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Why Do Highly Skilled Canadians Stay in Canada?
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Don J. DeVoretz and Chona Iturralde

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Why Do Highly Skilled Canadians Stay in Canada?*

Don J. DeVoretz
RIIM
devoretz@sfu.ca

and

Chona Iturralde
Human Resource Development Canada
iturralde@spg.org

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Introduction

In earlier pieces, DeVoretz and Laryea (1998) and DeVoretz (2000) have argued that the human capital transfer or the brain drain from Canada to the United States in the 1990s was both real and costly.¹ A careful analysis of both the permanent and most importantly temporary Canadian émigrés living in the United States circa 2000 indicates that the phenomenon persists.² However, given the large economic incentives to move and the ease of movement, any economist would ask: Why haven't more highly skilled Canadians moved to the United States? In this piece we reverse the logic of this question and ask: Why do so many highly skilled Canadians stay in Canada?³ Many social commentators have also recently grappled with variations of these questions.⁴ In short they implicitly ask: What are the value of these Canadian social amenities that influence the probability of staying in Canada? Canada's Prime Minister, Jean Chretien, offered one potential answer to this question by citing the fact that Canada is ranked number one by the United Nations on its Human Development Index (HDI).⁵ This index presumably reflects the quality of life in Canada owing in part to the provision of tax-financed public goods (health, education, etc.), which in turn act as a magnet to hold some potential leavers.

However, an economist would like to know at what income gain would a highly skilled Canadian give up Canada's social bundle of public goods and move to the United States? Moreover, does the staying power or risk of movement by the highly trained change as the age, gender or potential income gain for the potential mover alter? Moreover, does the marital status of the head of household matter and subsequently affect the risk of movement? In other words, do divorcees flee or remain in Canada with their possible dependants? On the other hand, does being married with children make a household less mobile? DeVoretz and Iturralde (2000) have addressed these and other questions and we present a summary of their findings in this review piece. In addition, armed with this evidence we extend their efforts here by exploring the policy implications of their work.

¹ In this journal in a previous issue a complete exchange of all views on the size of the transfer is presented.

² M. Hofer, D. Norris, and E. Ruddick (2000) present an accurate stock figure of 60,000 highly skilled TN-1 Canadian émigrés currently in residence in the United States.

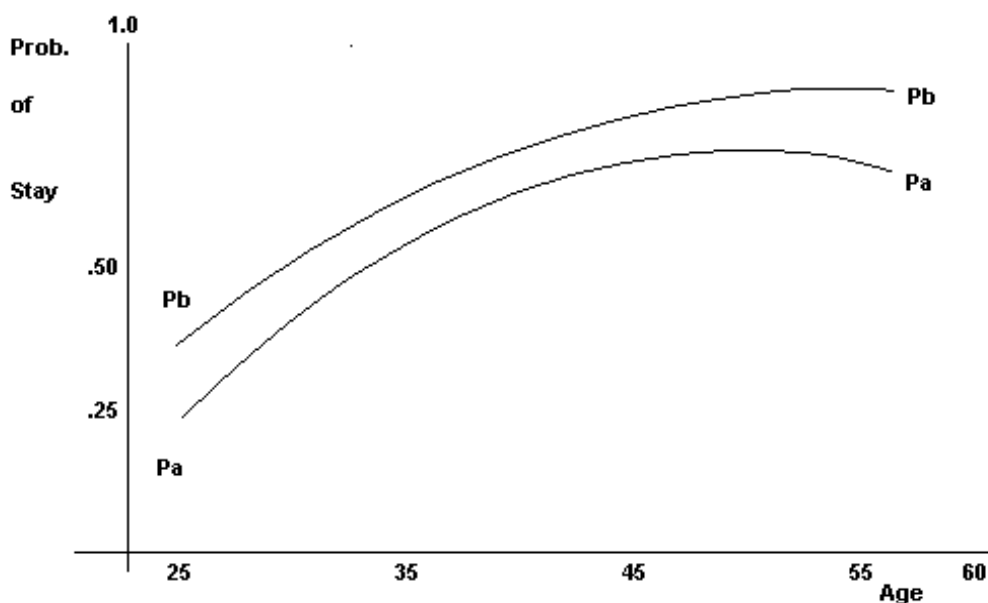
³ DeVoretz and Iturralde (2000) state the facts clearly. The rate of return for a highly skilled Canadian (BA degree) who emigrate to the United States is 40% or greater. The ease of obtaining a TN-1 visa cannot be overstated. With an employment letter and evidence of qualifications it can take as little as 15 minutes to process at the border. This visa is temporary and renewable indefinitely.

⁴ "Quality of life draws workers back to Canada, Dean says." *National Post*, December 30, 2000, p. A-4.

⁵ The Human Development Index incorporates economic and non-economic measures, length of life, education, etc., to rank countries.

To understand why a highly skilled head of household would stay in Canada given the 40 percent rate of return after moving to the United States, it is necessary to understand how lifetime events in a Canadian household constrain movement.⁶ Education, marriage, divorce, previous internal movement and the presence of children all affect the probability of staying in Canada. These events occur over time usually in a predictable sequence, as noted above and imply that the probability of staying rises in age. In other words, if we plotted the probability of staying in Canada over a lifetime, according to this argument it would appear concave in age as in Figure 1. This presumed mobility behavior or risk of leaving Canada over the household's lifetime would have important policy implications if this theoretical prediction holds under econometric tests.

Figure 1: Life-cycle Model of Probability of Staying



An inspection of Figure 1 portrays this argument by appealing to some stylized facts about mobility. At age 25, after obtaining a B.A. degree (or more) we assume that the highly skilled Canadian enters the Canadian labor market unmarried. In this youthful state there exist few demographic constraints to restrict movement and the lifetime income gain from movement to the U.S. is at its maximum. Thus, the incentive to move to the United States is at a maximum,

⁶ See DeVoretz and Iturralde (2000) Table 1. This 40% rate of return for a Canadian with a B.A. degree working in the United States is roughly four times greater than the 11% rate of return earned by an equivalent Canadian who stays in Canada.

and conversely, the probability of staying in Canada is at a minimum. As the head of household ages, the income gain from emigrating to the United States declines, given that a shorter earning period remains. Thus, the probability of staying in Canada increases at a decreasing rate in age. Next, we argue that a peak interval is reached (age 45–55) when the staying probability is invariant to age.

But there is more to Figure 1 when we add the non-economic factors which influence mobility including; marriage, presence of children, previous movement, and divorce. These lifetime events further alter the probability of staying in Canada for two specific reasons. First, these lifetime events raise (or lower) the cost of movement to the United States and thus deter (encourage) movement. Secondly, access to Canadian publicly financed goods will increase as these household status changes occur (children, divorce) which in turn increases the probability of staying. Any one of these events can be uniquely captured by a shift in the probability of staying from (Pa-Pa) to (Pb-Pb) in Figure 1.

All these demographic arguments are straightforward. However, since this work uniquely asks why people stay, we must define a unique economic argument to reflect both the incentive to stay in or leave for the United States. For stayers, we argue that when they consider staying, they compare their actual incomes earned in Canada net of their expected income in the United States. This income difference (or loss) is the opportunity cost of staying in Canada and the implicit value placed on the social amenities offered by Canada.⁷ For the mover who now lives in the United States the income incentive that induced the move to the USA is the difference in actual income earned now by the émigré in the US minus what was earned in Canada.⁸

⁷⁷ Our sole economic argument that conditions movement is the income gain or opportunity cost for either a mover or a stayer. For stayers the income gain is defined by G_s where

$$G_s = Y_{\text{CDN}}^{\text{actual}} - Y_{\text{USA}}^{\text{expected}}$$

The rationale to include G_s in a staying function is that staying in Canada is conditioned on the opportunity cost of staying in Canada or the difference in the earned Canadian income vis-à-vis the expected income to be earned in the USA. If G_s is negative the stayer should move unless she/he values Canadian amenities. The reservation income gain in this case would be the size of the negative value of G_s just before movement is induced.

⁸ This gain for the mover is defined as:

$$G_m = Y_{\text{USA}}^{\text{actual}} - Y_{\text{Cdn}}^{\text{expected}}$$

Again, for any individual household G_m can be positive or negative. Theoretically G_m must at least exceed the cost of movement to make the move economically rational.

In sum, the probability of staying in Canada depends on the size of the income gain, which varies systematically in age (concave) and the onset of major lifetime events, which raise (or lower) this probability.⁹ Both the shape-of-staying function and these argued shifts will have important policy implications if the model holds empirically. We provide the relevant evidence below.

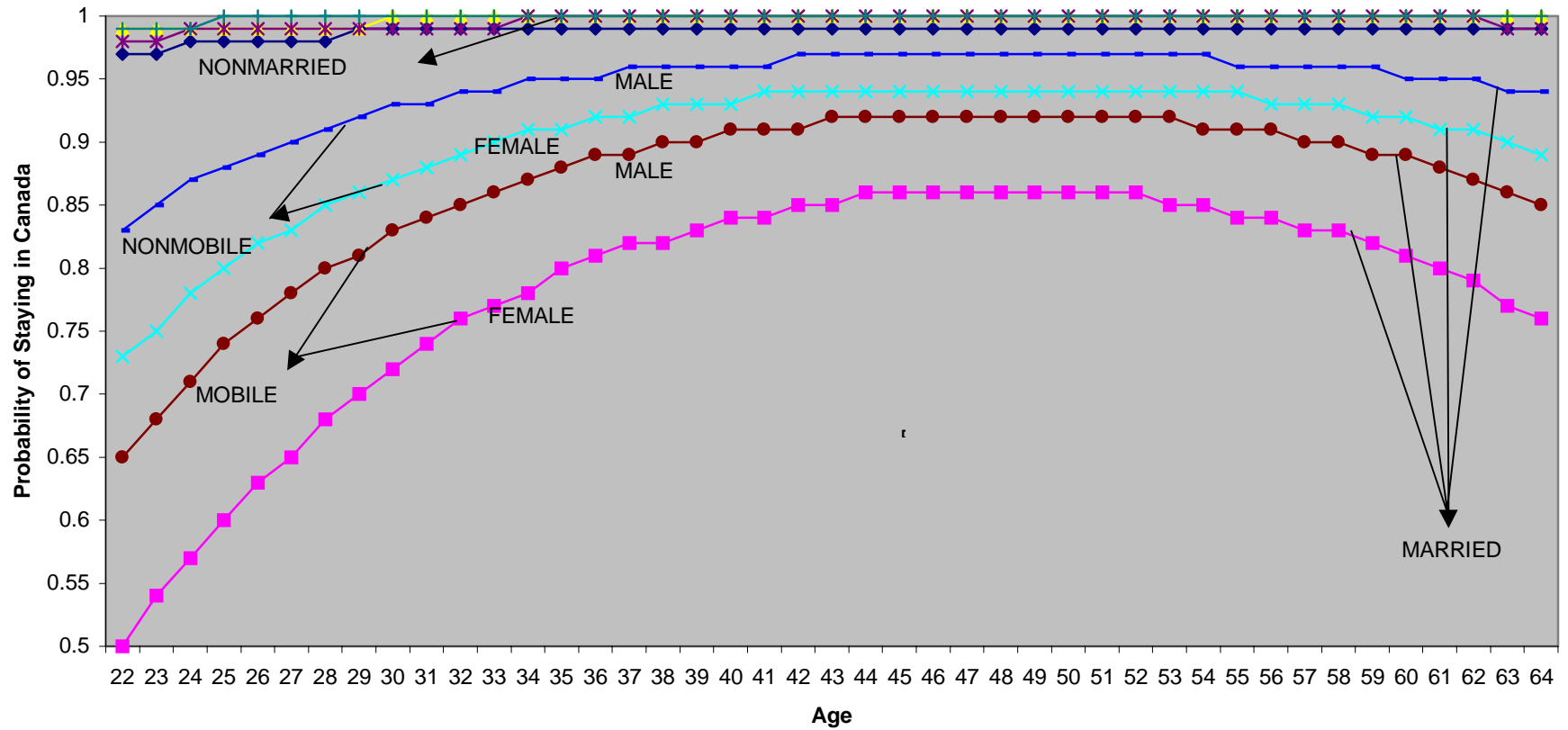
Empirical Evidence.

Does the empirical evidence support this modeling? Can we measure the affect of age and other demographic variables on the probability of staying in Canada for the highly trained Canadian? Finally, can the value of social amenities, which presumably keeps Canadians in Canada, be measured for the representative stayer?

In a more complete version of this paper we used Canadian Census data for 1991 and 1996 and the 1990 and 1995 Current Population Survey data in the United States to estimate various logit functions before and after the NAFTA accord to allow us to answer the above questions. We summarize our results derived from the econometric results with the simulated Figures below.

⁹ When a variety of household-status changes occur simultaneously, the change in the direction of the intercept (raise or lower) is now unknown. An example should clarify this argument. A household whose head has previously moved but subsequently has children will experience two countervailing forces to shift the convex staying function in an unknown direction. First, a previous move will reduce the transactions cost of a further move to the United States while having children raises the accessibility of public goods and increases the household's probability of staying in Canada. The question of which effect is larger must be determined empirically before the shift in the staying function can be determined.

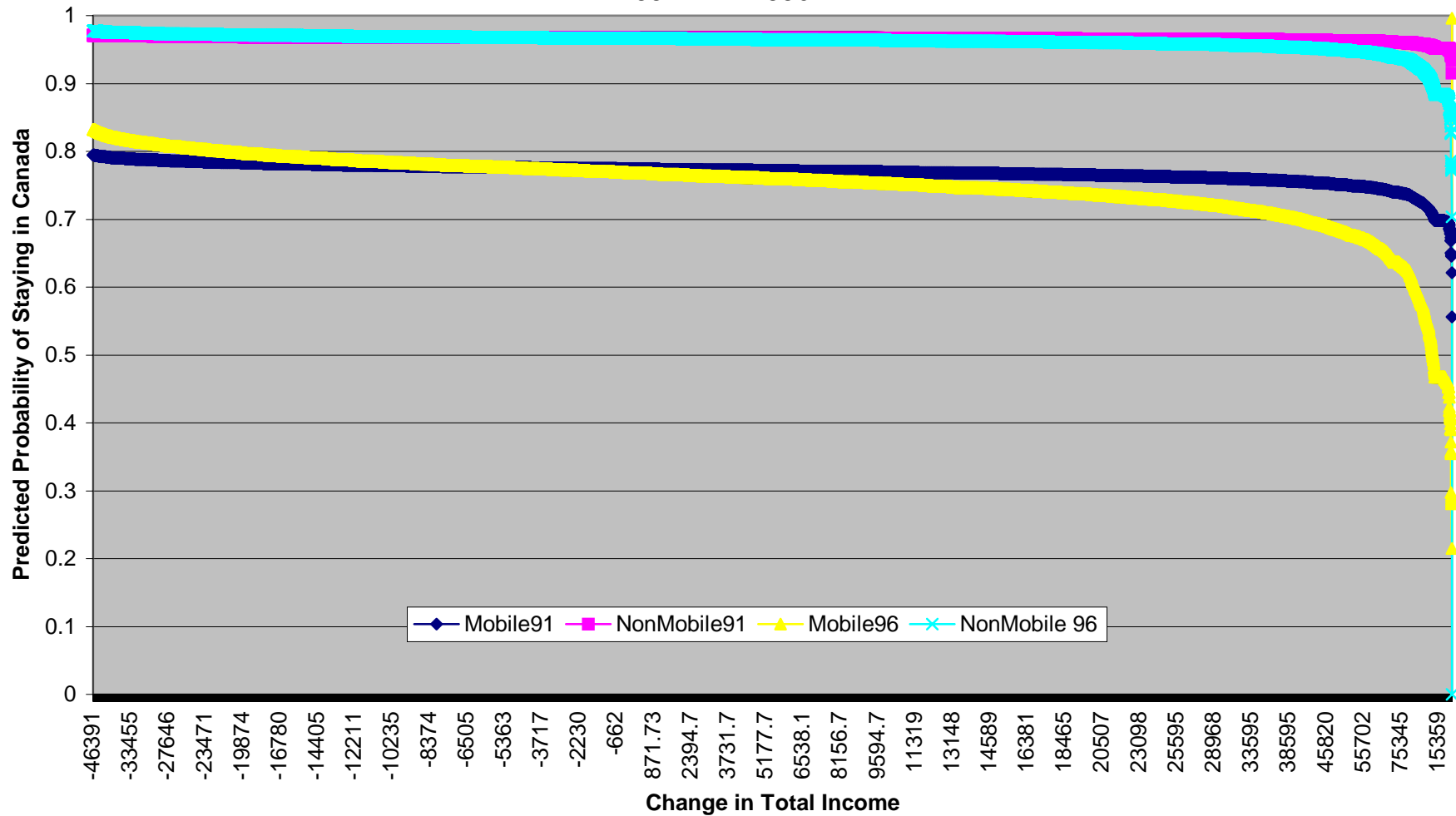
FIGURE 2: Effects of Gender, Marital Status and Mobility on Predicted Probabilities of Staying in Canada of Labour Force Members by Age Category: 1995-1996*



* These are the probabilities as a function of age at the sample means of total income and family.

SOURCES: 1996 Canadian Census, Public Use Microdata Individual Files and 1995 Current Population Survey, Person and Family Data Files, US Census Bureau.

FIGURE 3: EFFECTS OF MOBILITY ON PREDICTED PROBABILITIES OF STAYING IN CANADA OF MARRIED MALE LABOUR FORCE MEMBERS BY CHANGE IN TOTAL INCOME CATEGORY: 1991 AND 1996*



* These are the probabilities as a function of change in total income at the sample means of family size and age.
 Sources: 1991 and 1996 Canadian Census, Public Use Microdata Individual File , 1990 Decennial Public Use Persons and Household and 1995 Current Population Survey, Person and Family Data Files, US Census Bureau.

The (unreported) econometric results allow us to construct Figure 2, which mimics the theoretical views in Figure 1. For example, in 1996 for married males, the probability of staying in Canada is estimated to rise from .65 to .80 between the ages of 22 to 30. In other words, a young Canadian graduate has a probability of leaving of between 20 and 35 percent in their youth given the average qualities (marriage rates, income, etc.) of this recent cohort. The predicted affect of age is clearly confirmed as the staying probability peaks at .88 during the age interval of 42 to 53 as the representative midlife potential mover assumes the average qualities of this age group.

But, what if we control or isolate the potential mover to highlight the affect of different marital states or mobility experiences? The econometric results allow us to also portray these affects in Figure 2. First, a prior move within Canada for married males and females reduces the probability of staying in Canada by 8 to 20 percent.¹⁰ For example, married males aged 35 who have previously moved within Canada have a probability of staying in Canada of .85 while those aged 35 with no previous movement in Canada have a staying probability of approximately .92.

Most dramatically, the state of being unmarried surprisingly limits the risk of leaving Canada throughout a lifetime. It should be noted that the non-married include separated, divorced with children as well as never married.

Gender in conjunction with marital status had a unique affect on the probability of staying in Canada. Married females with post-secondary degrees who had moved inter-provincially in the last five years had the lowest probability of staying in Canada.

We argued earlier that the probability of staying in Canada is sensitive to the income gain (or loss) from moving to the United States. Figure 3 depicts the affect of income gain as defined by Gm (or Gs) on the probability of staying in Canada by gender, marital status and previous mobility experience in 1991 or 1996.

Figure 3 clearly addresses the central questions in the debate over staying in or leaving Canada. At what income gain will highly skilled Canadians leave? Also, what is the value of the social net that Canada provides? Both of these questions can be answered by an analysis of the simulation depicted in Figure 3. First, the probability of staying for the representative highly skilled male head of household is insensitive to income gains over a wide range.¹¹ In other words,

¹⁰ Mobility is defined as an inter provincial movement in the past 5 years.

¹¹ The results are similar for female movers and are available upon request.

as the potential income gain from moving to the United States increases from near zero (-\$662) to \$75,000 (Cdn) the chances of staying remain at .96 or greater circa 1991. However, when a critical income gain occurs, greater than \$75,000 in 1991 the turning point effect is substantial and the probability of staying in Canada collapses. Moreover, the probability of staying in Canada is invariant to income gain regardless of household status (married, male or female, mobile). Figure 3 demonstrates that income gain has a similar affect on previous internal movers in Canada as well as those who have never moved. In other words, the critical gain point, which leads to this collapse in staying, is invariant to many factors that the household has experienced over its lifetime.

Finally, the affect of NAFTA and the easier mobility rules between Canada and the United States are born out by the results. In effect, the probability of staying drops 20 percent points between 1991 and 1996 regardless of income gain or previous mobility status of the household. This decline is illustrated in Figure 2 by the parallel downward movement in the probabilities of staying in Canada circa 1996 (versus 1991) regardless of the head of household's previous mobility experience.

Summary

What have we learned from this analysis of the determinants from staying in Canada that we did not know from the extensive earlier work on the brain drain? First, the staying power in Canada with respect to the income gain from movement is extraordinary. Highly trained Canadians in the 1990s would forego between \$46,000 (1996) and \$75,000 (1991) in lifetime income gain before they would move to the United States. Thus, we now have a value of the implied value for the social goods and milieu provided by Canada. It is important to note that this "reservation wage" while large, is declining rapidly over time. Moreover, once this critical value (\$46,000) of income gain was reached circa 1996 the probability of staying in Canada collapsed. These combined observations of a declining critical income gain and the collapse in the probability of staying indicate that income was a more critical issue in affecting the brain drain in 1996 than 1991.

We have also learned that the motivation to stay in Canada is strong over a wide age range and various household states (married, childless, etc.) for the representative highly skilled Canadian household. In particular, after the age of 30 the probability of staying in Canada for a male-headed household exceeds 90 percent until his retirement. What underlies this resistance to leave Canada? One clue to this lethargy is masked in the previous mobility variable used in this

study. To wit, if you have moved within Canada in the last five years, this greatly reduces your probability of staying in Canada. What does this previous mobility decision tell us about the decision to leave Canada? In short, inter-provincial movement is associated with several other factors, acquiring higher education, fulfilling an initial job offer or a greater taste for risk, which all lead to within-Canada movement. Once a successful internal movement has occurred, most of the factors which would keep a potential émigré home no longer play an important part in the decision to make a more substantial move to the United States.

The second major finding – that only a large critical reservation income gain will induce movement to the United States – also suggests that several conditions must simultaneously be in place to induce a move for a highly trained Canadian. The potential mover first must be young, and expect a relatively rapid gain in earnings after arrival in the United States. These conditions in fact apply in particular to Canadian knowledge workers who typically receive payments in the form of stock options, physicians entering their specialties and nurses or star academics who receive a once-and-for-all large initial bonus upon movement. Thus, the income gain earned from movement to the United States does affect the staying power of Canada. But the income gain earned must be large and very quick to cause movement.

What are the policy implications of these findings if governments want to influence the probability of a move? To offset the pull force of the income gain earned from movement to the United States, there are two tactics to explore. First, any income tax rebate to curtail leaving must be strategic in nature to be effective. This tax rebate earned by staying in Canada must target young, low-income but highly skilled earners who are about to enter their high-income phase. This suggests a less steep and delayed (until a much higher income) marginal tax rate policy for professionals. Also, professional income in kind (stock options) which may yield a large gain in the future should be taxed less heavily or at least not be taxed until the gains are realized via disposition of the assets.

Moreover, any age-specific tax policy to retain the highly skilled should be phased out for those over age 40. The empirical evidence indicates that once the highly skilled have stayed to age 40 they will continue to remain in Canada. In addition, wage responses in the private market in the form of internships and more aggressive wage bidding at the entry level (age 25-38) may hold the highly skilled until the aging process raises the probability of staying.

Finally, the results in this paper further indicate the futility of income tax-based policy measures to stem the outflow once a critical income gain is reached.

What of measures to induce Canadian residents to return to Canada and reacquaint them with Canada's holding power? If we look to successful examples of repatriation of the highly skilled (India, Ireland or Taiwan), one common feature appears. These countries all had a substantial and dynamic high technology sector to induce these skilled people to return. Currently however, Nortel is faltering. Nevertheless, Canada's history offers a further tactic, which is consistent with the findings reported. In the late 1960s, when Canada had just experienced a decade of the brain drain to the United States, Canada induced Canadian academics to return with a combination of career opportunities plus a strategic tax remission. In short, if you returned to Canada for three or more years, the first three years of Canadian federal taxes were remitted. This is a prime example of an age-strategic income incentive that would work in the 21st century. The wisdom of this policy is threefold. First, the small foregone income tax can easily be recouped if a fraction of the repatriated Canadians remain in Canada. Next, the remission is for only three years or just enough time for the representative returning Canadian to age and establish roots in the community as suggested by this papers findings. Finally, repatriating Canadians would be less costly than importing highly skilled replacements from the rest of the world.

Of course the brain drain or transfer for Canada's high-income gainers is still a by-product of not Canadian conditions but the economic state and immigration policies of the United States. Any changes in either dimension will slow the movement faster than Canadian policies could. NAFTA precludes the United States from halting Canadians moving to the United States. However, the coming United States recession, which could wipe out the large income gains necessary to offset Canada's staying power, should halt further movement.

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