Vancouver Centre of Excellence

Research on Immigration and Integration in the Metropolis

Working Paper Series

RIIM

Research on Immigration and Integration in the Metropolis

Human Capital Investment and Flows:
A Multiperiod Model for China[1]

Kangqing Zhang
Senior Researcher, RIIM
kzhang@sfu.ca

and
Don DeVoretz
Co-Director, RIIM
devoretz@sfu.ca

(Revised July 2002)

Abstract: The international migration of the highly skilled, often referred to as the "brain drain," has arisen as an issue in most less-developed countries as well as in some developed countries. Conventionally, the term "brain drain" refers to skilled professional who leave their native lands in order to seek more promising opportunities elsewhere. By this definition, migration of the highly skilled is often considered a one-period unidirectional phenomenon. However, it has been gradually recognized that migration decisions are reversible. China has become an increasingly important sending country for the highly skilled as more and more highly skilled Chinese have migrated to developed countries. Even though it is true that the US is the major destination for Chinese students and scholars studying and remaining abroad, it is by no means the only destination country. Little is known about other destinations, such as Canada, Australia and European countries. In addition, several questions remain unanswered. Why do Chinese households arrive different location decisions for their students schooling? Once gone, will these student return home or remain abroad after completion of their studies abroad? If so, who will return home and who will move on, in terms of skill level? In order to answer some of these questions, if not all, this paper will develop a general model to describe the sequence of an individual's decision concerning human capital investment and movement over a multiperiod framework.

Key Words: China, brain drain, highly skilled, human capital, migration.

1. Introduction

The international migration of the highly skilled, often referred to as the "brain drain," has arisen as an issue in most less-developed countries as well as in some developed countries. The traditional literature on this subject has experienced considerable renewal, reflecting changes in the brain drain phenomenon. Conventionally, the term "brain drain" refers to skilled professionals who leave their native lands in order to seek more promising opportunities elsewhere. By this definition, migration of the highly skilled is often considered a one-period or once-and-for-all unidirectional phenomenon. Therefore, it is conventionally argued that sending countries are always suffering a brain drain loss to receiving countries (DeVoretz and Laryea 1998; Broad 1993; DeVoretz and Maki, 1980; Guha 1977).

However, it has been gradually recognized that migration decisions are reversible. Studies of international migration within the United States indicate that recent migrants have a high probability of returning to their origin or of moving on to other locations (DaVanzo 1983; Fields 1979). Warren and Peck (1980) and Warren and Kraly (1985) estimate that perhaps 30 percent of the foreign-born persons in the United States leave the country within a decade or two after their arrival. Hence, the notion of the brain drain is challenged by concepts of the brain gain, brain circulation, or brain exchange (DeVoretz and Ma 2001; Saxenian 2000; Beine, Docquier and Rapoport 1999; Johnson and Regets 1998; Mountford 1997; Grubel and Scott 1967)

DaVanzo (1983) does not treat migration as a once-and-for-all event, but a repeat move, either on to a new location or back to the country of origin. Within a multiperiod framework, DaVanzo broadens the human capital model of migration to incorporate concepts of location-specific capital and information costs. Among her findings, she points out that the less educated are the likeliest to return quickly, however, the most highly educated are the likeliest to move quickly onward.

Based on the fact that large numbers of immigrants choose not to remain in the United States, Borjas and Bratsberg (1996) present a human capital model with a skill sorting mechanism. They conclude that if the immigrant flow is positively selected so that immigrants have above average skills, the return migrants will be the least skilled immigrants. In contrast, if the immigrant flow is negatively selected, the return migrants will be the most skilled immigrants. Thus, multiple moves have a quality dimension.

The international move of the skilled is argued to be motivated by a number of reasons, including lack of employment opportunities in the home country, low pay, and student preference to remain abroad. However, Kwok and Leland (1982), using Taiwan as an example, show that the brain drain may still exist

even when students have a preference for returning home (at equal salaries) and when employment opportunities exist at comparable average pay. They explain that the reason for the problem is related to the information employers have at the time of hiring. They assume that employers in the native country offer wages that reflect the average productivity of returning workers, but which are not precisely tailored to individual productivities. Under this assumption, they conclude that the productivity of any worker remaining abroad exceeds the productivity of any worker returning home in equilibrium. In other words, imperfections in the home-country labor market owing to information gaps may drive the better students abroad to pursue advanced studies, but when these graduates complete their education, the labor market cannot attract the best of the group to return.

China has become an increasingly important sending country for the highly skilled as more and more highly skilled Chinese have migrated to developed countries. For example, China has become the top source country for skilled workers admitted to Canada as permanent residents since 1998. The principal applicants to Canada alone increased dramatically from 5,945 (17% of total skilled workers to Canada) in 1998 to 10,069 (24%) and 12,760 (25%) in 1999 and 2000 respectively (CIC 2001:96).

On the other hand, more Chinese students pursued higher education abroad, mainly in the US, Canada, and other developed countries, and some of them may not return after completion of their studies. The total number of Chinese doctorate recipients in the USA reached 18,551 during the 1985–96 period. Ninety five percent of them with permanent visas and 87 percent with temporary visas planned to stay in the US either for employment or for further study (Johnson 1998). In addition, Orleans (1988) provided a comprehensive analysis on the issues of Chinese students and scholars studying in the US and remaining there for the first decade of China's reform period. More recently, Zweig (1997) documented the economic and political motives for the highly skilled Chinese émigrés to remain in the United States.

The studies described above all have common features: (1) they all use a human capital model as their conceptual framework; (2) they recognize that the migration decision is reversible. Therefore, the migration of the highly skilled is not a once-and-for-all phenomenon, but a multiperiod one; (3) they conclude that all migration decisions depend upon skill levels, comparing relative returns (benefits) to their skills at home or abroad; and (4) they also recognize that measuring gains and losses through migration yields different implications for individuals and society as a whole.

Finally even though it is true that the US is the major destination for Chinese students and scholars studying and remaining abroad, it is by no means the only destination country. Little is known about other destinations, such as Canada, Australia and European countries. In addition, several questions remain unanswered. Why do Chinese households arrive different location decisions for their students

schooling? Once gone, will these student return home or remain abroad after completion of their studies abroad? If so, who will return home and who will move on, in terms of skill level?

In order to answer some of these questions, if not all, this paper will develop a general model to describe the sequence of an individual's decision concerning human capital investment and movement over a multiperiod framework.

The rest of the paper is organized as follows. Section 2 sets up the general model describing the sequence of human capital investment and flows. Section 3 will present some empirical evidence from China, and section 4 adds some concluding comments.

2. The Model

Bowman and Myers (1967) present analytical models for five possible migration sequences. We provide a more comprehensive modeling of these sequences, and present our diagram to illustrate the sequential nature of decisions for human capital investment and migration.

Figure 1: Human Capital Investment and Flows: A Multiperiod Model
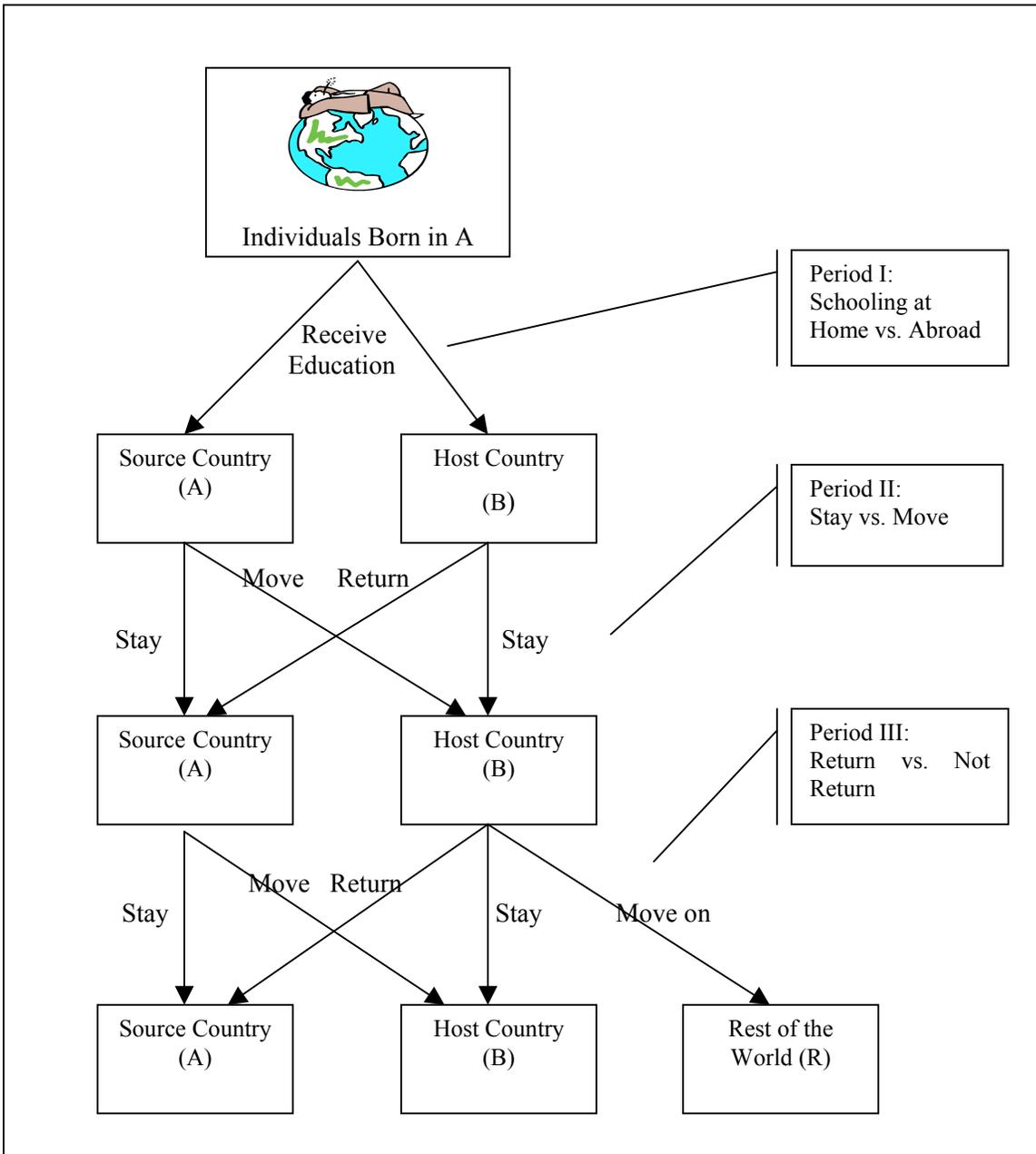
For each period in each location, it is essential to compare the present value of future income stream owing to this choice. The following notation is used in the model to construct these concepts:

a -   Age at the first decision point relating to migration

b -   Date of actual or intended out-migration

m -   Age at return from residence abroad, or move further to another destination

n -   Retirement age

R_t -   Expected earnings in the year t at the place of origin prior to (or in the absence of) any migration

D_t^B -   Expected earnings abroad (in host country B) in the year t

D_t^R -   Expected earnings abroad (in the Rest of the world R) in the year t

Y_t -   Expected earnings in the year t at the place of origin for migrant returnees ($t \succ m - a$)

C_t -   Direct cost in the year t of schooling or training in the area of origin

K_t -   Direct cost in the year t of schooling or training abroad

Z_t^o -   Direct cost of out-migration incurred in year t

Z_t^h -   Direct cost of return migration incurred in year t

Z_t^R -   Direct cost of moving further to R incurred in year t

r -   Discount rate

V -   Present value of future income streams

j -   Superscript denoting a particular race, age, sex, school attainment level, and occupation (if any) at time a

Also, we assume that the following relations exist between these variables:

(1) $D_t^R > D_t^B > Y_t > R_t$ - Higher expected earnings abroad than at place of origin.

(2) $K_t > C_t$ - Higher cost of schooling or training abroad than in the area of origin.

(3) $\dfrac{D}{K} \succ \dfrac{Y}{K} \succ \dfrac{R}{C}$ - Higher return to schooling abroad than in the area of origin.

Obviously, the decision-making in each period has a different focus. For example, in period I, the decision concerns the location of schooling. In period II, the decision becomes whether to stay or to move, and in period III it involves the choice to stay, return or move on to another destination. We outline these periods below.

Period I

In period I, there are only two choices:[2]

    1.1 Those born in A and schooled in A. ($C \succ 0, K = 0$)

    1.2 Those born in A and schooled in B. ($C = 0, K \succ 0$)

What is the incentive effect that determines the choice of schooling location? In other words, why do some people decide to study at domestic schools and others to study abroad? First, we agree that the choice of schooling location is primarily due to differences in school quality. Bowman and Myers (1967:882) suggest that despite large within-area differences in quality of schools, there are also large and significant differences between schools in one region as opposed to another. It is safe to assume that the average quality of local schooling in less developed countries is lower than that of foreign schooling in developed countries. Therefore, to choose higher quality schooling abroad is rational, since one expects a higher return for acquiring a skill. However, this is just one side of the coin. On the other, the cost of schooling abroad is obviously higher than local schooling. At this stage, it is hard to compare the net gain of higher expected returns with higher cost schooling abroad and lower expected returns with lower cost schooling locally.[3]

Second, people choosing foreign education and foreign working experience believe that they will emit a signal of for superior productivity (Spence 1973). However, at first thought, this economic return at home should not exceed that achieved abroad. Nevertheless, Kwok and Leland (1982) challenge this assumption by arguing that, (1) some welfare is lost by the fact that people must remain abroad for some time if the signal is to be valid; and (2) the longer a person remains abroad, the more likely he will become comfortable living there, and the greater the relocation costs of returning. Eventually, people may not return home after a certain length of stay abroad.

Third, the location decision of schooling is based on the higher demand relative to limited domestic supply for higher education. Let's consider the following market situation (as shown by Figure 2). There is an inelastic demand for higher education, and the current quantity of demand is Q_a at price C. Due to limited resources, the domestic supply S cannot fully meet the demand at Q_a, but only Q_h is supplied at price C. Therefore, there is a supply shortage of (Q_a-Q_h).

---

[2] There is also another possibility that both $C \succ 0, K \succ 0$. For simplicity, we focus only on two extremes in the model. Actually, if we define the starting point of human capital investment, i.e. for post-secondary education only, C will approach to 0.

[3] For details, see DeVoretz and Maki (1980).

If there is no possibility to study abroad, first Q_h students will pass the entry exam and enroll in domestic universities or alike. These students always represent the best of the peer group and need only pay the local cost on C for their higher education. The rest of the group (Q_a-Q_h) will spread to the local labor market, or attend vocational training or other trade schools.

With the possibility of studying abroad, the quantity of supply increases beyond Q_h along the supply curve S', with a significant rise in cost. Price K-C represents the cost of migration (moving), and any cost beyond K is the direct cost of studying abroad. S' cuts the demand curve at E, with the equilibrium price K_e. The total number of students who will receive higher education increases from Q_h to Q_e.

Figure 2: Supply and Demand of Higher Education: China
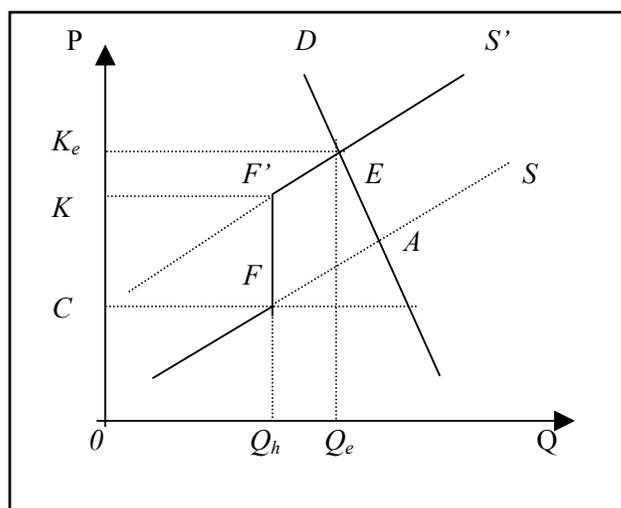
To sum up, there are two sorts of people in this market:

(1) Stayer (Q_h) – people who study domestically; and

(2) Mover (Q_e - Q_h) – people who study abroad at costs up to equilibrium price.

In other words, with the possibility of migration (studying abroad), the total formation of human capital at the sending country increased.[4]

---

[4] For a more detailed and specific model, see Vidal, 1998.

Finally, people choosing to receive foreign-education also believe that skills acquired from domestic or abroad have different degrees of transferability, which is as important as any quality difference. Bowman and Myers note that:

> There is a strong presumption that knowledge of the location in which men have acquired their work experience will improve statistical predictions of their competencies. How far a migrant's previous experiential learning may be transferable to his new setting is another matter. Undoubtedly there is selectivity in such transferability; he can move into the new environment carrying his experience with him only to the extent that the new environment gives scope for its use (1967:883).

Borjas and Bratsberg (1996) also include a variable reflecting ability or skills that are transferable across countries into their earning distribution model. They use it to measure deviations from mean incomes.

In short, we denote T^A and T^B in our model as measures for the transferability of a skill (or location-specific skill) that has been acquired at home country (A) or abroad (B) respectively. We further assume $T \in (0,1)$, $T^A < T^{B}$[5]. Thus, individuals pursue schooling and training abroad to insure a higher transferability of the acquired skill. In other words, the greater the transferability of skills, the lower the risk of the expected higher future income stream.

Altogether, an expected higher return, labor market signaling, excess demand for education and a need for greater transferability of skills, leads to a large set of incentives to seek higher quality schooling abroad. The consequences of these incentives are twofold. First, many students go abroad to seek foreign training with a high risk of never returning (brain drain). On the other hand, it may increase average levels of human capital and productivity of the remaining population in the source economy (Mountford 1997; Beine et al. 1999).

Period II

The incentive effect plays a role not only at period I, but also at period II. In this period, there are again two options arising from each circumstance in period I:

2.1 Those in category 1.1, and who have worked only in A (non-migrants) earn:

$$V_{2.1}^{j} = \sum_{t=a}^{n} \frac{R_t - C_t}{(1+r)^{t-a}} \qquad (1)$$

---

[5] One extreme is $T^A = T^B = 1$ if one has worked in the same place where he/she received his/her education.

2.2 Those in category 1.1, but who migrated to B as soon as their formal schooling was completed and who have worked only in B earn:

$$V_{2.2}^{j} = \sum_{t=a}^{n} \frac{T^{A} D_{t}^{B} - C_{t} - Z_{t}^{o}}{(1+r)^{t-a}} \tag{2}$$

2.3 Those in category 1.2, and who have worked only in B earn:

$$V_{2.3}^{j} = \sum_{t=a}^{n} \frac{D_{t}^{B} - K_{t} - Z_{t}^{o}}{(1+r)^{t-a}} \tag{3}$$

2.4 Those in category 1.2, but who return to A as soon as their formal schooling was completed and who have worked only in A earn:

$$V_{2.4}^{j} = \sum_{t=m}^{n} \frac{T^{B} Y_{t} - K_{t} - Z_{t}^{o} - Z_{t}^{h}}{(1+r)^{t-m}} \tag{4}$$

In order to make the decision of whether to stay or to move, potential migrants must compare the net gain among $V_{2.1}^{j}$ to $V_{2.4}^{j}$. DeVoretz and Iturralde (2001) provide a life-cycle model to estimate the probability of staying in Canada and moving. By comparing actual and expected incomes if a Canadian stays or moves, they argue that the probability of staying in Canada depends on the size of this income gain, which varies systematically with age, and major lifetime events. Given the opportunity cost of staying, they conclude that only a large gain in income will induce movement to the United States.

The economic arguments in our model are slightly different from that of DeVoretz and Iturralde. In addition to the expected income gain, costs of human capital investment, and moving, I take the transferability of skill (T) into account. I suggest that transferability of skill is significant when individuals invest their human capital and receive a return of this investment in different economies. Their expected incomes will also depend on the transferability of skill, which acts as a risk parameter. By comparing the net gain among these sequences, under the migration possibility, we posit the following conditions:

(1) Stayer:

    a.   Stays at home, if home, when

12

$$\sum_{t=a}^{n}\frac{R_t - C_t}{(1+r)^{t-a}} \geq \sum_{t=a}^{n}\frac{T^A D_t^B - C_t - Z_t^o}{(1+r)^{t-a}}$$

b. Stays abroad, if abroad, when

$$\sum_{t=a}^{n}\frac{D_t^B - K_t - Z_t^o}{(1+r)^{t-a}} \geq \sum_{t=m}^{n}\frac{T^B Y_t - K_t - Z_t^o - Z_t^h}{(1+r)^{t-m}}$$

(2) Mover:

a. Moves abroad, if home, when

$$\sum_{t=a}^{n}\frac{R_t - C_t}{(1+r)^{t-a}} < \sum_{t=a}^{n}\frac{T^A D_t^B - C_t - Z_t^o}{(1+r)^{t-a}}$$

b. Moves home, if abroad, when

$$\sum_{t=a}^{n}\frac{D_t^B - K_t - Z_t^o}{(1+r)^{t-a}} < \sum_{t=m}^{n}\frac{T^B Y_t - K_t - Z_t^o - Z_t^h}{(1+r)^{t-m}}$$

Period III

In this period, there are more possibilities conditional on each circumstance in the previous period:

3.1 Those in category 2.1 and 2.4, and who have worked only in A earn:

$$V_{3.1}^j = \begin{cases} \sum_{t=a}^{n}\dfrac{R_t - C_t}{(1+r)^{t-a}} & if\, C \succ 0, K = 0 \\[20pt] \sum_{t=a}^{n}\dfrac{T^B Y_t - K_t - Z_t^O - Z_t^h}{(1+r)^{t-a}} & if\, C = 0, K \succ 0 \end{cases} \qquad (5)$$

3.2 Those in category 2.1 and 2.4, and who remained to work for some time in A, but moved to B or R at age $b_{3.2}$ and continued to work in B or R thereafter.

$$V_{3.2}^{j} = \begin{cases} \displaystyle\sum_{t=a}^{b-1} \frac{R_t - C_t}{(1+r)^{t-a}} + \sum_{t=b}^{n} \frac{T^A D_t^{B,R} - Z_t^O}{(1+r)^{t-a}} & if C \succ 0, K = 0 \\[3em] \displaystyle\sum_{t=a}^{b-1} \frac{T^B R_t - K_t - Z_t^h}{(1+r)^{t-a}} + \sum_{t=b}^{n} \frac{T^B D_t^{B,R} - Z_t^O}{(1+r)^{t-a}} & if C = 0, K \succ 0 \end{cases} \qquad (6)$$

3.3 Those in category 2.2 and 2.3, and who have worked only in B earn:

$$V_{3.3}^{j} = \begin{cases} \displaystyle\sum_{t=a}^{n} \frac{T^A D_t^{B} - C_t - Z_t^O}{(1+r)^{t-a}} & if C \succ 0, K = 0 \\[3em] \displaystyle\sum_{t=a}^{n} \frac{D_t^{B} - K_t - Z_t^O}{(1+r)^{t-a}} & if C = 0, K \succ 0 \end{cases} \qquad (7)$$

3.4 Those in category 2.2 and 2.3, and who stayed to work for some time in B, but return to A at age $m_{3.4}$ and continued to work in A thereafter, earn:

$$V_{3.4}^{j} = \begin{cases} \displaystyle\sum_{t=a}^{m-1} \frac{T^A D_t^{B} - C_t - Z_t^o}{(1+r)^{t-a}} + \sum_{t=m}^{n} \frac{Y_t - Z_t^h}{(1+r)^{t-a}} & if C \succ 0, K = 0 \\[3em] \displaystyle\sum_{t=a}^{m-1} \frac{D_t^{B} - K_t - Z_t^o}{(1+r)^{t-a}} + \sum_{t=m}^{n} \frac{T^B Y_t - Z_t^h}{(1+r)^{t-a}} & if C = 0, K \succ 0 \end{cases} \qquad (8)$$

3.5 Those in category 2.2 and 2.3, and who stayed to work for some time in B, but moved further to R at age $m_{3.5}$ and continued to work in R thereafter, earn:

$$V_{3.5}^{j} = \begin{cases} \sum\limits_{t=a}^{m-1} \dfrac{T^A D_t^B - C_t - Z_t^o}{(1+r)^{t-a}} + \sum\limits_{t=m}^{n} \dfrac{T^A D_t^R - Z_t^R}{(1+r)^{t-a}} & if C \succ 0, K = 0 \\[4ex] \sum\limits_{t=a}^{m-1} \dfrac{D_t^B - K_t - Z_t^o}{(1+r)^{t-a}} + \sum\limits_{t=m}^{n} \dfrac{T^B D_t^R - Z_t^R}{(1+r)^{t-a}} & if C = 0, K \succ 0 \end{cases} \qquad (9)$$

The mobility status in this period arises from the $V_{3.3}^{j}, V_{3.4}^{j}$, and $V_{3.5}^{j}$, which in turn represent the stayer, returnee, and onward-mover. By investigating the underlying factors which give rise to these conditions we can answer: (1) who will stay, and who will return or move on? (2) Why does someone stay while others return or move on? And (3) what are the economic and policy implications of this pattern of movement? Obviously, we cannot give explicit answers to these questions unless we have concrete data for our unknown variables.[6] However, previous studies do guide us and we provide a summary of this literature below.

DaVanzo (1983) finds that: (1) the farther the initial move, the more likely is a following repeat move; (2) initial moves apparently pressured by unemployment (and possibly based on inferior information) tend to be followed by return moves; (3) very young household heads are especially prone to return within a year or so of leaving; and (4) the less educated are the likeliest to return quickly, however (5) the most highly educated are the likeliest to move quickly onward. This study also affirms that location-specific capital accumulated by recent arrivals in a new location deters further migration.

Borjas and Bratsberg's study (1996) on US data further find that various source country characteristics, including the source country's per-capita GNP; the country's distance from the United States; whether the country has a communist regime; whether the country has recently experienced a coup or a revolution; and a measure of inequality in the source country's income distribution, are the major determinants of the out-migration rate. They suggest that the per-capita GNP in the source country is a key variable determining the out-migration rate. Immigrants tend to return to rich countries, not to poor countries. A doubling of per-capita GNP increases the out-migration rate by 4.9 percentage points. The distance has a strong negative impact on the out-migration rate. Every 1000-mile increase in distance between the United States and the source country reduces the out-migration rate by 1.2 percentage points. The presence of a communist regime in the source country has a strong negative impact on the out-migration rate. Their most interesting findings is that the out-migration rate first increases and then decreases with the income inequality measure in the source country. It fits their theoretical model's

---

[6] For this reason, this paper calls for further empirical study.

prediction that the relationship between the out-migration rate and the rate of return to skills should have an inverse-U shape with the peak occurring at the US rate of return.

DeVoretz and Iturralde (2001) focus on the question of why do highly skilled Canadians stay in Canada. They surmise that education, marriage, divorce, previous moves, and the presence or not of children all affect the probability of staying in Canada. These events usually occur in a predictable sequence in a person's life, and they imply that the probability that a person will stay will first rise and then fall with age. Their study also indicates that Canadians' "staying power" in the face of large prospective gains in income is extraordinary. In 1991, the represented highly trained Canadians would forego \$C75,000 in annual income before moving to the United States; in 1996 this figure was \$C46,000.

This existing literature strongly indicates that the movement of the highly skilled over each period is not a random selection process. Thus, we argue that the followings determine the mobility options:

(1) Stay

$$V_{3.3}^{j} > V_{3.4}^{j} \text{ and } V_{3.3}^{j} > V_{3.5}^{j}$$

(2) Return

$$V_{3.4}^{j} > V_{3.3}^{j} \text{ and } V_{3.4}^{j} > V_{3.5}^{j}$$

(3) Onward-move

$$V_{3.5}^{j} > V_{3.3}^{j} \text{ and } V_{3.5}^{j} > V_{3.4}^{j}$$

3. Conclusions

This paper presents a myopic model to describe the sequence of an individual's decision to acquire human capital and move within a multiperiod framework. The model links the flow of the highly skilled to the locational choice to acquire human capital. It also considers the more extensive geographic coverage beyond some specific destination countries such as the US.

The multiperiod model suggests that: (1) the flow of human capital starts as early as its formation period. The location of schooling determines, to a large extent, the quality of schooling and transferability of skills, which in turn affect further mobility. (2) The migration decisions of the highly skilled are not only reversible, but also extendible. In other words, people may initially face a choice to move or stay, and later end up by returning home, staying abroad or moving on. Therefore, the conventional concept of a uni-directional brain drain is too narrow. (3) This repeated migration decision is not a random one. It is

affected by many factors, such as the possibility of foreign higher education acquisition, relative rate of return to education, existing student visa legislation, and the strength of the link with home countries and so forth, that all determine the value of future income stream in a particular location.

Future research with the 2000 Chinese (including Hong Kong) census will allow us to test the relationship between the probability of stay or move and the value of the income stream under these choice.

References

Beine, M., F. Docquier and H. Rapoport. 1999. Brain Drain and Economic Growth: theory and evidence. Paper presented at Séminaire organisé par l' Axe Ethique et développement durable du Centre d'Economie et d'Ethique pour 'Environnement et le Développement, 19-20 Mars 1999, Université de Versailles St Quentin en Yvelines.

Borjas, G. and B. Bratsberg. 1996. Who Leaves?: The Outmigration of the Foreign-born. *Review of Economics and Statistics* 78 (1): 165-76.

Bowman, M. J., and R.G. Myers. 1967. Schooling, Experience, and Gains and Losses in Human Capital through Migration. *Journal of the American Statistical Association* 62, no. 319 (Sept.): 875-98.

Broad, G. M. (ed.). 1993. China's Response to the Brain Drain. *Comparative Education Review* 37, no. 3 (August): 277-303..

Citizenship and Immigration Canada. 2001. *Facts and Figures 2000: Immigration Overview.*

DaVanzo, J. 1983. Repeat Migration in the United States: Who Moves Back and Who Moves On? *The Review of Economics and Statistics* (Nov.): 552-59.

DeVoretz, D. and C. Itturalde. 2001. Probability of Staying in Canada. *Policy Options*, IRPP, 22, no. 2 (March): 59-63; and RIIM Working Paper No. 00-06.

DeVoretz, D. and D. and Maki. 1980. The Size and Distribution of Human Capital Transfers From LDC's to Canada 1966-73. *Economic Development and Cultural Change*, 28 (4): 779-800.

DeVoretz, D. and S. Laryea. 1998. Human Capital Transfers: USA and Beyond. RIIM Working Paper No. 98-18.

DeVoretz, D. and Zhongdong Ma. 2001. Triangular Human Capital Flows between Sending, Entrepôt and the Rest-of-the-World Regions. Paper presented at workshop *Globalization and Immigration: Canada, China and Beyond*, May 23 2001, Vancouver, Canada.

Fields, Gary S., 1979. Place to Place Migration: Some New Evidence. *The Review of Economics and Statistics*. February: 21-32.

Grubel, H.G., and A.D. Scott. 1967. Determinants of Migration: The Highly Skilled. *International Migration* 2: 127-39.

Guha, A. 1977. Brain Drain Issue and Indicators on Brain Drain, *International Migration* 15 (1): 3-20.

Johnson, J. M. 1998. Statistical Profiles of Foreign Doctoral Recipients in Sciences and Engineering: Plans to Stay in the United States. NSF 99-304. Arlington: National Science Foundation, Division of Science Resources Studies.

Johnson, J. M., and M. C. Regets. 1998. International Mobility of Scientists and Engineers to the United States – Brain Drain or Brain Circulation? NSF 98-316. Arlington: National Science Foundation, Division of Science Resources Studies.

Mountford, A. 1997. Can a Brain Drain be Good for Growth in the Source Economy? *Journal of Development Economics* 53 (2): 287-303.

OECD, 2000. *The Appraisal of Investments in Educational Facilities.* OECD.

Orleans, L. A. 1988. *Chinese Students in America: Policies, Issues, and Number.* Washington, D.C.: National Academy Press.

Saxenian, A. 2000. Brain Drain or Brain Circulation? The Silicon Valley-Asia Connection. *Modern Asia Series Fall 2000,* Harvard University Asia Center.

Spence, A. M. 1973. Job Market Signalling. *Quarterly Journal of Economics* 87 (August): 355-74.

Warren, Robert, and Ellen Percy Kraly. 1985. The Elusive Exodus: Emigration from the United States. *Population Trends and Public Policy*. 7 (March).

Warren, Robert, and Jennifer Mards Peck. 1980. Foreign-Born Emigration from the United States: 1960-1970. *Demography*. 17 (Feb.): 71-84.

Zweig, D. 1997. To Return or Not to Return? Politics vs. Economics in China's Brain Drain. *Studies in Comparative International Development* 33 (1):92-125.

Working paper series from 2000

No.	Author(s)	Title	Date
00-01	J. Atsu Amegashie	A Political Economy Model of the Permissible Number of Immigrants	01/00
00-02	David Ley	Seeking *Homo Economicus:* The Strange Story of Canada's Immigration Program	05/00
00-03	Chieko Tanimura	Immigration of Nikkeijin to Ease the Japanese Aging Crisis	05/00
00-04	Eden Nicole Thompson	Immigrant Occupational Skill Outcomes and the Role of Region-Specific Human Capital	05/00
00-05	Christiane Werner	A Taste of Canada: An Analysis of Food Expenditure Patterns for Canadian-born and Foreign-born Consumers	05/00
00-06	Don DeVoretz and Chona Iturralde	Probability of Staying in Canada	08/00
00-07	Ravi Pendakur, Fernanda Mata, Stan Lee and Natalie Dole	Job Mobility and Promotion in the Federal Public Service. A Joint Project with Strategic Research and Analysis, Multiculturalism Program, Canadian Heritage and Research Directorate. Public Service Commission.	05/00
00-08	Barry R. Chiswick and Paul W. Miller	The Complementarity of Language and Other Human Capital: Immigrant Earnings in Canada	07/00
00-09	John E. Hayfron	The Housing Market Outcomes of Immigrants in Norway	08/00
00-10	Greg Cunningham, Daniel Hiebert and Brian Klinkenberg	Immigration and Greater Vancouver: A 1996 Census Atlas http://www.geog.ubc.ca/metropolis/atlas	09/00
00-11	Barry R. Chiswick	The Economics of illegal Migration for the Host Economy	09/00
00-12	Daniel Hiebert	The Social Geography of Immigration and Urbanization in Canada: A Review and Interpretation	09/00
00-13	Barry R. Chiswick and Paul W. Miller	A Model of Destination Language Acquisition: Application to Male Immigrants in Canada	09/00
00-14	Jamie Winders	Immigration to Vancouver: An Analytical Review	09/00
00-15	Daniel Hiebert	Cosmopolitanism at the Local Level: Immigrant Settlement and the Development of Transnational Neighbourhoods	09/00
00-16	David Prescott, David Wilton, Canan Dadayli and Aaron Dickson	Visits to Canada: The Role of Canada's Immigrant Populations	08/00
00-17	J. Atsu Amegashie and John E. Hayfron	Perception and Labour Supply: A Theoretical Analysis with and Application to Immigrants	10/00
00-18	Geraldine Pratt	Studying Immigrants in Focus Groups	12/00
00-19	Allesandra Casarico and Carlo Devillanova	Social Security and Migration with Endogenous Skill Upgrading	12/00
00-20	Don DeVoretz, Holger Hinte, Christiane Werner	Some Immigrant Language Lessons from Canada to Germany	10/00

No.	Author(s)	Title	Date
00-21	Don DeVoretz	An Analysis of Turn-of-the-Century Canadian Immigration: 1891-1914	12/00
01-01	Shahrokh Shahabi-Azad	Immigrant Expenditure Patterns on Transportation	01/01
01-02	Johanna L. Waters	The Flexible Family? Recent Immigration and 'Astronaut' Households in Vancouver, British Columbia	01/01
01-03	David Ley, Peter Murphy, Kris Olds, Bill Randolph	Immigration and Housing in Gateway Cities: The Cases of Sydney and Vancouver	01/01
01-04	Gillian Creese, Robyn Dowling	Gendering Immigration: The Experience of Women in Sydney and Vancouver	01/01
01-05	David W. Edgington, Bronwyn Hanna, Thomas Hutton, Susan Thompson	Urban Governance, Multiculturalism and Citizenship in Sydney and Vancouver	01/01
01-06	Kevin Dunn, Minelle Mahtani	"Adjusting the Colour Bar": Media Representation of Ethnic Minorities under Australian and Canadian Multiculturalisms	01/01
01-07	Ian Burnley, Dan Hiebert	Emerging Patterns of Immigrant Settlement in Metropolitan Sydney and Vancouver: The Need for New Concepts and Models	01/01
01-08	Daniel Hiebert, David Ley	Assimilation, Cultural Pluralism and Social Exclusion Among Ethno-Cultural Groups in Vancouver	02/01
01-09	Harald Bauder	The Visible Minority Category and Urban Analysis	01/01
01-10	Johanna L. Waters	Migration Strategies and Transnational Families: Vancouver's Satellite Kids	01/01
01-11	Dominique M. Gross, Nicolas Schmitt	Do Birds of a Feather Flock Together? The Role of Cultural Clustering in Attracting New Immigrants	01/01
01-12	Diane Coulombe, William L. Roberts	The French-as-a-second-language Learning Experience of Anglophone and Allophone University Students	03/01
01-13	Galina Didukh	Health and Personal Care Consumption Patterns of Foreign-born and Canadian-born Consumers: 1984-1996	04/01
01-14	Carl Mosk	Asian Immigrants to the Pacific Northwest: Canadian and American Experiences Compared	05/01
01-15	Margaret Walton-Roberts	Returning, Remitting, Reshaping: Non-Resident Indians and the Transformation of Society and Space in Punjab, India	08/01
01-16	Parin Dossa	Narrative Mediation of Conventional and New Paradigms of "Mental Health": Reading the Stories of Immigrant Iranian Women	08/01
01-17	Harald Bauder, Johanna Waters and Sin Yih Teo	Impacts of Immigration on British Columbia: Population, Labour Markets, Housing Markets and International Linkages	09/01
01-18	Lin Wang	Household Operations and Furnishings Consumption Patterns of Canadian and Foreign-born Consumers: 1984-1996	09/01

No.	Author(s)	Title	Date
01-19	Laura Beattie and David Ley	The German Immigrant Church in Vancouver: Service Provision and Identity Formation	10/01
01-20	David Ley, Judith Tutchener and Greg Cunningham	Immigration, Polarization, or Gentrification? Accounting for Changing Housing Prices and Dwelling Values in Gateway Cities	08/01
01-21	Shemina Hirji and June Beynon	Teachers of Punjabi Sikh Ancestry: Their Perceptions of their Roles in the British Columbia Education System	11/01
01-22	June Beynon, Roumiana Ileva and Marela Dichupa	Teachers of Chinese Ancestry: The Interaction of Identities and Professional Roles	12/01
02-01	Galina Didukh	Immigrants and the Demand for Shelter	01/02
02-02	Abdala Mansour, Nicolas Marceau and Steeve Mongrain	Gangs and Crime Deterrence	02/02
02-03	Harald Bauder and Emilie Cameron	Cultural Barriers to Labour Market Integration: Immigrants from South Asia and the former Yugoslavia	02/02
02-04	Brian Geiger	Clothing Demand for Canadian-born and Foreign-born Households	01/02
02-05	Dan Hiebert	Canadian Immigration and the Selection-settlement Services Trade-off: Exploring Immigrant Economic Participation in British Columbia	02/02
02-06	David W. Edgington and Thomas A. Hutton	Multicultural and Local Government in Greater Vancouver	03/02
02-07	Steven Vertovec	Religion in Migration, Diasporas and Transnationalism	03/02
02-08	Isabel Dyck	Becoming Canadian? Girls, Home and School and Renegotiating Feminine Identity	05/02
02-09	Parin Dossa	Modernization and Global Restructuring of Women's Work: Border-Crossing Stories of Iranian Women	03/02
02-10	Barry Edmonston	Interprovincial Migration of Canadian Immigrants	03/02
02-11	Handy Gozalie	Immigrants' Earnings and Assimilation into Canada's Labour Market: The Case of Overachievers.	04/02
02-12	Arlene Tigar Mclaren and Isabel Dyck	"I don't feel quite competent here": Immigrant Mothers' Involvement with Schooling	05/02
02-13	Geraldine Pratt	Between Homes: Displacement and Belonging for Second Generation Filipino-Canadian Youths	06/02