trade and Regional Integration in North America*, OECD Proceedings, 30: 135-153.
- DeVoretz, D. J. and J. Ma. 2002. Triangular human capital flows between sending, entrepôt and the rest of the world's regions. *Canadian Population Studies*, 29 (1):53-69.
- DeVoretz, D. J. and D. Maki. 1983. The immigration of third world professionals to Canada: 1968-1973. *World Development* 11 (1): 55-64.
- DeVoretz, D. J. and S. Pivnenko. 2004. The Economic Experiences of Refugees in Canada. In *Homeland Wanted: Interdisciplinary Perspective on Refugee Settlement in the West*, edited by P. Waxman and V. Colic-Peisker, Ch. 1. New York: Nova Science Publishers.
- DeVoretz, D. J. and S. Pivnenko. 2006. The economics of Canadian citizenship. *Journal of Immigration and Integration* (forthcoming).
- DeVoretz, D. J. and K. Zhang. 2004. Citizenship, passports and the brain exchange triangle. *Journal of Comparative Policy Analysis* 6 (2):199-212.
- DeVoretz, D. J. and F. Vadean. 2005. A Model of Foreign-born Transfers: Evidence from Canadian Micro data Vancouver Centre for Excellence, Research on Immigration and Integration in the Metropolis, Working Paper Series, No. 05-17.

- Globerman, S. 1995. Immigration and Trade. In *Diminishing Returns: The Economics of Canada's Recent Immigration Policy*, edited by D. DeVoretz. Toronto and Vancouver: C. D. Howe and The Laurier Institution.
- . 1999 Trade Liberalization and the Migration of Skilled Workers. In *Perspectives on North American Free Trade*. Industry Canada, Paper Number 3.
- Green, A. and D. Green. 1996. The Economic Goals of Canada's Immigration Policy: Past and Present. Vancouver Centre for Excellence, Research on Immigration and Integration in the Metropolis, Working Paper Series, No. 96-04.
- Grubel, H. B. and A.D. Scott. 1966. The international flow of human capital. *American Economic Review* 56: 268-74.
- Parai, L. 1965. Immigration and Emigration of Professional and Skilled Manpower during the Post-War Period. Economic Council of Canada Special Study, No. 1, June.
- Statistics Canada. *Annual Salaries of Hospital Nursing Personnel*, various issues.
- . *Degrees, Diplomas, Certificates Awarded by Degree Granting Institutions*, various issues.
- . *Degrees, Diplomas, Certificates Awarded by Universities*, various issues.
- . *Education in Canada*, various issues.
- . *Salaries and Qualifications of Teachers in Elementary and Secondary Schools*, various issues.
- Reitz, J.G. 2005. Tapping immigrants' skills: New directions for Canadian immigration policy in the knowledge economy. *IRPP Choices* 11 (1): 2-15.
- Shi, Y. 2004. The impact of Canada's new immigration act on Chinese independent immigrants. *Canadian Journal of Urban Research* 13 (1): 140-54.

APPENDIX A

Table A-1. Variable definitions for Immigrant Model

(1) Variables	(2) Operational definitions	(3) Sources
1. Immigrants	Teachers, professors, physicians and nurses entering Canada during 1975-86 under immigrant visas from 16 countries.	Canada, <i>LIDS</i>
2. Earnings		
(a) Teachers	Median real annual salaries for all public secondary and elementary school teachers.	Canada, <i>Salaries and Qualifications of Teachers in Public Elementary and Secondary Schools</i> (various issues).
(b) Professors	Median real salaries of full-time university teachers.	Canada, <i>Education in Canada</i> (Various issues).
(c) Physicians	Net annual real earnings of self-employed physicians and surgeons.	Canada (various issues).
(d) Nurses	Mean real salaries of graduate nurses employed in Canada.	Canada (various issues).
3. Lagged Canadian graduates		
(a) Teachers	Bachelor and Master of Education degrees granted in Canadian universities and colleges.	For all categories used: Canada, <i>Degrees, Diplomas, Certificates</i>
(b) Professors	All earned doctorates granted in all fields in Canada.	Awarded by <i>Degree Granting Institutions</i> (various issues).
(c) Physicians	MD and Master of Medicine degrees granted in Canadian universities and colleges.	
(d) Nurses	Bachelor of Nursing degrees granted in Canadian universities and colleges.	
4. Immigration to United States	Immigration levels to the United States in each occupational category: professional, technical and managerial.	US INS (various years).

Table A-2 : Variables and data sources for Foreign student Demand Function		
Variable	Definition	Data Source
TFEE LTFEE	Annual tuition fee – average for the bachelor level programs in Arts across universities in Ontario Lagged (1-year) TFEE	<i>Education in Canada</i> , annual statistical reviews for the period 1980-2000/ Statistics Canada, Education, Science and Culture Division, Projections Section. Published Ottawa : Statistics Canada,
ENR LENR	Annual enrollments of foreign students to Canadian universities, by country of origin Lagged (1-year) ENR	<i>Foreign Students in Canada 1980-2001</i> , Priorities, Planning and Research Branch, Citizenship and Immigration Canada, January 2003, http://www.cic.gc.ca/english/research/papers/foreignstudents/students-toc.html
EXR	Annual exchange rate (Canada/Source country)	Federal Reserve Statistical Release: G5 Release: Foreign Exchange Rates. (US/Canada cross-rates were used by the author to obtain Canada/Source Country rates)
RATE	US/Canada exchange rate (normalized to 1980EXR=1)	Ibid., author's calculations
RGDP	Real GDP per capita	Penn World Tables, Center for International Comparisons, University of Pennsylvania http://pwt.econ.upenn.edu/

Table A-3 . Trends in Canadian Immigration 1980-2001 (absolute numbers in 000s)

Year			Immigrants Professionals*	
	Total	(1) Immigration	(2) Total	(3) as % of All
1980		142,856	11,067	7.75%
1981		128,311	13,369	10.42%
1982		120,616	14,404	11.94%
1983		88,617	7,766	8.76%
1984		87,236	6,560	7.52%
1985		82,822	6,643	8.02%
1986		97,509	8,245	8.46%
1987		149,515	15,290	10.23%
1988		158,499	16,503	10.41%
1989		188,148	18,154	9.65%
1990		213,009	19,517	9.16%
1991		229,693	16,870	7.34%
1992		250,550	15,868	6.33%
1993		252,194	18,836	7.47%
1994		220,500	20,945	9.50%
1995		209,726	24,646	11.75%
1996		222,728	31,099	13.96%
1997		208,582	33,507	16.06%
1998		163,446	27,770	16.99%
1999		183,308	34,870	19.02%
2000		222,352	45,282	20.37%
2001		246,892	50,206	20.34%

*All managerial and professional occupations

Source: LIDS

Table A-4. Immigration to Canada by occupation, 1980-1990

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
Managerial	2,599	2,848	2,960	2,088	1,748	1,677	2,090	4,630	5,394	5,465	5,792	37,291
Engineers	1,236	2,133	2,630	965	693	679	896	1,647	1,563	1,895	2215	16,552
Natural Scientists	559	617	674	341	279	298	336	518	560	729	730	5,641
University Professors	482	334	339	262	246	291	341	349	284	397	413	3,738
Teachers	766	751	775	501	459	496	563	798	859	1,144	1,368	8,480
Physician	510	555	607	451	449	449	553	567	483	654	668	5,946
Nurses	660	983	1,006	362	303	283	392	741	1,045	1,185	1,277	8,237
Medical tech.	1,124	925	961	619	512	559	679	1,064	1,188	1,526	1,558	10,715
Other professionals	3,290	4,087	4,420	2,112	1,762	1,796	2,365	5,102	5,424	5,457	5,783	41,598
TOTAL	11,226	13,233	14,372	7,701	6,451	6,528	8,215	15,416	16,800	18,452	19,804	138,198

Source: Landed Immigrants Data System (LIDS), Citizenship and Immigration Canada

Table A-5. Immigration to Canada by occupation, 1991-2001

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
Managerial	3,913	3,650	3,180	2,486	1,943	1,948	1,696	1,329	1,730	2,508	3,064	27,447
Engineers	2,095	2,143	3,535	4,504	6,012	8,094	9,574	8,473	11,505	15,447	16,874	88,256
Natural Scientists	736	600	743	1,307	1,882	2,698	2,877	2,328	2,727	2,842	2,726	21,466
University Professors	541	493	453	312	267	248	192	210	222	273	309	3,520
Teachers	1,140	940	1,027	778	660	721	539	470	457	675	771	8,178
Physician	686	631	688	546	520	592	537	451	436	592	674	6,353
Nurses	1,165	1,027	877	831	634	421	351	249	243	327	439	6,564
Medical tech.	1,285	1,048	1,088	1,001	1,087	1,235	1,256	915	992	1,299	1,517	12,723
Other professionals	5,346	5,274	6,849	8,616	11,092	14,329	15,733	12,592	15,745	20,339	22,895	138,810
TOTAL	16,907	15,806	18,440	20,381	24,097	30,286	32,755	27,017	34,057	44,302	49,269	313,317

Source: Landed Immigrants Data System (LIDS), Citizenship and Immigration Canada

Table A-6. Annual enrollments in Canadian universities by field of study (both undergraduate and graduate levels)

	Ag and biology	Educ ation	Engine ering and applied science s	Fine and applie d arts	Health profess ions	Human ities	Math and physica l science s	Social science s	TOTAL	% FB
1980/81	23306	40451	42131	13331	30897	30329	22885	107384	310,714	7.58%
1981/82	22958	41862	43837	13767	31854	30536	26657	113593	325,064	8.00%
1982/83	24706	42947	46665	14100	32564	31664	31396	119068	343,110	7.58%
1983/84	25783	44432	48059	15002	33239	34230	34357	125344	360,446	6.63%
1984/85	29410	44937	47840	15239	34289	39586	37102	134949	383,352	5.44%
1985/86	30937	45645	47005	15377	35215	40589	34649	138941	388,358	4.98%
1986/87	32435	47403	46122	15804	35810	43331	33316	144003	398,224	4.76%
1987/88	33315	48434	45040	16022	36217	46526	31491	149569	406,614	5.12%
1988/89	33390	49459	45601	16019	36879	49367	31071	155420	417,206	5.48%
1989/90	33079	52525	46519	16468	36839	52973	31184	162170	431,757	5.95%
1990/91	33611	56495	49140	16769	37389	56033	31878	165058	446,373	6.36%
1991/92	35515	59251	52399	17890	38663	59102	32977	171492	467,289	6.49%
1992/93	37522	61373	54631	18207	39840	61940	34575	177681	485,769	6.51%
1993/94	39774	61167	55544	18579	41574	61247	35543	176589	490,017	6.20%
1994/95	41141	60107	56024	18938	42124	60166	35302	178047	491,849	5.97%
1995/96	43971	59880	53352	19339	43140	59011	35155	173679	487,527	6.30%
1996/97	44570	60351	54233	19286	43508	56219	35143	173068	486,378	6.69%
1997/98	44865	60257	55111	19768	43054	55119	36396	172556	487,126	7.16%
1998/99	44144	61028	56837	20023	43229	54670	38563	173510	492,004	8.39%

Table A-7: Total Foreign Student Flows and Stocks in Canada: 1980-2001

	Flow	Stock
1980	20,620	36,751
1981	25,649	45,315
1982	23,262	48,410
1983	19,246	46,427
1984	17,661	41,927
1985	18,716	38,356
1986	19,987	37,050
1987	22,853	38,179
1988	27,563	42,977
1989	27,794	49,106
1990	30,711	56,722
1991	30,759	62,256
1992	29,395	63,815
1993	28,165	64,254
1994	27,929	61,457
1995	32,538	63,131
1996	39,982	71,242
1997	42,708	76,517
1998	41,467	78,257
1999	51,989	89,910
2000	63,684	107,961
2001	73,979	133,022

Source: Priorities, Planning and Research Branch, Citizenship and Immigration Canada, January 2003

Appendix B

A Ukrainian Male Student-Immigrant Narrative

My decision to apply to a graduate school in North America was based not only on my career aspirations but also on the prospect of immigration.

By the time I started sending out applications my stereotypes about Canada and the US were inevitably formed. They were based on opinions of my friends studying there as well as on the image of these countries prevalent in Ukraine. Accordingly, I viewed Canada's supremacy of family values and a rather sluggish pace of life to be more appealing and closer to a Ukrainian mentality than career-oriented lifelong battle for success which supposedly characterized the American way of life. In addition, Canada was perceived as a safer place to live.

Nevertheless, I came to Canada not by choice, but rather by way of opportunity. While several US graduate schools gave their admission offers, none of them offered full financial aid. On contrary, Canadian schools such as Simon Fraser University and York University were able to provide equally good full financial assistance packages. I chose SFU because an old friend of mine studied there. A warmer climate and a scenic natural environment were also important factors in my decision.

My student visa application was not difficult to obtain as long as I could provide a letter from the University confirming my admission and TA appointment for the next year. My spouse and I received visas rather quickly, without any additional requests from the Canadian Embassy in Ukraine.³⁹

After approximately 18 months in SFU I fulfilled my Master's degree requirements. However, my Master's project was submitted to the library only after another 18 months.⁴⁰ These extra 18 months plus a 1-year post graduation work permit were necessary to assure my legal status in Canada for the period of processing of my immigration documents.⁴¹ Of course, such a strategy was conditioned on the ability to find a job which, in turn, was necessary to support my family during the application waiting time, and to meet eligibility requirements for a post-graduation work permit.

I believe that because of the difficulty of finding employment such a system of delaying graduation is not commonly used. Few employers would like to hire a person with a nearly expired student visa. In addition, there are psychological costs associated with uncertainty about timing of the application process and ability to maintain legal status in Canada. Tuition fees paid in order to extend student status contribute to financial cost of such an immigration strategy.

Although my return to Ukraine to apply for permanent resident status was an option, I think it would have been even more costlier due to the high travel expenses, longer waiting times, difficulty of finding employment, and psychological costs.

³⁹ Here I have to mention that we arrived to Canada before the 9/11 and heightened security hurdles were not yet in place.

⁴⁰ Such a submission triggers official graduation process.

⁴¹ Permanent residence status applications must be made from outside of Canada. However, if a perspective immigrant has lived over a year in a country other than his country of citizenship, (s)he can apply for Canadian permanent residence from that country. Given these two provisions, foreign students after one year in Canada can apply from Buffalo, Seattle or Los Angeles which are Canada's closest Canadian consulates.

A Chinese Female Student Immigrant Narrative

I have to say that I was perfectly happy with my situation in China before I came to Canada. I had a satisfying job, great friends and a very happy life. Moving to Canada was my ex-husband's idea, mostly because of China's unstable social and political environment. Instead of directly applying for immigration, we decided that I should come here as a student first. On one hand, our impression was that getting a student visa was relatively easy as opposed to applying for permanent immigrant status. In addition, while doing my study, I thought I could acquire some first-hand information about this country to see if this is the place we wanted to settle in.

Therefore, in my case, immigrating to Canada was the intention before I left China. The main reason we choose Canada over the US is that it was easier to obtain the landed immigrant status in Canada. In addition, I worked with a couple of Canadians when I was in China and from talking to them I get the feeling that Canada has very good welfare system, high living standard, beautiful scenery and a clean environment. However, my ex-husband and I did talk about the possibility of moving on to the US after acquiring landed immigrant status. At the time, both of us were very career oriented and we thought the US has more opportunities and greater potentials to make it "big."

The visa application process itself was very smooth, the hard part was to get admission and full financial support from a well recognized post secondary institution. To gain admission and financial support I had to take one year off to study English and write the TOEFL and GRE tests, prepare application materials and write cover letters. Finally, I got full financial support from both Simon Fraser University (in Canada) and West Michigan University (in US). Since my goal was to immigrate to Canada, I decided to accept the offer from SFU.

Approximately one year after I got to Canada, I started to apply for the immigrant status. I've decided to go through the application process by myself, since I believed that I had a greater chance of success given my six years of working experience in a world-renowned company (in Beijing). Eight months after sending out my application, I got a letter requesting an interview at Los Angeles. Meanwhile, I was finishing my Master's degree and I needed a reason to remain here in Canada while I waited for the interview. So I decided to apply to get into the Ph.D program. My immigration application was approved at the interview.

After becoming a landed immigrant, I remained in the Ph.D program. During this time, I realized that I wanted to stay in Canada for the foreseeable future. In addition, lots of jobs related to my field are within the Canadian federal government. To obtain these jobs, my impression is that Canadian citizens are preferred to landed immigrants.⁴²

As a result, three years after acquiring my immigration status, I sent out the application to become a Canadian citizen. Again this process was smooth. All the information is listed on Immigration Canada's webpage. Steps and waiting times are clearly outlined. Six months later, I wrote the citizenship test and two months after that, I became a Canadian citizen.

In general, I was lucky in the whole immigration application process. Everything went quite smoothly and there was no obstacle. As of today, I am still happy with my decision to become a Canadian citizen.

⁴² On paper, the government of Canada does not distinguish between Canadian citizens and landed immigrants, but from talking to some of my fellow students I get the impression that citizens have better job opportunities.

No.	Author(s)	Title	Date
04-01	Rosa Sevy and John Torpey	Commemoration, Redress, and Reconciliation in the Integration of Immigrant Communities: The Cases of Japanese-Canadians and Japanese-Americans	02/04
04-02	Don DeVoretz and Sergiy Pivnenko	Immigrant Public Finance Transfers: A Comparative Analysis by City	02/04
04-03	Margaret Walton-Roberts	Regional Immigration and Dispersal: Lessons from Small- and Medium-sized Urban Centres in British Columbia	02/04
04-04	Don J. DeVoretz, Sergiy Pivnenko, and Morton Beiser	The Economic Experiences of Refugees in Canada	02/04
04-05	Isabel Dyck	Immigration, Place and Health: South Asian Women's Accounts of Health, Illness and Everyday Life	02/04
04-06	Kathy Sherrell, Jennifer Hyndman and Fisnik Preniqi	Sharing the Wealth, Spreading the "Burden"? The Settlement of Kosovar Refugees in Smaller B.C. Cities	02/04
04-07	Nicolas Marceau and Steeve Mongrain	Interjurisdictional Competition in Law Enforcement	03/04
04-08	Shibao Guo	Responding to the Changing Needs of the Chinese Community in Vancouver: The Contribution of SUCCESS (1973-1998)	04/04
04-09	Amanda Aizlewood and Ravi Pendakur	Ethnicity and Social Capital in Canada	04/04
04-10	Kathy Sherrell and Jennifer Hyndman	Global Minds, Local Bodies: Kosovar Transnational Connections Beyond British Columbia	05/04
04-11	Krishna Pendakur and Ravi Pendakur	Colour my World: Has the Minority-Majority Earnings Gap Changed over Time?	05/04
04-12	Leonie Sandercock with Leslie Dickout and Ranja Winkler	The Quest for an Inclusive City: An Exploration of Sri Lankan Tamil Experience of Integration in Toronto and Vancouver	05/04
04-13	Don DeVoretz	Immigration Policy: Methods of Economic Assessment	06/04
04-14	Min-Jung Kwak	An Exploration of the Korean-Canadian Community in Vancouver	07/04
04-15	Daniel Hiebert and Min-Jung Kwak	Transnational Economies of Export Education	07/04
04-16	Harald Bauder	Attitudes Towards Work: Ethnic Minorities and Immigrant Groups in Vancouver	07/04
04-17	Leslie Dickout	The Quest to Negotiate Equitable Civic Engagement: Response of Toronto's Sri Lankan Tamil Community to Social Development Planning in Canada's Largest Multicultural Metropolis	08/04
04-18	Zheng Wu and Christoph M. Schimmele	Immigrant Status and Unmet Health Care Needs in British Columbia	08/04

No.	Author(s)	Title	Date
04-19	Jennifer Hyndman and Nadine Schuurman	Size Matters: Attracting new Immigrants to Canadian Cities	10/04
04-20	Heather A. Smith	The Evolving Relationship between Immigrant Settlement and Neighbourhood Disadvantage in Canadian Cities, 1991-2001	10/04
04-21	Don J. DeVoretz and Sergiy Pivnenko	The Economic Causes and Consequences of Canadian Citizenship	11/04
04-22	Kenny Zhang and Minghuan Li	To Stay or to Move? Chinese Migrant Workers in Cities	12/04
05-01	David Ley	Indicators of Entrepreneurial Success among Business Immigrants in Canada	01/05
05-02	Diane Dagenais and Patricia Lamarre	Representations of Language among Multilingual Youth in Two Canadian Cities	01/05
05-03	Kelleen Toohey and Natalia Gajdamaschko	Communities of Practice, Figured Worlds and Learning Initiative in the Second Language Education of Immigrant Students	01/05
05-04	Kelleen Toohey	Assigning Marginality: The Case of an “ESL/learning Disabled” Student	01/05
05-05	Loren B. Landau	Urbanization, Nativism, and the Rule of Law in South Africa’s ‘Forbidden’ Cities	01/05
05-06	Gillian Creese	Negotiating Belonging: Bordered Spaces and Imagined Communities in Vancouver, Canada	01/05
05-07	Don J. DeVoretz and Sergiy Pivnenko	Self-Selection, Immigrant Public Finance Performance and Canadian Citizenship	02/05
05-08	Shibao Guo and Don J. DeVoretz	The Changing Faces of Chinese Immigrants in Canada	02/05
05-09	David Ley and Audrey Kobayashi	Back in Hong Kong: Return Migration or Transnational Sojourn?	04/05
05-10	Krishna Pendakur and Ravi Pendakur	Ethnic Identity and the Labour Market	05/05
05-11	Krishna Pendakur	Visible Minorities in Canada’s Workplaces: A Perspective on the 2017 Projection	05/05
05-12	Krishna Pendakur	Visible Minorities and Aboriginals in Vancouver’s Labour Market	05/05
05-13	Harald Bauder	Immigrants’ Attitudes towards Self-Employment: The Significance of Ethnic Origin, Rural and Urban Background and Labour Market Context	06/05

No.	Author(s)	Title	Date
05-14	Daniel Hiebert	Migration and the Demographic Transformation of Canadian Cities: The Social Geography of Canada's Major Metropolitan Centres in 2017	06/05
05-15	Zheng Wu and Christoph M. Schimmele	Health Care Utilization of Later-Stage Immigrants in British Columbia	06/05
05-16	June Beynon, Linda Larocque, Roumiana Ilieva, and Diane Dagenais	A Sociocultural and Critical Analysis of Educational Policies and Programs for Minority Youth in British Columbia	06/05
05-S1	Jamie Doucette	An Annotated Bibliography of RIIM Publications Related to the Settlement Services Sector of Greater Vancouver, 1996-2004	06/05
05-17	Don J. DeVoretz and Florin P. Vadean	A Model of Foreign-Born Transfers: Evidence from Canadian Micro Data	08/05
05-18	David Ley	Post-Multiculturalism?	09/05
05-19	Chen Bo	A Model in Brain Drain and Circulation	10/05
05-20	Shibao Guo and Don J. DeVoretz	Chinese Immigrants in Vancouver: Quo Vadis?	10/05
05-21	Dan Swanton	Iranians in Vancouver: 'Legible People'/Irredeemable Others/Migrant Stories	10/05
05-22	Amanda Aizlewood, Pieter Bevelander and Ravi Pendakur	Recreational Participation among Ethnic Minorities and Immigrants in Canada and the Netherlands	10/05
05-23	Katharyne Mitchell and Walter Parker	I Pledge Allegiance To... Flexible Citizenship and Shifting Scales of Belonging	10/05
05-24	Herbert J. Schuetze	The Self-Employment Experience of Immigrants to Canada.	10/05
05-25	Shibao Guo	Toward Minority Group Rights and Inclusive Citizenship for Immigrants: The Role of a Voluntary Organization in Vancouver	11/05
05-26	Arlene Tigar McLaren and Tracey Lou Black	Family Class and Immigration in Canada: Implications for Sponsored Elderly Women	11/05
05-27	Krishna Pendakur and Ravi Pendakur	Glass Ceilings for Ethnic Minorities	12/05
05-28	Heather Antecol, Peter Kuhn and Stephen J. Trejo	Assimilation via Prices or Quantities? Sources of Immigrant Earnings Growth in Australia, Canada, and the United States	12/05
05-29	Don J. DeVoretz	The Economics of Citizenship: A Common Intellectual Ground for Social Scientists?	12/05

No.	Author(s)	Title	Date
06-01	TIAN Fangmeng and MA Zhongdong	Explaining Socio-economic Well-being of Immigrants and Returned Migrants: An Econometric Analysis of the Hong Kong and Canadian 2001 Censuses*	02/06
06-02	Parin Dossa	Creating Politicized Spaces: “Here” and “There”: Lives of Elderly Afghan Women in Metropolitan Vancouver	02/06
06-03	Parin Dossa	“Witnessing” Social Suffering: Migratory Tales of Women from Afghanistan	02/06
06-04	Shibao Guo	Bridging the Gap in Social Services for Immigrants: A Community-Based Holistic Approach	04/06
06-05	Pieter Bevelander and Justus Veenman	Naturalisation and Socioeconomic Integration: The Case of the Netherlands	04/06
06-06	Kirk Scott	The Economics of Citizenship. Is there a Naturalization Effect?	06/06
06-07	James McLean, Chris Friesen and Jennifer Hyndman	The First 365 Days: Acehnese Refugees in Vancouver, British Columbia	06/06
06-08	Arlene Tigar McLaren	Parental Sponsorship – Whose Problematic? A Consideration of South Asian Women’s Immigration Experiences in Vancouver	06/06
06-09	John E. Hayfron	The Economics of Norwegian Citizenship	06/06
06-10	Rob Fiedler, Jennifer Hyndman and Nadine Schuurman	Locating Spatially Concentrated Risk of Homelessness amongst Recent Immigrants in Greater Vancouver: A GIS-based Approach	07/06
06-11	Kelleen Toohey and Tracey M. Derwing	Hidden Losses: How Demographics Can Encourage Incorrect Assumptions About ESL High School Students’ Success	07/06
06-12	Michael Buzzelli and K. Bruce Newbold	Immigrant Rites of Passage: Urban Settlement, Physical Environmental Quality and Health in Vancouver	08/06
06-13	Dominique M. Gross and Nicolas Schmitt	Why do Low- and High-skill Workers Migrate? Flow Evidence from France	08/06
06-14	Steven Vertovec	The Emergence of Super-diversity in Britain	09/06
06-15	Daniel Hiebert	Beyond the Polemics: The Economic Outcomes of Canadian Immigration	09/06

For information on papers previous to 2004, please see our Website
<http://www.riim.metropolis.net/research/policy>

Back issues of working papers are available for \$5 from
Vancouver Centre of Excellence: Immigration
WMX4653, Simon Fraser University, 8888 University Drive
Burnaby, B.C, Canada V5A 1S6.
Tel: 604-291-4575 Fax: 604-291-5336

E-mail: riim@sfu.ca
<http://www.riim.metropolis.net/>