The Migration of Highly Skilled Individuals Within and Between Canada and the United States

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Abstract

In earlier research focusing on the 1980s and early 1990s, Hunt and Mueller (2004) found that US states have wider returns to skill than Canadian provinces. This favoured the migration of higher-skilled Canadians to the US. In this study, we extend this analysis to include average tax incidence for each income decile in each of the potential areas to which migration occurs as well as per capita expenditures on various public services. We use an expanded observational base of microdata from the US and Canadian censuses of 2000/2001. By being able to identify highly skilled individuals, through the use of this model, we perform simulations regarding the types of economic and non-economic variables that motivate individuals to migrate both within their home country and between countries, as well as the magnitude of these migrations. We find that individuals with lower skills, Canadian nativity (especially French speakers), and age are all negatively related to the propensity to migrate. Amongst those who do migrate, an area with higher mean returns to skill, higher employment growth rates, moderate climates, and geographical proximity to the migrant's area of origin increase the probability of migration to these areas. The simulations suggest that increasing after-tax returns to skill and fiscal equalization (reducing both average taxes to their average US level as well as expenditures to maintain a balanced budget) would be the most effective policies in reducing southward migration, especially amongst the highly skilled.

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I. Introduction

In earlier research focusing on the 1980s and early 1990s, Hunt and Mueller (2004), found that US areas have higher returns to skill than Canadian areas. This favoured the migration of higher-skilled Canadians to the US. They also found substantial national border effects that attenuate the attraction of higher returns in the US. In this study, we will update and expand these data and statistical estimates to determine if the additional economic integration occurring in the 1990s and early 2000s reduced border effects. In addition, we will extend the analysis to include average tax rates by income level as well as per capita public expenditures on items such as education and health care in each of the potential areas to which migration occurs. We will use an expanded observational base of microdata from the US and Canadian censuses of 2000/2001 giving us more precise results.

By being able to identify highly skilled individuals through the use of this model, we can perform simulations regarding the types of economic and non-economic variables that motivate individuals to migrate both within their home country and between countries, as well as the magnitude of these migrations. It is the migration of highly skilled Canadians to the United States, especially in the late-1990s, that attracted the attention of the media, policy makers and academics. While the attention paid to this issue has subsided in the past few years, it is still worthwhile to ascertain the causes of this migration, and its magnitude, as well as the policy levers that might prove fruitful in regulating this migration in the future. The model utilized is robust and allows for a variety of policy simulations, facilitating policymakers in choosing the best policy alternatives (e.g., changing the costs of border crossings, tax rates, etc.). In particular, it permits us to conduct simulations in which we can answer the following "what if" questions:

(1) What are the migration implications of changes in returns to skill in Canada versus the United States?

(2) If border-crossing costs (due to changes in integration) are decreased further, what will be the effect on inter-provincial migration in Canada, and on migration to the United States?

(3) What impact will an aging Canadian population have on migration flows?

(4) How important are provincial tax rates and employment growth rates in determining migration within and between the two countries?

(5) Do highly skilled individuals differ in their propensity to migrate compared to those with lower skills?

(6) Are there fundamental differences between the highly skilled that move within Canada and those who migrate to the United States?

(7) Which policies would be most effective at changing migration patterns?

(8) Would these policies have different effects on the highly skilled compared to all others in the sample?

The next section discusses some key current policy issues and presents the context within which this current work is placed. Section III discusses the methodology that is followed. Section IV outlines the data sets used, as well as their limitations. Presentation of the results from the estimated econometric model is the topic of Section V. In Section VI we use the econometric results to conduct simulations using both policy and non-policy variables. The final section offers discussion on the results and concludes.

II. Key Issues and Background

North American migration within and between Canada and the United States has been the topic of prior scholarly research. Normally, this research is concerned with bilateral migration from Canada to the US, and usually it is assumed that better economic opportunities exist in the US and this is what drives the migration patterns. It is the migration of highly skilled Canadians that has periodically been a public policy issue – as in the 1990s. This migration has been attributed to the NAFTA provisions on the movement of labour between the two countries, better employment opportunities in the US, and to the higher marginal tax rates in Canada, among other factors (Finnie, 2001).

While income differentials are important, there are many other factors that may push migrants away from existing locations, and other factors that may pull migrants towards new locations. Recent research has incorporated a number of "place characteristics" and "person characteristics" that captured many of the factors involved in migration (see Hunt and Mueller, 2004). Two key place characteristics are the return to skills offered by the place, and whether relocating to the place involves crossing the Canada-

US border: internal migration within Canada or the US would not involve border crossing; international migration between the countries obviously would.

Unlike many other studies of North American migration, this approach distinguishes persons by their skill level. Skill level is an important "person characteristic" for migration when places offer varying returns to skill. In other words, returns to individual characteristics such as education, experience, marital status and other observable attributes held by individuals. Individuals who possess relatively high skills have an incentive to migrate to areas where these skills have the highest return, all other things being equal. Similarly, individuals with relatively low skills have an incentive to migrate to locations where their lack of skills will be penalized least. In this approach, personal characteristics interact with place characteristics to determine the migration of individuals by skill level. This delineation of migration by skill level is endorsed by others (see Gera, *et al*., 2004).[1]

In studying migration data for the US and Canada for the late 1980s and early 1990s, Hunt and Mueller (2004) found that the more highly skilled the Canadians or Americans are, the more responsive they are to higher returns to skill. Their calculations showed that the total returns to skill of observable personal characteristics are higher in the US states than in the Canadian provinces. This implies that higher-skilled Canadians should be migrating to the US and these authors find evidence to support this conclusion. However, such migration involves crossing a national border and they also find that there are very high "border-crossing costs." These attenuate the out-migration of higher-skilled Canadians even though the returns to skill are higher in the US. In the economics literature on migration going back to Sjaastad (1962), the largest component of migration costs is "psychic" costs — the personal costs of leaving family and friends and familiar surroundings. In the national border crossing case, they also include cultural and national factors. As laid out in Hunt and Mueller (2004), these border-crossing costs are substantial enough to make the Canada-US border much less porous to labour migration than to the

[1] Other recent studies have also included variables to capture the importance of differing income distributions between source and host countries. Clark, Hatton and Williamson (2002) use 28 years of US immigration data and model gross immigration rates (i.e., annual gross flow of immigrants as a proportion of the source country population) as a function of the income inequality ratio between the source country and the US (using Gini coefficients on household income as the measure of inequality). Mayda (2005) uses a similar methodology and data from 14 OECD countries over 16 years. She too finds that relative income inequality is an important determinant of gross emigration rates from source countries. The importance of relative income distribution in migration decisions was formalized by Borjas (1987) based on the discussion of selection biases between occupations in Roy (1951). What differentiates our approach is that we use micro data and place each individual in a North America-wide skills distribution.

flow of goods, services, and capital. Consequently, a Canadian brain drain to the US, with its higher returns to skills, is substantially blunted by the presence of the border.[2]

One interesting policy question raised by these empirical results is: to what extent will greater economic integration between Canada and the United States lower border-crossing costs? If most costs are related to national and cultural sensibilities, there may not be much effect of greater integration on migration between Canada and the US. One method to estimate integration effects is to update the data from the period of the late 1980s and early 1990s to the period of the late 1990s and early 2000s (when the 2000 US and 2001 Canadian censuses were completed). This updating moves us from a period when the Canada-US Free Trade Agreement was just beginning to take effect (about 1989) to a period when this agreement (and its successor the NAFTA) had been in effect for about 10 years. Moreover, the updated period importantly ends before the events of September 11, 2001; thus, these events and their aftermath will not confound the updated estimates of the effects of greater integration. In fact, the proposed update period is ideal given the timing of integration initiatives and the events of September 11.[3]

In this work we will update the previous data and statistical estimation of the key factors behind North American migration as contained in Hunt and Mueller (2004). Here we focus on the period 1995/96-2000/01, the period when concerns over the brain drain peaked. Using the updated data and estimates, we will perform a comparative analysis with these prior estimates to determine if the integration trends over the ten-year period reduced border-crossing costs. Another feature of this paper will be the inclusion of taxes and public expenditures; relatively high Canadian taxes were often blamed for the migration of skilled Canadians to the United States in the 1990s. The estimated econometric model will allow us to perform simulations on key policy variables.

[2] The model outlined here and in Hunt and Mueller (2004) are short-term models. Theoretically one might expect regional differences in returns to skill to be equalized in the long term as migration changes the supply of labour in each region. However, the existence individual costs of migration, especially non-financial or psychic costs, may prohibit this longer-term equilibrium from being attained. To wit, Lemieux (2005) provides evidence that free trade between Canada and the United States has not led to the convergence of wages between the two countries. To the contrary, they have diverged, and are not as large as the differences that exist between six regions in Canada.

[3] Related work in progress explicitly addresses these border effects.

III. Methodology

The methodology has been developed and reported in several publications (see Hunt, 2000; Hunt and Mueller, 2002; and Hunt and Mueller, 2004). It involves two basic steps: (1) data development; and, (2) maximum likelihood estimation of a partially degenerate nested logit model. The technical details are contained in Appendices A and B.

Step I: Data Development

In this first step, a set of destination places for migrants in North America will be delineated. In previous studies, these places were the 10 Canadian provinces and the lower-48 US states plus Washington, DC. In this current proposal, we will do the same again. For each of the resulting 59 places, data will be obtained on relevant place characteristics including: returns to skills, employment growth rates, heating and cooling degree days (climatic amenity proxies), distances from each area to all other areas, area tax rates, a variety of per capita public expenditures, and country. Although many of these data are available from secondary sources, the returns to skills data are an exception. These must be generated according to the methodology laid out in Hunt and Mueller (2002) and reproduced below in Appendix B. Basically, this involves using relatively large census microdata samples from the respective countries' individual census microdata files. The IPUMS center at the University of Minnesota is the source for these data in the case of the US. The Canadian census data are from Statistics Canada. Using these data, Mincerian-style log-wage equations will be estimated and used to impute a skill index and ranking to individual workers. The results can also be used to parameterize the returns to skill distribution in each province and state. Given these imputations, the individuals can then be placed in the appropriate skill decile and the returns to skill for each place delineated can be computed.

In addition to computing the skill decile for each individual, these data permit us to obtain additional person characteristics that are important for estimating migration propensities. These include: age, gender, race, marital status, nativity, and mother tongue. Moreover, we obtain information on whether an individual resides in the same place in 2000/01 as he or she resided in 1995/96 (a non-migrant) or in a different place within the same country (internal migrant) or different country in North America (North American migrant).

Step II: Maximum Likelihood Estimation of the Nested Logit

The appropriate model for this statistical analysis of discrete choice among one origin area and 58 alternative non-origin destination areas is a partially degenerate nested logit model (see Hunt, 2000; Hunt and Mueller, 2004). The model encompasses both place and person characteristics that are found to be important in migration decision-making.

It is assumed that individual will make the decision to stay in the area of origin (as opposed to migrating to one of the 58 non-origin areas) based on the individual's age, country of birth, mother tongue, place in the North America-wide skills distribution, and utility received from the origin characteristics (e.g., returns to skills) compared to that available in the alternative destinations. This latter utility information is contained in the inclusive value (IV) variable. The stay branch is degenerative in the nested logit model because it has only the origin as a lower-level choice area. If the individual does not stay in origin area, she has the option of migrating to one of the other 58 areas in the North American region. The migrate branch is non-degenerative in the nested logit model because it contains more than one (i.e., 58 in this application) lower-level choice areas. Conditional on choosing to migrate, the non-origin area selected as the destination will be based on distance from the origin, a variety of area amenities (e.g., climate), crossing the international border, and economic variables such as area employment growth, total tax incidence, mean returns to skill, and the returns to skill distribution as well as the interaction of this distribution with the individual's location in the skills distribution. The Roy migration model predicts that individuals will, *ceteris paribus*, migrate to locations where their skills are rewarded the most (or penalized the least). Thus, highly skilled individuals will migrate to areas with the largest variance in the returns to skill distribution so that their skills will be rewarded most (while lower skilled individuals will migrate to areas with the smallest variance so that their lack of skills will be penalized least). The technical presentation of the model is contained in Appendix A.

The statistical estimates of the model give the quantitative importance of each of these characteristics. The statistical results permit us to infer which person and place characteristics are statistically significant factors in internal and North American migration and allow us to assess the importance of returns to skill and border effects, as well as policy variables such as tax rates. The quantification of the border effects permits us to do a comparative analysis with prior findings in this regard to see if further economic integration in North America has significantly reduced border-crossing costs and increased the permeability of national borders to labour migration.

IV. Data

Contextual Data Set Structure

The data requirements derive from the nature of a Roy selection model of choice of destination area by individuals and their related migration and immigration status. The data therefore encompass both individual and area dimensions. In the individual dimension, data on origin and destination areas, migrant and immigrant status, and skill and mobility characteristics are included. The area dimension includes wage distribution, tax incidence, amenity features, and several migration cost factors that are area-specific for individuals.

The contextual data structure constructed integrates these two dimensions. Consider the first individual in the sample. This person has J=59 alternative destinations from which to choose: the 10 Canadian provinces, the lower 48 US states, and the District of Columbia (D.C.).[4] So, for the first individual observation, there will be J rows in the data array. Each of these J rows will contain individual and area information. The individual information will be invariant. The area information will vary with area. This data structure is repeated for all individuals, N, in the sample. The total number of rows in the contextual data set is NxJ.

Using the 2000 US Public Use Microdata Sample (PUMS) A and the 2001 Canadian Census Individual File, we derive the subsample that we use, within this overall constraint, as follows. For both Americans and Canadians, we include only non-institutionalised individuals between the ages of 25 and 64 who worked at least one week in the year prior to the census, were not self-employed, did not attend school either full or part time, and had at least $1000 US in real wage and salary income in the reference

[4] We use states and provinces, rather than metropolitan areas, as the migration-defining regions for several reasons. First, this definition of the geography results in 59 areas that almost exhaustively cover the North American area in which we are interested. Second, our software is limited to no more than 100 lower-level choices. If we use metropolitan areas, we could only include 100 of them and this would leave the majority of the metro areas as well as all non-metro areas out of the analysis. Third, we wish to confirm and extend prior work by Borjas, et al. (1992) and Hunt and Mueller (2004). This work uses states as the geographic unit. The exclusion of Alaska and Hawaii from the data set reflects the desire to have geographic contiguity among areas analyzed so that the distance and border crossing variables are well defined. Since the Yukon, Northwest Territories and Nunavit are not included, Alaska is treated likewise (although the state's panhandle actually does border British Columbia).

calendar year.[5] In addition, only Canadian-born and American-born individuals are retained. This is to remove any confounding effects of third-country migrants between and within the two countries. Among this set of workers, we retained all recent immigrants to the other country -- i.e., those who had immigrated within five years of the census date (since 1995 for Canadians in the United States and since 1996 for Americans in Canada).[6] We also retain a subsample of internal migrants within each country, and yet a smaller subsample of those who do not migrate internally or internationally in the five-year period. Since we are constrained in the number of observations that we can use, we retain all observations from the smallest group (international migrants) and retain the smallest proportion of those from the largest group (non-migrants).

The sampling fractions implied by the subsampling procedures are inverted to obtain weights for each individual observation. These weights are applied to the corresponding components of the sample to generate the worker population represented by the sample. The nested logit estimates presented below employ the appropriate population-based weights. Table 1 shows that sample sizes (weighted and unweighted) for both males and females in the US and Canadian data. There are 37,573 males in the data which represent almost 47 million males in Canada and the US. Most of these individuals in both countries are stayers or internal migrants followed by international migrants. The weighted numbers are proportionately larger for stayers in the United States since they were subsampled whereas internal and international migrants were not. Similarly, for females the sample size was limited by subsampling only stayers. The total number is 33,329 which represent a population of over 44 million. In both male and female cases, the data follow the pattern that is well-established in the literature: individuals generally tend to remain where they are (at least within the same province or state), that internal migration is not common (less than 10 percent of the individuals observed to have changed states or provinces within the previous five years), and that international migration is rare (less than one percent in each case). For both males and females, the number of Canadian observations is about one-tenth of those in the US. The final row of Table 1 shows the total number of observations used in the estimation of the model (which is simply the number of unweighted observations multiplied by 59, i.e., the total number of areas).

[5] The reference year for the US is 1999 and for Canada it is 2000. Wage and salary incomes in Canada were deflated by the 1999 annual Canadian inflation rate and then changed into US dollars at the 1999 exchange rate. This gives all earnings in real 1999 US dollars.

Variables

The variables used are of three types: (1) individual variables, (2) area variables, and (3) individual-area interactions. Individual variables vary in value across individuals and include the individual's origin area in 1995 (1996) and destination area in 2000 (2001), mobility status, skill characteristics, Canadian or American nativity, mother tongue, and age.[7] These variables indicate whether an individual is a stayer, internal migrant, or immigrant; skill decile; and certain costs of migrating. Area variables vary in value across areas and reflect interregional variations in returns to skill, employment search costs, and climate amenities, etc. The individual-area interactions include returns to skills, mobility costs related to distance and fixed costs of crossing an international border.

The method used to generate the individual skill indexes is based on Mincerian-style human capital equations as documented in Hunt and Mueller (2002).[8] To do this, an individual's location in the North America-wide skills distribution is computed using individual-specific characteristics for each sex and all jurisdictions in North America (i.e., all 59 areas). This is done by regressing the log of weekly wages on a variety of human capital characteristics such as years of education, potential experience, and other variables that are individual-specific; other area-specific characteristics are included as regressors as well. Next, predictions of individual's log weekly wages are made using only the estimated coefficients on the individual-specific characteristics. These predictions form a skills distribution and this allows us to rank individuals from highest to lowest, they can be sorted into skills deciles based on their location in this distribution.

Summary statistics of these individual characteristics are presented in Table 2. We disaggregate the sample into males and females, and within each gender into international migrants (those who moved to the United States in the preceding five-year period), internal migrants (those who moved between provinces in the previous five years), and non-migrants or stayers (those whose province of residence remained the same in the census). The final two columns of this table show the mean differences between international migrants and internal migrants, and between internal migrants and non-migrants.

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[6] The data do not allow us to differentiate between those emigrating from their country of birth and those emigrating from third countries. In all cases, we must assume that individuals are emigrating from their country of birth.

The results are similar for both males and females and are as expected: Those who move have more years of education than non-migrants, with international migrants having the highest levels of education. Those who left for the United States have less potential experience than those who moved within Canada, and this latter group of movers have less experience than non-migrants. Both groups of migrants are less likely to be married than their non-migrant counterparts. Together these factors show the relative youth of migrants, but high education levels. Part-time work is less prevalent amongst international migrants than internal migrants. Finally, the calculated decile variable[9] shows that skills are higher amongst those who migrated to the United States versus both internal migrants and non-migrants.

Two of our key area variables, MUAT and PHIAT (the mean after tax returns to skill and the relative standard deviation of the returns to skill distribution), will vary by gender because these two variables are computed based on Mincerian-style human capital equations and are estimated separately for males and females as documented in Hunt and Mueller (2002). Consequently, there is one set of area standardized log wage distributions for males and another set for females. Variable names, definitions, and sources are presented in Table 3.

Descriptive statistics for the variables used in the logit model are presented in Table 4. The upper panel contains statistics for males, and the lower panel statistics for females. For both males and females, the origin and destination variables have a mean value of 0.0169 (=1/59). Males are less likely to be stayers in these data compared to females (90.46 per cent versus 91.66 per cent). The male sample contains proportionately more Canadian-born individuals compared to the female sample, but both men and women exhibit similar age distributions. Minorities are more prevalent in the female sample while both are similar in terms of the proportion who claimed to have French as their mother tongue. Since the deciles were calculated before subsampling, the statistics for these are approximately equal to 0.10. Mean adjusted returns to skill (MU) are higher for males on average and also exhibit wider distribution between regions (PHI). Distances are similar for both males and females meaning that neither sex shows a different propensity to move further on average. Both sexes have identical values of the amenity

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[7] For simplicity, we will use the interval 1995 through 2000 throughout the remainder of the paper. However, the reader should keep in mind that the Canadian data are for the 1996 through 2001 period.
[8] This methodology is also found in Appendix B to this paper.
[9] This is calculated from the skill index variable (ν). See Table 3 and Appendix B.

variables employment growth, heating degree-days and cooling degree-days, public expenditures, etc. since these do not change by sex.

V. Econometric Estimates

Tables 5 and 6 contain econometric estimates for males and females of the nested logit model outlined in Equations (17) – (20) in Appendix A. This is estimated on data from both the 2000 US and 2001 Canadian censuses as outlined above. In the upper branch, individuals decide whether to remain in their origin or move to any of the other 58 destinations. The migration decision is based on age, Canadian-born vs. US-born, French mother tongue, an individual's location in the skills distribution (separated into deciles), and the relative utility received by residing in alternative areas as captured by the IV variable. All else equal, we expect age to have a positive effect on remaining in the origin, as will French mother tongue and lower skills deciles. Age is consistently shown to have a negative effect on migration decisions (either nationally or internationally) while lower skills reduce the opportunities available to individuals as does French mother tongue (at least outside of the province of Quebec).[10]

In the lower branch, individuals decide where to relocate based on after tax mean returns to skills (MUAT) in each area, the area-specific variance of this skills distribution compared to a standardized all-area variance of the skills distribution, interacted with the individual's position in this latter distribution (PHIATSD), distance from the origin to the destination (DIST), a index of rental prices for each area (RENT), the employment growth rate in the area from 1995 through 2000 (EGROW), temperature extremes (HDD and CDD), per capita public expenditures on health care (XHSPC), education (XEDPC), debt service (XDSPC), and other expenditures (XOTHPC). In Model C, these expenditure variables are interacted with a dummy variable equal to one for individuals in the highest five skills deciles (i.e., deciles 6 through 10). Finally, since we are interested in border effects, we include a dummy variable equal to one for each of the 58 non-origin areas that would require the individual to cross the 49th parallel when migrating (COUD and UOCD), and zero for all other of the 58 areas. Given previous work on migration, we expect MUAT to have a positive effect on migration and PHIATSD to have a positive (negative) effect on migration for those at the upper (lower) tail of the skills distribution since those with high (low) skills will

[10] Finnie (2005) shows that the probability of emigration amongst French-speaking Canadians is low compared to English speakers.

be rewarded more (penalized less) in areas with a wider (narrower) returns to skills distribution. Further, it is expected that RENT will have a negative effect on migration while EGROW will exert a positive influence. Since individuals generally do not prefer temperature extremes, both HDD and CDD are expected to have a negative effect on migration. Since individuals consider public expenditures an economic good, we would expect a positive sign on these coefficients. The exception would be XDSPC where a negative coefficient would indicate the unwillingness of individuals to migrate to areas with prior public debt commitments. Finally, we expect both COUD and UOCD to be negative since the international border poses more of an impediment to migration than migrating internally.

Model A is the basic model while Model B disaggregates the age variable into categories. Model C is as Model A, but with interactions of decile 6 through 10 dummy variables with each of the four public expenditure variables. Again, this is to capture any differential public expenditure effects on the upper and lower halves of the skills distribution.

For both males and females the results are remarkably similar and are robust to model specification. In all estimations of the upper branch, age is positively related to remaining in the origin, as is French mother tongue. In Model B, the probability of remaining in the origin is increasing in age category (the omitted category is the 60-64 age group). As expected, the probability of remaining in the origin displays a decreasing pattern as skill decile increases, meaning that individuals with high (low) skills are more (less) mobile. These results are consistent with the migration literature.

The lower branch of the estimations shows which factors determine the destination choice for those individuals who migrate either internally or between Canada and the United States. In each specification the qualitative results are identical and each is statistically significant at one percent. Higher after-tax mean area returns to skill (MUAT) result in increased migration to these areas, and the return to an individual’s skill relative to mean skills interacted with returns to these skills (PHIATSD) is positively related to migration to these areas. In other words, those with higher than average skills tend to be attracted to areas where these skills are rewarded. Conversely, those with lower than average skills will not be attracted to these areas, but to areas with a more compressed return to skills distribution. Distance (DIST) tends to discourage migration. In all cases, the coefficient on the rental index variable (RENT) is positive and significant. This goes against expectations. It is likely due to the “bright lights, big city” effect whereby the amenities of various locations (at least those we do not control for) are positively correlated with rental rates. Consistent with expectations is the coefficient on area employment growth rates (EGROW), which tend to exert a positive influence on migration. Both colder and hotter climates (CDD and HDD) do not attract migrants. The coefficients on Canadian (US) origin and US (Canadian) destination are negative in each case, indicating that migrants in either country as much less probable to cross the 49th parallel than they are to move internally. These results are consistent with the findings of Hunt and Mueller (2004).[11]

VI. Simulations

The econometric model estimated above now allows us to perform simulations on various key policy variables. Such simulation experiments are an important device in producing more policy-relevant information from the technical estimates of the statistical model. The values of some of the key variables in the US and Canada, and will be used in policy simulations, are contained in Table 7. Both MUAT and PHIAT are larger in the US, while total incidence (TAX) and employment growth (EGROW) are higher in the case of Canada. Before proceeding to the policy simulations, it is necessary to see how well the econometric model performs in predicting both international and internal migration. These baseline simulations will then be used as the yardstick against which all other policy simulations are compared.

A. Baseline Simulations

Table 8 presents the simulation results for Canadian-origin males and females. Table 9 shows comparable data for American-origin males and females. In each we are interested in the effects of policy changes (mainly in Canada) on the migration of individuals internally and internationally, and differences in these effects at various parts of the skills distribution. To accomplish this task, we will set Canadian values of the various variables equal to those in the United States and measure what the effect is on the numbers of migrants both within and between the two countries.

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[11] The estimated border effects are larger for Canadians and smaller for Americans in the current work compared to the estimates in Hunt and Mueller (2004). This is likely owing to the fact that they did not control for taxes and public expenditures in their estimates. Insofar as lower taxes in the United States are viewed as an amenity by Canadians, this will lower the estimated border effect in a model that does not control for taxes. The reverse argument holds for Americans viewing Canada as a potential destination. In separate estimates that do not include taxes and public expenditures, estimated border effects are very close to those in Hunt and Mueller (2004). As mentioned above, complementary work in progress more fully explores these border effects.

The first column in Table 8 is the weighted numbers of Canadian-origin males and females by migrant type (i.e., stayers, internal migrations and international migrants) in our original data set. Note individuals at lower skills deciles are less likely to migrate both within Canada and to the United States. By contrast, Canadian males in decile 10 are slightly more likely to migrate within Canada compared to the average (4.11% versus 4%) but are almost seven times more likely that the average Canadian resident to have gone to the US in the preceding five-year period (5.45% versus 0.80%). The same pattern holds for Canadian females.

The baseline simulation results for both Canadian males and females show that the model has performed rather well. For both males and females, the model tends to overestimate the extent of migration (international and national) at lower deciles, and underestimate international migration but slightly overestimate internal migration at higher deciles. Despite this, the migration patterns between deciles are preserved in the baseline simulations compared to the patterns in the observed data.

For American-origin males and females (Table 9) show that Americans are much more (less) mobile internally (internationally) compared to their Canadian counterparts. And while the baseline simulations in these cases tend to track the actual number of stayers and internal migrants accurately, the model tends to overestimate the numbers going to Canada at lower deciles, while underestimating the number at high deciles.

B. Alternative Simulations

In this section we are interesting in performing a number of “what if” scenarios on the estimated model. Each of these will be conducted by adjusting parameter values in Canada to equal the actual values in the US data. The values of these values of these variables are contained in Table 7. After tax mean wages (MUAT) are about 10 per cent higher for US males and about 7 per cent higher for American females. The mean standard deviation of the standardized after tax returns to skill distribution (PHIAT) in the American states is about double those in Canadian provinces for both males and females. Total taxation burden as a percentage of wages (TAX) in the United States is some 71 per cent of that in Canada. Finally, employment growth in the US states over the five-year period under consideration averages only about 90 per cent of comparable Canadian rates.

1. Returns to Skill

As mentioned above, the mean returns to skill is higher in the United States, and it distribution is also much wider. Clark, Hatton and Williamson (2002) find that moving from an inequality ratio typical of South America to one typical of Western Europe reduces a country's immigration rate sizeably since the lower skilled will have less of an incentive to migrate. This is consistent with a Roy-type model. In the context of Canada-US migration, Harris and Lemieux (2005:18) write:

> The lower level of inequality in Canada makes the United States particularly attractive to high-income Canadians who typically earn substantially less then their U.S. counterparts. If free trade and economic integration had pushed Canadian income inequality in Canada to the U.S. level, we would likely not have seen this systematic migration of highly skilled and high-income Canadians to the United States.

In earlier work, Hunt and Mueller (2004) also find that equalizing PHI (before tax) does confirm the predictions of the Roy model, but the magnitude is small in every case.

We raise the value of both MUAT and PHIAT in Canadian provinces by the amount of the mean difference of both variables values in Canada and the United States. In other words, we increase the values of these variables in all Canadian areas so that the mean values are equalized between the two countries. This preserves differences between provinces. This might occur, for example, if institutional factors such as employment insurance, minimum wages, labour laws, etc. were changed in Canada, if returns to skills changed in response to shifts in the relative demand or supply of various skills, or fir there were changes in the capital stock (whether substitutes or complements).

The results of these simulations (Tables 8 and 9) are supportive of the theoretical model. For both Canadian males and females, and for all skills deciles, migration within Canada increases, while migration to the United States decreases. For the higher skills deciles, the changes are most pronounced. This is owing to the fact that these groups gained the most by migrating to the United States because of higher returns to skills.[12] For example, for males in the tenth decile there is a drop of about two-thirds compared to the baseline. For females in the tenth decile, the drop is larger: about 75 per cent.

For US-origin males and females, equalization of these two parameters has the same effect: more individuals migrating to Canada. Again, the results are most pronounced for those at the upper tail of the skills distribution.

Increasing only PHIAT in Canada to equal the average value in the United States does little to change either the total number of internal migrants or the number of Canadians migrating to the US. Still, there are large differences across deciles. For both males and females at the middle of the skills distribution there is little change. For those at the lower tail, however, there are sizeable increases in migration to the US as well as similar reductions in inter-provincial migration. The result is the opposite for those in the upper tail of the distribution: sizably lower migration to the United States and increased migration between provinces. These results are consistent with earlier work by Hunt and Mueller (2004). Moving to the US no longer penalizes individuals at the lower tail of the skills distribution. Conversely, those at the upper tail are no longer rewarded to the same degree. For American males and females, migration to Canada amongst those at the upper tail is enhanced since higher skills will now be rewarded more in Canada. For those in lower deciles, however, migration to Canada is reduced since the lack of skills is now penalized.

Comparing this case to the previous case where both MUAT and PHIAT were equalized we find the latter case results has a larger impact on migration in all cases. This suggests that individuals are attracted by higher wages in general. This means that increasing mean returns to skill in Canada, rather than widening the distribution, would be result in fewer Canadians migrating south. This is especially pronounced for those in upper deciles.

2. *Employment Growth Rates*

Equalizing employment growth rates is done by decreasing the mean Canadian rate reported in Table 7 (i.e., 13.052%) to equal the mean US rate (11.072%) over the 1995 to 2000 period. The results of this simulation are as predicted by theory: lower growth rates in Canada decrease inter-provincial migration and increase migration to the United States relative to baseline estimates. This result holds for both males and females and the effects are somewhat higher for the higher skills deciles. This result again agrees with earlier work (Hunt and Mueller, 2004). However the direction of change is different since employment growth rates in Canada were lower in the 1985-90 period relative to the United States. For US-origin males and females, equalizing employment growth has essentially no effect on migration

[12] Recall that it is the interaction of PHIAT and SD that is a regressor in the model (Tables 5 and 6) and that SD is inter-regionally

patterns. This is quite different, but not inconsistent, from these earlier results where American migration to Canada increased dramatically as did inter-provincial migration in Canada, while Canadian migration to the US decreased as did interstate migration in the US. However, the employment growth rate equalization was much greater in this earlier work in addition to being in the opposite direction.[13]

3. Fiscal Equalization

To test the effects of a reduction in taxes in Canada on migration, especially migration to the United States, we reduce the average tax rates in Canada to those of the United States. In fact, while much of the debate about Canada-US migration in the 1990s was framed around higher Canadian income taxes, there is little evidence that this affected the migration decision Canadians (Frank and Bélair, 1999; Wagner, 2000).

The flip side of tax reductions is the decrease in the public expenditures that must occur to maintain fiscal balance. Many authors have found that low-skilled immigrants might be attracted to areas that have highly developed welfare states. This is the “welfare magnet effect” according to Böheim and Mayr (2005). These authors use data for 18 OECD countries (including Canada and the United States) over the 1990-2001 period, disaggregate public spending into public and private components (i.e., income transfers), and find that the former attracts both low-skilled and high-skilled immigrants, while the latter attracts low-skilled immigrants.[14] According to Böheim and Mayr (2005:1):

> Workers have an incentive to migrate in order to benefit from inter-regional differentials in taxes and benefits. Mobile high-skilled workers will move to countries where taxes are lower, other things being equal. In the same way, mobile low-skilled workers will move to countries where transfers are higher.

Davies (2003) has noted that there exist significant human capital externalities which result in growth, but the income tax system tends to tax investments in human capital at a higher rate than other forms of investment. The reduction of personal taxes must be balanced against the loss of services that these tax dollars provide, according to Harris (2004:35) “Knowledge workers want good schools and a clean environment.” Collins and Davies (2003) find that the effective tax rate on human capital is higher in

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invariant. As a result, it is changes in PHIAT that will influence destination choice.

[13] In this work, Canadian employment growth rates were increased by about 55 per cent. In the present work, Canadian growth rates are reduced by about 10 per cent.

[14] They also find that immigration reduces public spending, as result of what they call the “anti-social effect” of natives towards immigrants.

Canada than in the United States, especially for higher income earners. This could harm Canada in two ways: by reducing the incentive to invest in human capital and by increasing incentives to migrate to the United States for those who have human capital. Collins and Davies (2003:480) also note: "The magnitude of that flow [from Canada to the United States] depends on the elasticity of migration with respect to the tax differential – something outside the scope of this study but deserving of further research."

Of course, decreasing taxes does not happen in isolation. Over time governments are subjected to a budget constraint whereby budgets must be balanced. Thus, tax reductions must also be matched with commensurate decreases in public expenditures. We work with this assumption and reduce the mean tax burden in Canada to equal that in the United States. To ensure that the provinces do not increase their budgetary deficits, we also reduce program spending so that the operating budget remains balanced. Table 7 shows that taxes in Canada must be reduced by 28.85 per cent (or 11.20 percentage points) on average to equal mean taxes in the United States. We assume that public debt service payments are fixed, and therefore spending reductions must come from the other public expenditures. These are reduced equally by 28.62 per cent across the remaining three spending categories.

The results for Canadian males and females show that fiscal equalization would dramatically reduce migration to the United States while increasing inter-provincial migration. The results here and in Tables 5 and 6 also suggest that the reduction in public expenditures on all items except health care will increase the attractiveness of an area. The coefficient values on these expenditures are negative and are larger in absolute value compared to the coefficient on health care expenditures, so the net effect of a reduction in public expenditures is to attract immigrants. Thus, reducing taxes as well as expenditures within a balanced budget framework unambiguously increases migration to an area. For both males and females, these migration effects increase as we move up the skills distribution. This is consistent with Jackson (2005:304) who noted: "Public opinion research shows that only the very affluent have strong supported the tax cut agenda, not least because the U.S. model of low taxes and low social service provision would leave them better off."

4. Aging Population

It is well known that both the Canadian-born and American-born populations are increasing in average age (although the young immigrant population in both countries does allay this somewhat). Since our focus here is on the populations born in each country, we are curious about the internal and international migration implications of this aging native-born population. Recently, Clark, Hatton and Williamson (2002) estimate that raising the share of a source country's young population (i.e., those aged 15-29) increases immigration to the US.

Here we use the published population projects from Statistics Canada and the US Census Bureau for the years 2010/11 and 2025/26. These data project the populations within each of our age groups by sex. Increasing age works to both increase and decrease the propensity of Canadians to migrate to the United States. First, an older population means that individuals will on average possess more experience in the labour market and this will be rewarded higher in the United States. Second, as people age they are less likely to migrate (either internally or internationally).

The simulations results suggest that the population age changes have very little effect on either internal or international migration.

5. Border Effects

Many authors have discussed the importance of international boundaries in reducing the flows of both goods and migration, all else equal. In other words, international borders do matter when it comes to migration decisions and can be due to cultural differences, the monetary costs of crossing the border (e.g., visas and lawyer fees) or other country-specific characteristics. Part of the debate regarding the brain drain in the 1990s was attributed to the lower border crossing costs as the result of the Canada-US Free Trade Agreement (FTA) and its successor the North American Free Trade Agreement (NAFTA). These agreements allowed many individuals to cross the 49th parallel and work in the other country with relative ease compared to the previous cumbersome visa procedures. This in effect, reduced the border crossing costs for individuals on either side of the border.

Still, legal restrictions against immigration are only one cost of crossing the border. Helliwell (2005) discusses other factors such as the loss of network density and shared norms, additional nonmonetary deterrents to international migration. Similarly, Devoretz and Coloumbe (2005) discuss the "home bias" of potential migrants. Although defining these effects is rather ambiguous, we found in Hunt and Mueller (2004) that reducing these border crossing costs initially favoured the United States in terms of higher net migration from Canada, but then favoured Canada as costs were further reduced, and these positive results were strongest for those at the upper tail of the skills distribution.

Here we perform four simulations by reducing border effects by 10, 25, 50, and 100 per cent. The latter case is the complete elimination of any border effects. This is accomplished by changing the values of the country origin dummies for cross-border migrants (COUD and UOCD) to values of 0.90, 0.75, 0.50, and 0.00. Both of the variables have a value of 1.00 in the baseline simulation (i.e., the border effects which existed in 2000/01). In terms of the theoretical model, this means that the individuals would consider the negative effects on indirect utility of moving to the other country lower (for whatever reason) compared to the full border effect in the baseline simulation.

For both Canadian males and females, the effects are large and result in higher migration rates to the United States. The largest impacts however are at the lower tail of the skills distribution. This could reflect the fact that those in the higher skills deciles have had an easier time crossing the border than those at lower deciles since the latter group is likely more mobile (due to higher education, etc.) and also because they have already been granted favourable admission to the United States under the FTA and the NAFTA. They may also reflect that higher deciles exhibit less of a "home bias" than their lower decile nationals. The results also echo that fact that the border effect estimates in Tables 5 and 6 are much higher for Canadian (COUD) than Americans (UOCD). For Americans, there is essentially no effect, due to lower border effects in the first place.

The effects of lower border costs on net migration to Canada are shown in Tables 10 and 11 for males and females, respectively. Both tables use the international migration estimates from the simulations in the final columns of Tables 8 and 9. The percentages reported are the number of migrants relative to the total number of individuals in each group. For Americans, these are the total numbers in Table 9. For Canadian migrants as well net migration, the relevant groups are in Table 8. For example, in Table 10 the total number of males estimated to leave the United States for Canada under the 50 per cent reduction in border costs is 5,960, or about (after rounding error) 0.01 per cent of the total number of

42,882,292 males. For Canadian males, the comparable figures are 187,261 migrants of a total of 4,109,122, or about 4.56 per cent. Similarly, the net migration of -181,301 males is about -4.41 per cent of this same Canadian male total. The final column in both Tables 10 and 11 is the ratio of the number of migrants at 0 per cent of baseline (i.e., no border effects) to the number at 100 per cent of baseline (i.e., existing border effects).

The general pattern is the same for both males and females: the lower the perceived border crossing costs, the higher the net migration rate from Canada to the United States. This is due to the estimated border crossing costs being higher for Canadian than Americans (thus reducing these has a larger effects on the number of Canadians), as well as the fact that Canadian migration to the United States is larger in absolute numbers. In other words, since baseline migration is higher for Canadians and the border effects larger, the larger the reduction in the border effect, the larger the net loss of Canadians. Compared to the baseline estimates, percentage increases in net migration tends to be higher at the lower skills deciles as evidenced by the higher ratios in the final column of both tables. Put plainly, reducing the costs of the border crossing will increase the flow of Canadian to the United States by more than the increase in American migration to Canada, resulting in a net loss of individuals to Canada.

While these numbers are large, especially with the simulated elimination of the border, it must be remembered that these include both monetary and psychic costs. While the former can be reduced by bilateral or multilateral agreements (e.g., NAFTA), the latter cannot. The case of the European Union is relevant here since there are essential no monetary costs to migration within the EU (at least before the newest 10 members entered in 2004). This, coupled with the fact that there exists a great deal of variance in labour market conditions between member states suggests that intra-European migration should be high. The evidence, however, is not supportive of this but rather suggests that other linguistic, cultural, and other barriers remain important (see Dumont, 2005, for a review).

VII. Conclusions and Policy Implications

We have found a great deal of empirical support for the theoretical Roy model of migration within and between Canada and the United States. We have employed a partially degenerate nested logit model where migration is a two-stage process: the decision to migrate versus staying in the origin location, followed by the decision of which of the other 58 areas (provinces and states) migrated to once this decision has been made. The econometric estimates of the model are consistent with the theory and with earlier studies, particularly Hunt and Mueller (2004), the study with which the present work is most closely related. We have also updated this previous work to study the North American migration patterns of the 1990s; the period when the debate about a Canada-US brain drain was widely discussed in Canada. Another innovation is adding both tax incidence and public expenditures of various items to the model.

We find that the propensity to migrate tends to be negatively influenced by lower skills, Canadian nativity (especially for French speakers) and age. An area with higher mean returns to skill, employment growth rates, moderate climates and geographically proximity to the migrant's area of origin are all attractive to migrants. To these factors we also add public expenditures on various items. High health care expenditures tend to attract immigrants while larger expenditures on public debt service, education, and "other" items tend to reduce migration to the area. All else equal, Canadians are less likely to move to the United States than Americans are to relocate to Canada. These are the border effects.

We now turn our attention to the eight questions posed at the beginning of the paper.

(1) What are the migration implications of changes in returns to skill in Canada versus the United States?

Changing both MUAT and PHISD in Canada to equal the mean values in the United States results in more inter-provincial migration, and less migration to the United States. This effect is especially pronounced at the upper tail of the skills distribution. Increasing only the value of PHIAT (the relative variance of the returns to skill distribution) in Canada to equal that of the United States results in more migration to the US of those in the lower tail of the skills distribution, but lower migration amongst those at the top. Comparing the two results suggests that increasing mean returns to skill in Canada would do more to stem the flow of highly skilled Canadians to the US. This could be done, for example, by increasing the productivity of Canadian firms.

(2) If border-crossing costs (due to changes in integration) are decreased further, what will be the effect on inter-provincial migration in Canada, and on migration to the United States?

Our results suggest that Canada will lose human resources as border effects are reduced from present levels. However, the legal restrictions are only part (although the most quantifiable part) of total border effects. The less quantifiable variables related to culture are more difficult to quantify. Our results imply that all border crossing costs must fall. The question is whether these will change. Helliwell's argument (2005) implies that even if the legal restrictions are decreased further we should not expect southward migration to increase in the absence of the reduction of these other costs. Furthermore, it is unlikely that the legal restrictions to crossing the 49th parallel are likely to be reduced. If anything, these have increased in the wake of the events of September 11, 2001 (DeVoretz and Coulombe, 2005), especially for foreign-born Canadians (and particular those of Middle Eastern origin). The same could be said of Canadian-born individuals of Middle Eastern heritage. In addition, Clarkson (2005) argues that further increases in integration with the United States that will foster migration are unlikely given the political situation between American labour organizations and Congress. For the meantime, at least, increased border protection measures in the US are limiting further southward migration.

(3) What impact will an aging Canadian population have on migration flows?

Our simulations show that the aging Canadian population is likely to have very little effect on migration to the United States. While increasing age is generally a deterrent to migration, it also increases the labour market experience of individuals which promotes migration since it is rewarded more handsomely in the United States.

(4) How important are provincial tax rates and employment growth rates in determining migration within and between the two countries?

Employment growth rates are important determinants of migration. In our simulations we find that reducing Canadian employment growth rates results in higher migration rates to the United States. This agrees with the estimates by Hunt and Mueller (2004).

By decreasing tax rates along with an equal decrease in public expenditure, migration to the United States is decreased, while inter-provincial migration increases. This effect is especially pronounced at higher deciles.

(5) Do highly skilled individuals differ in their propensity to migrate compared to those with lower skills?

Estimates in Tables 5 and 6 show that higher skilled individuals are more likely to migrate both internally and internationally. Compared to non-migrants both groups on average have more education but less experience (reflecting the youth of migrants).

(6) Are there fundamental differences between the highly skilled that move within Canada and those who migrate to the United States?

Migrants who entered the United States in the five-year period preceding the 2000 US census are much more educated than those Canadians who moved internally over essentially the same period (about 1.7 years more for males and 1.1 for females), but have over 2 years less experience. Using our measure of skills differential, we also find that migrants to the US are on average more likely to be in the upper tail of the distribution whereas internal migrants are close to the mean.

(7) Which policies would be most effect at changing migration patterns?

The simulations results for all deciles imply that equalization of mean after-tax returns to skills (MUAT) and fiscal equalization result in fewer Canadian entering the United States and more Canadian migrating inter-provincially. These two policies also result in the largest inflow of the US-born to Canada.

(7) Would these policies have different effects on the highly skilled compared to all others in the sample?

The main policy concern in Canada is the migration of the highly skilled to the United States. The simulation results show that those in the upper skills deciles are influenced to a greater degree by the same policies as all Canadians. For example, fiscal equalization reduces migration to the United States to numbers in the hundreds, from the thousands in the baseline case. Similarly, increasing mean after-tax returns to skill has a more profound effect on the upper tail of the skills distribution. The results suggest that the migration decisions of those at the upper tail of the skills distribution are, in general, much more sensitive to changes in the relative economic climate between Canada and the United States. This factor might be taken into consideration in policy deliberations.

This work represents a reasonably comprehensive model of the factors which cause Canadians to migrate, both internally and internationally to the United States. Given the differences in many of the economic variables between the two countries, it is somewhat surprising that migration to the United States was not larger in the late-1990s. The importance of border effects in deterring migration cannot be understated. The experience of European labour market integration seems to be relevant for this work. Specifically, the border is not simply a legal entity, but a physiological barrier which affects human beings (but not other factors of production). A better understanding of these barriers would be a fruitful avenue for future research.

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Appendix A – Detailed Methodology of the Nested Multinomial Logit Model based on Hunt and Mueller (2004)

Basic specification

Let indirect utility in location j for individual i (V_{ij}) be expressed as

(1) $V_{ij} = V(w_{ij}, t_j, a_j)$

where

w_{ij} is individual i's wage (net of taxes) in area j

t_j is the total tax incidence in area j

a_j is a vector of unpriced amenities in area j.[15]

Let j=o indicate the individual's origin location. The individual's indirect utilities in the origin and alternative locations are

(2a) $V_{io} = V(w_{io}, t_o, a_o)$, j=o

(2b) $V_{ij} = V(w_{ij}, t_j, C_{ioj}, a_j)$, $j \neq o$

where

(3) $C_{ioj} = C(C_{io}, d_{io \rightarrow j}, B_{io \rightarrow j})$

is the cost of migrating which is assumed to have fixed and variable components. The fixed component, C_{io}, captures various costs of moving unrelated to distance and includes "origin-specific" non-wage benefits forgone in moving from the origin. The variable component reflects that the costs of moving are a nondecreasing function of both the distance ($d_{io \rightarrow j}$) between individual i's origin (o) and the location (j), as well as any costs associated with crossing an international border ($B_{io \rightarrow j}$) in moving to location j. In other words, fixed costs are associated with the act of moving *per se* whereas variable costs depend on the destination: its distance from the origin and whether or not it is in another country.

The individual is assumed to choose that location j which maximizes his remaining working lifetime indirect utility. Remaining working lifetime indirect utility for individual i in location j (LV_{ij}) is

(4) $$LV_{ij} = \int_0^T V_{ij}(\bullet) e^{-\rho\tau} d\tau$$

[15] The price of tradeables is assumed to be equalized across the North American Free Trade Area. We take the price of tradeables to be the numéraire and set its value to unity.

where $T=T^*-y_i$, and T^* is a fixed retirement age, y_i is the individual's age, $e^{-\rho\tau}$ is a discount factor with discount rate equal to ρ, τ is an index of remaining periods, and all other notation is as previously defined.

Assuming that individual expectations regarding the relevant arguments in the indirect utility function remain at the τ=0 values over the remaining lifetime, and assuming that individuals have the same indirect utility function structure and the same rates of time discount, ρ, the solution to (4) is

(5) $LV_{ij} = (1/\rho)[\ V_{ij}(\bullet)][1-\exp(-\rho T)]$,

or, substituting for T,

(6) $LV_{ij} = (1/\rho)[\ V_{ij}(\bullet)][1-\exp(-\rho(T^*-y_i))]$.

Therefore, remaining working lifetime indirect utility for individual i in area j is

(7) $LV_{ij} = LV(\rho, C_{io}, y_i, w_{ij}, t_j, a_j, d_{io\rightarrow j}, B_{io\rightarrow j})$

where ρ and y_i are factors that are invariant across all destinations, C_{io} is invariant across non-origin destinations, and $w_{ij}, t_j, a_j, d_{io\rightarrow j}, B_{io\rightarrow j}$ vary by destination.

We assume that individuals, regardless of area of residence, will earn a wage based on both the mean wage of the area, as well as there relative position in a "skills distribution" and the returns to skill in each area: An individual of above (below) average skills will earn more (less) than the mean area-specific wage. Furthermore, this the rate of return to skills differ by area so that a person with skills above the mean will earn more in an area with higher returns to skill than in an area with lower returns to skill. Conversely, an individual with below average skills, will be penalized less in an area with lower returns to skill compared to an area with higher returns to skill. Following Borjas, Bronars, and Trejo (1992), the natural logarithm of individual i's net wage in region j can be written as

(8) $\ln(w_{ij}) = \mu_j + \phi_j(\upsilon_i - \upsilon)$

where μ_j is the mean log wage in area j, ϕ_j is the return to skills parameter in area j, υ_i is the individual's skill level, and υ is the mean skill level. In Equation (8), it can be seen that the position of each individual in the skill distribution (i.e., $(\upsilon_i - \upsilon)$) is interregionally invariant. In other words, $Corr(\upsilon_{ij},\upsilon_{ik})=1$, $j\neq k$, where j and k index regions. Thus an individual with above (below) average skills in one area will have above (below) average skills in all areas.

Consequently, we are assuming that migration does not change an individual's skill level; rather, returns to migration are generated by spatial variations in μ_j and ϕ_j. Taking the first two moments of (8), we obtain

(9) $E[\ln(w_{ij})] = \mu_j + \phi_j[E(\upsilon_i) - \upsilon]$

(10) $Var[\ln(w_{ij})] = \phi_j^2 Var(\upsilon_i)$.

If the individuals in area j have above (below) average skills, then $E(\upsilon_i) >(<) \upsilon$. In such cases, the mean of the log wage distribution will differ across areas due to both interregional differences in average skills, $E(\upsilon_i) - \upsilon$, and the values of μ_j and ϕ_j. Interregional differences in the variance of the log wage distribution will occur because of differences in ϕ_j and $Var(\upsilon_i)$.

Since we are interested in individual choices of destinations, we need to remove variations in the interregional log wage distribution parameters that result from differences in skill mix. This is achieved by using a standardized skill distribution with $E(\upsilon_i)=\upsilon$, and $Var(\upsilon_i)=\sigma^2$.

For this standardized skill distribution, the first two moments of the log wage distribution are

(11) $E[\ln(w_{ij})^*] = \mu_j + \phi_j[E(\upsilon_i) - \upsilon]$

$= \mu_j + \phi_j[\upsilon - \upsilon]$

$= \mu_j$

(12) $Var[\ln(w_{ij})^*] = \phi_j^2 Var(\upsilon_i)$

$= \phi_j^2 \sigma^2$.

Given estimates of the first two moments of the standardized log wage distribution, the values of μ_j and ϕ_j are identified as

(13) $\mu_j = E[\ln(w_{ij})^*]$

(14) $\phi_j = \{ Var[\ln(w_{ij})^*] / \sigma^2 \}^{1/2}$

where the asterisk indicates the standardized log wage.

Substitution of (13) and (14) into Equation (8) implies that individual i's log wage in area j depends on the mean and variance of the standardized log wage distribution, the variance of the skill distribution, and the individual's algebraic difference from the mean skill level. Denoting the latter as the individual's skill differential, an individual with a positive skill differential will have a higher log wage, *ceteris paribus*, in an area with a higher value of ϕ_j, and will prefer such an area because his indirect utility is higher in such an area. In contrast, an individual with a negative skill differential will have a higher log wage, *ceteris paribus*, in an area with a lower value of ϕ_j, and will prefer such an area because his indirect utility is higher in such an area. All individuals will prefer areas with higher values of μ_j to those areas with lower values of μ_j.

In terms of the Roy selection process, higher values of μ_j raise LV_{ij}, for all individuals, and therefore should increase the probability of selection of area j by all individuals, *ceteris paribus*. Higher values of ϕ_j should increase (decrease) LV_{ij}, for individuals with higher (lower) skills, and therefore should increase (decrease) the probability of selection of area j by individuals with positive (negative) skill differentials, *ceteris paribus*. Moreover, because the effect on log wages of returns to skill is continuous in this model, the probability of selection of area j should vary directly (inversely) with the extent of individual positive (negative) skill differential, *ceteris paribus*.

Equations (8), (13), and (14) imply that we can write remaining working lifetime utility (LV_{ij}) in Equation (7) as

(15) $LV_{ij} = LV(\rho, C_{io}, y_i, \mu_j, \phi_j(\upsilon_i - \upsilon), t_j, a_j, d_{io\rightarrow j}, B_{io\rightarrow j})$

where the arguments to $w_{ij}=w[\mu_j, \phi_j(\upsilon_i - \upsilon)]$ replace w_{ij}.

Econometric Specification

In a stochastic setting, the area choice process can be represented by

(16) $P_{ij} = \text{Prob}[\ (LV_{ij} + \varepsilon_{ij}) > (LV_{in} + \varepsilon_{in})\ ]\ \ ; j\neq n$

where P_{ij} is the probability that individual i selects area j and the LV terms for the lifetime utilities for individuals are from Equation (7).

Equation (16) follows in general the random utility approach to discrete choice. The structure of the LV function in Equation (7) indicates that the area selection process can be specified in particular as a nested logit model (McFadden 1978, 1981). This nested logit specification would involve two upper level branches: stay and migrate. The area choice under the first of the upper level branches would be the origin. The area choices under the second of the upper level branches would be non-origin areas.

The lower level indirect utility depends on characteristics that vary across areas. The corresponding factors in Equation (7) are w_{ij}, t_j, a_j, $d_{io\to j}$,$B_{io\to j}$. The upper level indirect utility depends on factors that vary with the choice of staying or migrating. The factors in Equation (7) that directly incorporate this feature are C_{io} and y_i. The maximum indirect utility attainable in non-origin areas compared with the indirect utility offered by the origin also influences the upper level choice of staying or migrating. This is captured in nested logit models by branch-specific "inclusive value" variables that are functions of the characteristics that vary across areas.

The nested logit structure specified has a partially degenerate structure with degeneracy in the "stay" branch, in which the origin is the only choice, and non-degeneracy in the "move" branch which encompasses all "non-origin" areas as the choice subset.

Lower-Level Conditional Probabilities

Non-degenerate Branch (m: migrate)

(17) $P_{ij\,|\,m} = \{\exp(\beta' x_{ij})/\sum_{k\in M} \exp(\beta' x_{ik})\}$

where $x_{ij}=\{\mu_j, \phi_j(\upsilon_i - \upsilon), t_j, a_j, d_{io\to j}, B_{io\to j}\}$ and M is the set of non-origin areas.

Degenerate Branch (s: stay)

(18) $P_{io\,|\,s} = \{\exp(\beta' x_{io})/\sum_{k\in S} \exp(\beta' x_{ik})\} = 1$

where $x_{io}=\{\mu_o, \phi_o(\upsilon_i - \upsilon), t_o, a_j\}$ and S is the set of origin areas, S={o}.

Upper-Level Unconditional Probabilities

Non-degenerate Branch (m: migrate)

(19) $P_{im} = \{\exp(\alpha_m' z_i + \theta_m IV_{im})/[\exp(\alpha_s' z_i + \theta_s IV_{is}) + \exp(\alpha_m' z_i + \theta_m IV_{im})]\}$

where $z_i=\{C_{io}, y_i\}$. Econometric identification of the parameters in the both of the alpha vectors simultaneously is impossible. We choose to implement the identifying restrictions: $\alpha_m'=0$. This implies that the elements of α_s' relate to the effect of each element of z_i on the probability of staying in the origin relative to migrating. This identifying restriction implies that Eq. (19) can be rewritten as

(19') $P_{im} = \{\exp(\theta_m IV_{im})/[\exp(\alpha_s' z_i + \theta_s IV_{is}) + \exp(\theta_m IV_{im})]\}$.

Degenerate Branch (s: stay)

(20) $P_{is} = \{\exp(\alpha_s' z_i + \theta_s IV_{is})/[\exp(\alpha_s' z_i + \theta_s IV_{is})] + \exp(\theta_m IV_{im})\}$.

The inclusive values are defined as: $IV_{is} = \log(\exp(\beta' x_{io})) = \beta' x_{io}$, where o indicates origin; and $IV_{im} = \log\{\Sigma \exp(\beta' x_{ik})\}$, where the sum is over the k non-origin areas.

There are two basic alternative forms that can be specified for a nested logit model: (1) the non-normalized form developed by Ben-Akiva (1973), and (2) the utility maximizing form developed by McFadden (1978, 1981). The latter is preferred because of its consistency with the utility maximization principle. McFadden (1978, 1981) shows that estimates of his form imply utility maximizing behavior if the IV estimates are within the interval (0,1). Koppelman and Wen (1998) demonstrate that the non-normalized form is consistent with the utility maximizing form if the inclusive value (IV) parameters are restricted to equality. Following Hunt (2000), who demonstrates these points for the case of the partially degenerate structure used in the present paper, we use the non-normalized form, which can be implemented in our software, and impose an equality restriction on the IV parameters for the degenerate stay and the non-degenerate move branches. We also check for an estimated IV parameter value in the interval (0,1).

Appendix B - Methodology for Calculating MU (μ) and PHI (ϕ) based on Hunt and Mueller (2002)

Area mean log wage (μ_j). In Equation (13) in the Appendix A, μ_j is equal to the expected value of the standardized log wage distribution for area j. We compute an estimate of this expectation for each of the fifty-nine areas by specifying a Mincerian-style log wage equation for individuals that incorporates observable explanatory variables related both to skill level factors (e.g., years of schooling and potential experience) and to non-skill level factors potentially influencing the wage (e.g., metropolitan residence status and amenities). This equation is estimated with ordinary least squares (OLS) separately with a sample of observations from each area and for each gender. Third, we partition the *entire* sample, irrespective of area, into two subsets: males and females. For each of these two groups, we compute the mean of each of the right-hand side variables specified in the equation using the *entire* sample of males or females across *all* 59 areas. Using these means in the estimated equation, we compute the predicted log wage for each group in each of the fifty-nine areas. These predicted log wages constitute our estimates of the fifty-nine area mean log wages, μ_j, for both males and females. By using the entire sample of both males and females across all 59 areas, we are able to control for inter-area differences in skills-mix that would otherwise affect the area-specific estimates of μ, thereby achieving an estimate for a standardized distribution of skills.

Area returns to skills (ϕ_j). Equation (14) in Appendix A we have $\phi_j = \{ Var[ln(w_{ij})^*] / \sigma^2 \}^{1/2}$. To get an estimate of the variance of the log wage distribution in each area for the standardized skills distribution, $Var[ln(w_{ij})^*]$, we use the estimated Mincerian-style equations again introducing the group-specific means, computed from the *entire* sample of males or females, for each of the non-skill-related variables. Summing these terms with the estimated constant parameter yields an area-specific, constant effect on group members' log wages for each area. This constant effect does *not* play a role in the $Var[ln(w_{ij})^*]$. We next compute the estimated effect of the skill-related terms on each individual group member's log wage in area j. For these calculations, the *entire* sample of group members is used irrespective of area. We refer to this result as the area-specific returns to skills effect for each individual. We then compute the variance of these individual area-specific returns to skills effects by group. These area-specific estimated variances are our estimates of $Var[ln(w_{ij})^*]$. Each area-specific estimate for a gender gives an estimate of the variance of the log wage distribution for the group-specific standardized skills distribution.

In order to obtain an estimate of the variance of the standardized skills distribution for each group irrespective of area, we obtain OLS estimates of the observable skill and non-skill factors specified in our Mincerian-style equation for all individuals in a group using the *entire* male or female sample irrespective of area of residence. In this case, we also specify area-specific fixed effects to capture variation in wages due to area-specific amenity or other unspecified non-skill factors. The estimated parameters on the non-skill factors and fixed effects represent effects that influence the location of area log wage distributions but not their variance.

The variance of the standardized skills distribution can be estimated for each group by, first, introducing the group means of the non-skilled-related variables (based on the *entire* sample) into this estimated version of the Mincerian-style log wage equation and computing the result for each group. Because group means are used, the result will not influence the variance. Second, we introduce each individual group member's value for the observable skill-related variables into the estimated equation and compute the individual-specific result. These individual results provide an estimate of the returns to skills effect for each individual in each of the two groups. Finally, an estimate of σ^2 for each gender is provided by computing the variance of the individual returns for each gender. An estimate of the returns to skills parameter for each area can now be computed for each group as $\phi_j = \{ Var[ln(w_{ij})^*] / \sigma^2 \}^{1/2}$.

The estimate of ϕ for each area measures the returns to skills variance in each of the areas for the standardized skill distribution relative to the returns to skills variance for the standardized skill distribution computed across all areas. If $\phi_j > 1$ (< 1), then the area return to skills is greater than (less than) the returns to skills variance across all areas (i.e., σ^2). Because each term, $Var[ln(w_{ij})*]$ and σ^2, are computed with the same group of individuals, the skill mix is held constant in each term, and therefore the ratio of the terms reflects differences solely in returns to skill among the 59 areas. As in the computation of μ_j, the use of a fixed group of individuals to compute the each area's ϕ achieves a standardized measure.

Table 1: Number of Sample Observations and Corresponding Populations by Country and Gender

	Males				Females			
	Unweighted		Weighted		Unweighted		Weighted	
	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada
Nonmigrants	10,215	10,585	38,597,750	3,912,121	9,913	9,776	36,841,870	3,620,652
Internal migrants	10,829	4,441	4,282,786	164,254	9,097	3,473	3,526,468	128,594
Migrants: U.S. to Canada[a]		51		1,888		67		2,661
Migrants: Canada to U.S.[a]	1,453		32,748		1,000		21,966	
Country total (individuals)	22,497	15,077	42,913,284	4,078,263	20,010	13,316	40,390,304	3,751,907
Total Observations (N)[b]	37,573		46,991,547		33,329		44,142,211	
Rows of data (Nx59)[c]	2,216,807				1,966,411			

[a]Immigrants who arrived within the last five years (1995-2000 for Canada to U.S. and 1996-2001 for U.S. to Canada).

[b]Total number of individual observations (N).

[c]Each individual has 59 alternative area choices. Therefore the number of rows in the data set is equal to Nx59.

Table 2: Selected Summary Statistics International Migrants, Internal Migrants, and Non-Migrants, Canadian-born Males and Females

Males

	International Migrants (1)		Internal Migrants (2)		Non-migrants (3)		Differences	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	(1) - (2)	(2) - (3)
Years of education	15.547	2.433	13.853	2.325	13.049	2.476	1.694	0.804
Potential experience	21.130	8.920	23.326	9.676	28.867	10.314	-2.196	-5.541
Married	0.642	0.480	0.674	0.469	0.731	0.443	-0.032	-0.057
Householder	0.776	0.417	0.701	0.458	0.743	0.437	0.074	-0.041
English	0.993	0.083	0.994	0.075	0.863	0.344	-0.001	0.131
Minority	0.054	0.227	0.020	0.138	0.014	0.118	0.035	0.006
Urban resident	0.570	0.495	0.611	0.488	0.568	0.495	-0.041	0.043
Part-time work	0.024	0.152	0.152	0.359	0.149	0.357	-0.129	0.003
Skills differential	0.267	0.206	-0.024	0.210	-0.020	0.215	0.291	-0.004
Skills decile	8.489	1.937	5.181	2.756	5.331	2.773	3.308	-0.150
Unweighted obs	1,453		4,399		104,976			
Weighted obs	32,748		162,556		3,881,026			

Females

	International Migrants (1)		Internal Migrants (2)		Non-migrants (3)		Differences	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	(1) - (2)	(2) - (3)
Years of education	15.243	2.268	14.094	2.072	13.359	2.225	1.149	0.735
Potential experience	19.944	8.986	22.482	9.816	28.401	10.162	-2.538	-5.919
Married	0.587	0.493	0.666	0.472	0.720	0.449	-0.079	-0.054
Householder	0.388	0.488	0.414	0.493	0.386	0.487	-0.026	0.028
English	0.991	0.093	0.992	0.092	0.852	0.355	0.000	0.140
Minority	0.062	0.242	0.022	0.146	0.014	0.117	0.041	0.008
Urban resident	0.541	0.499	0.624	0.484	0.584	0.493	-0.084	0.040
Part-time work	0.114	0.317	0.315	0.465	0.289	0.453	-0.202	0.026
Skills differential	0.186	0.192	0.014	0.173	-0.016	0.214	0.171	0.030
Skills decile	8.052	2.063	5.958	2.655	5.529	2.822	2.094	0.429
Unweighted obs	1,000		3,434		96,640			
Weighted obs	22,148		127,196		3,579,028			

Note: The number of observations in this table differs from those in Table 1 owing to a different subsambling in the latter case.

Table 3: Variable Names, Definitions, and Sources

Variable	Variable Name	Variable Definition	U.S.	Canada
Individual Variables				
Origin area (1995, 1996)	ORIGIN	Unity if individual's origin, zero otherwise	a	b
Destination area (2000, 2001)	DEST	Unity if individual's destination, zero otherwise	a	b
Stayer (1995-2000, 1996-2001)	STAYER	Unity if individual is a stayer, zero otherwise (ORIGIN = DEST)	a	b
Migrant or immigrant (1995-2000, 1996-2001)	MIGRANT	Unity if individual is a migrant, zero otherwise (ORIGIN ≠ DEST)	a	b
Skill index	ν	Individual's skill index	c	c
Skill differential = $(\nu - \bar{\nu})$	SD	Individual's skill differential = (skill index - mean of skill index)	c	c
Nth skill decile	DECn	Unity if individual is in nth skill decile, zero otherwise (n=1,2,3,…,10)	c	c
Born in Canada	BORNCAN	Unity if individual's nativity is Canadian, zero otherwise	a	b
Mother tongue French	MTFRENCH	Unity if French is the individual's mother tongue, zero otherwise	a	b
Age (2000, 2001)	AGE	Individual's age in years	a	b
Area Variables				
Log wage for mean skills	MU	Mean of area's standardized natural log wage distribution	c	c
	PHI	Standard deviation of area's standardized skill distribution relative to the standard deviation of the all-area standardized skills distribution	c	c
Net log wage for mean skills	MUAT	As MU but calculated using after-tax income	c, j	c, k
Returns to skill (after tax)	PHIAT	As PHI but calculated using after-tax income	c, j	c, k
Rental price index	RENT	Area's housing rental price index	d	e
Employment growth rate	EGROW	Area's employment growth rate 1995-2000 in percent	f	g
Heating degree days	HDD	Area's heating degree days in °F	h	i
Cooling degree days		Area's cooling degree days in °F	h	i
Tax Incidence	TAX	Area's total taxation as a percentage of income, by income decile, 1995	j	k
Public health care expenditures	XHSPC	Public health care expenditures per capita in 1996 (US $)	n	m
Public education expenditures	XEDPC	Public education expenditures per capita in 1996 (US $)	n	m
Public debt service expenditures	XDSPC	Public debt service expenditures per capita in 1996 (US $)	n	m
Other public expenditures	XOTHPC	Total public expenditures per capita less above three items in 1996 (US $)	n	m
Individual x Area Variables				
PHI x SD	PHISD	Standard deviation of area's log wage distribution multiplied by the individual's skill differential	c	c
PHIAT x SD	PHIATSD	As PHISD but calculated using PHIAT	c, j	c, k
Distance from origin to each area	DIST	Distance (in miles) from capital city of individual's origin to capital of each destination (= 0 for	l	l
Canadian origin, U.S. destination dummy	COUD	Unity for U.S. areas if individual's origin is in Canada, zero otherwise	c	c
U.S. origin, Canadian destination dummy	UOCD	Unity for Canadian areas if individual's origin is in U.S., zero otherwise	c	c

Notes:

a. 2000 U.S. Census of Population, PUMS Sample A (5%).
b. 2001 Canadian Census of Population.
c. Computed by authors following the methodology of Hunt and Mueller (2002).
d. 2000 U.S. Census of Population, Social and Economic Characteristics, and 1990 U.S. Census of Housing, General Housing Characteristics.
e. Social and Economic Characteristics of Individuals, Families and Households, 2001 Census, Catalogue No. 97F0021XCB2001000.
f. U.S. Bureau of Labor Statistics, Regional and State Employment and Unemploymnet (various issues).
g. Statistics Canada, CANSIM Table 281-0025.
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i. Environment Canada, Canadian Climate Normals or Averages, 1971-2000.
j Michael P. Ettlinger, John F. O'Hare, Robert S. McIntyre, Julie King, Neil Miransky and Elizabeth A. Fray. *Who Pays?: A Distributional Analysis of the Tax Systems of All 50 States* (Citizens for Tax Justice, 1996). Based on Institute for Taxation and Economic Policy's (ITEP) microsimulation tax model.
k. Fraser Institute.
l. Rand McNally Standard Highway Guide (1987).
m. CANSIM Tables 176-0049, 385-0002, 1996 Canadian Census of Population.
n. U.S. Bureau of the Census, State and Local Government Finances, by state (1995-96).

Table 4: Sample Statistics, Males and Females

	Males (n = 37,573)				Females (n = 33,329)			
	Mean	Std. Dev.	Minimum	Maximum	Mean	Std. Dev.	Minimum	Maximum
ORIGIN	0.0169	0.1291	0.00	1.00	0.0169	0.1291	0.00	1.00
DEST	0.0169	0.1291	0.00	1.00	0.0169	0.1291	0.00	1.00
STAYER	0.9046	0.2937	0.00	1.00	0.9166	0.2764	0.00	1.00
CAN	0.0898	0.2860	0.00	1.00	0.0882	0.2835	0.00	1.00
MIN	0.1319	0.3384	0.00	1.00	0.1594	0.3660	0.00	1.00
FRE	0.0302	0.1711	0.00	1.00	0.0300	0.1706	0.00	1.00
DECILE	5.4831	2.8719	1.00	10.00	5.5010	2.8741	1.00	10.00
First skill decile	0.1010	0.3014	0.00	1.00	0.1017	0.3022	0.00	1.00
Second skill decile	0.1014	0.3019	0.00	1.00	0.0978	0.2970	0.00	1.00
Third skill decile	0.1012	0.3016	0.00	1.00	0.1010	0.3013	0.00	1.00
Fourth skill decile	0.0974	0.2965	0.00	1.00	0.0994	0.2992	0.00	1.00
Fifth skill decile	0.1006	0.3007	0.00	1.00	0.0985	0.2980	0.00	1.00
Sixth skill decile	0.0989	0.2986	0.00	1.00	0.0992	0.2989	0.00	1.00
	0.1018	0.3024	0.00	1.00	0.1038	0.3050	0.00	1.00
Eighth skill decile	0.0992	0.2989	0.00	1.00	0.0999	0.2998	0.00	1.00
Ninth skill decile	0.1013	0.3017	0.00	1.00	0.0980	0.2973	0.00	1.00
Tenth skill decile	0.0972	0.2963	0.00	1.00	0.1008	0.3011	0.00	1.00
AGE	42.0765	10.1770	25.00	64.00	42.0695	0.9953	25.00	64.00
AGE2529	0.1308	0.3372	0.00	1.00	0.1259	0.3318	0.00	1.00
AGE3034	0.1399		0.00	1.00	0.1381	0.3450	0.00	1.00
AGE3539	0.1608	0.3674	0.00	1.00	0.1634	0.3697	0.00	1.00
AGE4044	0.1650	0.3712	0.00	1.00	0.1683	0.3741	0.00	1.00
AGE4549	0.1428	0.3499	0.00	1.00	0.1504	0.3574	0.00	1.00
AGE5054	0.1245	0.3302	0.00	1.00	0.1226	0.3279	0.00	1.00
AGE5559	0.0822	0.2747	0.00	1.00	0.0837	0.2770	0.00	1.00
AGE6064	0.0539	0.2258	0.00	1.00	0.0477	0.2131	0.00	1.00
SD	-0.0019	0.2620	-1.33	0.91	-0.0009	0.2332	-1.40	0.85
MU	6.4888	0.1690	6.01	6.81	6.0656	0.1454	5.75	6.52
PHI	0.9290	0.1790	0.45	1.20	0.9494	0.1949	0.54	1.46
CDD	560.1932	457.7674	8.90	2327.00	560.1932	457.7674	8.90	2327.00
HDD	3129.2390	1260.8667	581.00	5777.50	3129.2390	1260.8667	581.00	5777.50
EGROW	0.1193	0.0480	0.02	0.29	0.1193	0.0480	0.18	0.29
TAX	41.8970	13.7128	4.10	69.40	41.9920	13.7131	4.10	69.40
DIST	1293.1660	811.0342	0.00	4525.00	1282.8416	4.8134	0.00	4525.00
UOCD	0.1547	0.3616	0.00	1.00	0.1550	0.3619	0.00	1.00
COUD	0.0726	0.2595	0.00	1.00	0.0710	0.2568	0.00	1.00
PHISD	-0.0018	0.2479	-1.59	1.09	-0.0009	0.2260	-2.05	1.23
INTERMIG	0.0007	0.0271	0.00	1.00	0.0006	0.0236	0.00	1.00
RENT	0.9631	0.1962	0.65	1.56	0.9631	0.1962	0.65	1.56
XSHPC	1068.8068	485.2596	444.09	2802.35	1068.8068	485.2596	444.09	2802.35
XEDPC	1012.3081	221.8509	474.16	1489.33	1012.3081	221.8509	474.16	1489.33
XDSPC	224.6151	271.4655	27.92	1018.43	224.6151	271.4655	27.92	1018.43
XOTHPC	1125.1594	534.7631	486.80	4138.88	1125.1594	534.7632	486.80	4138.88
XTOTPC	3430.8894	1017.4697	2298.05	8656.88	3430.8894	1017.4698	2298.05	8656.88
MUAT	6.1087	0.2411	5.51	6.51	5.7464	0.1855	5.30	6.22
PHIAT	0.9019	0.2368	0.31	1.18	0.9311	0.2489	0.38	1.47
PHIATSD	-0.0017	0.2443	-1.57	1.08	-0.0009	0.2247	-2.07	1.25

Table 5: Maximum Likelihood Estimates of Partially Degenerate Nested Logit Model of Migration and Destination Choice, Males

	Model A			Model B			Model C		
	Coefficient	Standard Error		Coefficient	Standard Error		Coefficient	Standard Error	
Stay versus migrate choice									
Constant	1.2058E-01	3.0758E-03	*	3.7917E+00	3.9332E-03	*	1.2291E-01	3.0757E-03	*
Age	6.5990E-02	6.5358E-05	*				6.5989E-02	6.5357E-05	*
25-29				-1.9617E+00	3.3806E-03	*			
30-34				-1.5200E+00	3.3470E-03	*			
35-39				-1.1482E+00	3.3261E-03	*			
40-44				-7.2187E-01	3.3780E-03	*			
45-49				-4.3287E-01	3.4653E-03	*			
50-54				-1.1895E-01	3.5447E-03	*			
55-59				-2.1170E-01	3.7417E-03	*			
Canadian-born	4.9581E-01	2.8522E-03	*	4.9184E-01	2.8552E-03	*	4.9388E-01	2.8536E-03	*
Mother tongue French	7.3378E-01	5.5192E-03	*	7.3466E-01	5.5225E-03	*	7.3487E-01	5.5194E-03	*
Second skill decile	-1.7662E-01	2.2372E-03	*	-1.9072E-01	2.2443E-03	*	-1.7659E-01	2.2372E-03	*
Third skill decile	-2.7435E-01	2.2782E-03	*	-3.0815E-01	2.2971E-03	*	-2.7431E-01	2.2782E-03	*
Fourth skill decile	-4.2921E-01	2.2687E-03	*	-4.4978E-01	2.2867E-03	*	-4.2916E-01	2.2687E-03	*
Fifth skill decile	-3.1313E-01	2.3631E-03	*	-3.6882E-01	2.4146E-03	*	-3.1306E-01	2.3631E-03	*
Sixth skill decile	-3.8809E-01	2.5830E-03	*	-4.4512E-01	2.6285E-03	*	-3.8781E-01	2.5831E-03	*
Seventh skill decile	-6.0960E-01	2.3558E-03	*	-6.7132E-01	2.3958E-03	*	-6.0937E-01	2.3557E-03	*
Eighth skill decile	-7.0121E-01	2.4013E-03	*	-7.3886E-01	2.4362E-03	*	-7.0100E-01	2.4011E-03	*
Ninth skill decile	-9.4335E-01	2.2403E-03	*	-1.0273E+00	2.3129E-03	*	-9.4315E-01	2.2402E-03	*
Tenth skill decile	-1.3063E+00	2.4997E-03	*	-1.3193E+00	2.5173E-03	*	-1.3061E+00	2.4997E-03	*
Destination choice									
MUAT	3.6047E+00	7.9843E-03	*	3.6033E+00	7.9862E-03	*	3.6040E+00	7.9857E-03	*
PHIATSD	1.3935E+00	1.3350E-02	*	1.3935E+00	1.3351E-02	*	1.1177E+00	1.3786E-02	*
Distance (DIST)	-8.6672E-04	7.7727E-07	*	-8.6675E-04	7.7725E-07	*	-8.6709E-04	7.7767E-07	*
Rental index (RENT)	9.2563E-01	3.9196E-03	*	9.2606E-01	3.9195E-03	*	9.2767E-01	3.9207E-03	*
Employment growth rate (EGROW)	4.2308E+00	1.4330E-02	*	4.2310E+00	1.4331E-02	*	4.2323E+00	1.4332E-02	*
Heating degree days (HDD)	-2.4662E-04	1.0275E-06	*	-2.4672E-04	1.0275E-06	*	-2.4574E-04	1.0276E-06	*
Cooling degree days (CDD)	-2.1684E-04	2.3123E-06	*	-2.1686E-04	2.3122E-06	*	-2.1630E-04	2.3126E-06	*
Public health care expenditures (XHSPC)	1.0234E-03	3.4752E-06	*	1.0227E-03	3.4754E-06	*	1.0614E-03	4.2158E-06	*
Public education expenditures (XEDPC)	-6.5804E-04	3.3808E-06	*	-6.5794E-04	3.3809E-06	*	-5.3446E-04	4.4578E-06	*
Public debt service expenditures (XDSPC	-4.7845E-03	1.1355E-05	*	-4.7821E-03	1.1354E-05	*	-4.3534E-03	1.3765E-05	*
Other public expenditures (XOTHPC)	-7.8544E-04	2.3743E-06	*	-7.8513E-04	2.3744E-06	*	-9.1909E-04	2.9140E-06	*
XHSPC*DEC6-10							-7.0456E-05	4.8118E-06	*
XEDPC*DEC6-10							-2.4808E-04	5.9195E-06	*
XDSPC*DEC6-10							-9.0473E-04	1.6766E-05	*
XOTHPC*DEC6-10							2.6631E-04	3.3011E-06	*
Canadian origin/U.S. destination (COUD)	-7.3695E+00	1.0418E-02	*	-7.3683E+00	1.0418E-02	*	-7.4669E+00	1.0636E-02	*
U.S. origin/Canadian destination (UOCD)	-2.3573E+00	2.4428E-02	*	-2.3582E+00	2.4428E-02	*	-2.4639E+00	2.4507E-02	*
Inclusive value [a]									
Migrate	1.5204E-02	5.8227E-04	*	1.4215E-02	5.8329E-04	*	1.6082E-02	5.8386E-04	*
Number of observations	2,216,807			2,216,807			2,216,807		
Number of iterations	49			50			53		

* denotes statistical significance at the 1 per cent level.

Table 6: Maximum Likelihood Estimates of Partially Degenerate Nested Logit Model of Migration and Destination Choice, Females

	Model A		Model B		Model C	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Stay versus migrate choice						
Constant	5.1559E-01	3.3321E-03 *	3.6962E+00	4.2991E-03 *	5.2524E-01	3.3343E-03
Age	5.8943E-02	6.7161E-05 *			5.8938E-02	6.7160E-05
25-29			-1.7056E+00	3.6870E-03 *		
30-34			-1.2632E+00	3.6891E-03 *		
35-39			-7.9678E-01	3.7012E-03 *		
40-44			-4.1553E-01	3.7699E-03 *		
45-49			-2.3229E-01	3.8589E-03 *		
50-54			-2.3666E-01	3.9213E-03 *		
55-59			-1.2739E-03	4.2816E-03		
Canadian-born	5.5141E-01	3.2263E-03 *	5.4648E-01	3.2345E-03 *	5.4436E-01	3.2206E-03
Mother tongue French	7.6022E-01	6.1268E-03 *	7.6537E-01	6.1357E-03 *	7.6377E-01	6.1271E-03
Second skill decile	-1.3229E-01	2.5146E-03 *	-1.5775E-01	2.5373E-03 *	-1.3202E-01	2.5147E-03
Third skill decile	-1.6863E-01	2.6747E-03 *	-2.8810E-01	2.7222E-03 *	-1.6828E-01	2.6748E-03
Fourth skill decile	-3.1822E-01	2.7415E-03 *	-3.3966E-01	2.7708E-03 *	-3.1819E-01	2.7416E-03
Fifth skill decile	-4.1051E-01	2.7003E-03 *	-5.0213E-01	2.7362E-03 *	-4.1041E-01	2.7004E-03
Sixth skill decile	-4.6223E-01	2.7623E-03 *	-5.3494E-01	2.7919E-03 *	-4.6308E-01	2.7624E-03
Seventh skill decile	-4.8186E-01	2.5628E-03 *	-5.3441E-01	2.5816E-03 *	-4.8260E-01	2.5628E-03
Eighth skill decile	-7.8455E-01	2.3334E-03 *	-8.1078E-01	2.3567E-03 *	-7.8546E-01	2.3337E-03
Ninth skill decile	-8.2848E-01	2.4791E-03 *	-9.5479E-01	2.5275E-03 *	-8.2959E-01	2.4795E-03
Tenth skill decile	-8.8356E-01	2.5704E-03 *	-9.4605E-01	2.5937E-03 *	-8.8461E-01	2.5706E-03
Destination choice						
MUAT	3.7880E+00	9.9152E-03 *	3.7852E+00	9.9148E-03 *	3.7742E+00	9.9446E-03
PHIATSD	3.1055E+00	1.7721E-02 *	3.1055E+00	1.7721E-02 *	2.7809E+00	1.7969E-02
Distance (DIST)	-9.0255E-04	8.7678E-07 *	-9.0260E-04	8.7672E-07 *	-9.0155E-04	8.7777E-07
Rental index (RENT)	9.6130E-01	4.2690E-03 *	9.6193E-01	4.2694E-03 *	9.6853E-01	4.2732E-03
Employment growth rate (EGROW)	4.1734E+00	1.6303E-02 *	4.1750E+00	1.6304E-02 *	4.1492E+00	1.6348E-02
Heating degree days (HDD)	-1.5268E-04	1.2296E-06 *	-1.5278E-04	1.2296E-06 *	-1.5204E-04	1.2314E-06
Cooling degree days (CDD)	1.0420E-04	2.8615E-06 *	1.0406E-04	2.8613E-06 *	9.9389E-05	2.8714E-06
Public health care expenditures (XHSPC)	8.9286E-04	3.8608E-06 *	8.9203E-04	3.8641E-06 *	5.4223E-04	5.1297E-06
Public education expenditures (XEDPC)	-5.9885E-04	3.8530E-06 *	-5.9922E-04	3.8535E-06 *	-4.1231E-04	5.4111E-06
Public debt service expenditures (XDSPC	-4.6574E-03	1.2331E-05 *	-4.6555E-03	1.2334E-05 *	-4.0822E-03	1.6083E-05
Other public expenditures (XOTHPC)	-7.5557E-04	2.6105E-06 *	-7.5471E-04	2.6107E-06 *	-8.8733E-04	3.4612E-06
XHSPC*DEC6-10					5.7443E-04	5.4911E-06
XEDPC*DEC6-10					-3.4008E-04	6.7059E-06
XDSPC*DEC6-10					-1.0375E-03	1.8760E-05
XOTHPC*DEC6-10					1.9510E-04	3.7750E-06
Canadian origin/U.S. destination (COUD)	-7.2744E+00	1.1749E-02 *	-7.2734E+00	1.1749E-02 *	-7.3163E+00	1.1991E-02
U.S. origin/Canadian destination (UOCD)	-2.2269E+00	2.1891E-02 *	-2.2273E+00	2.1892E-02 *	-2.2142E+00	2.1963E-02
Inclusive value [a]						
Migrate	2.2171E-02	6.2203E-04 *	1.9871E-02	6.2395E-04 *	2.5410E-02	6.1945E-04
Number of observations	1,966,411		1,966,411		1,966,411	
Number of iterations	46		50		52	

* denotes statistical significance at the 1 per cent level.

Table 7: Average Values of MUAT, PHIAT, TAX and EGROW for U.S. and Canadian Areas

	Males			Females		
	U.S.	Canada	U.S./Canada	U.S.	Canada	U.S./Canada
MUAT	6.2072	5.6257	1.1034	5.8162	5.4045	1.0762
PHIAT	0.9867	0.4861	2.0296	1.0255	0.4681	2.1908
TAX	27.6059	38.8013	0.7115	27.6059	38.8013	0.7115
EGROW	11.7020	13.0520	0.8966	11.7020	13.0520	0.8966

Source: Authors' calculations.

Table 8: Migration and Destination Choice of Canadian-Origin Males and Females By Skill Level (1995-2000): Observed, Baseline Simulation, and Alternative Simulations

Males

					Alternative Simulations																			
													Aging				Border Effects							
	Observed		**Baseline Simulation**		MUAT and PHIAT Equalized		PHIAT Equalized		EGROW Equalized		Fiscal Equalization		Workforce Age: 2010/11		Workforce Age: 2025/26		10% Reduction		25% Reduction		50% Reduction		100% Reduction	
Categories	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	4,109,123	100.00%	4,109,122	100.00%	4,109,135	100.00%	4,109,123	100.00%	4,109,129	100.00%	4,109,102	100.00%	4,109,169	100.00%	4,109,148	100.00%	4,109,134	100.00%	4,109,130	100.00%	4,109,164	100.00%	4,109,088	100.00%
Stay in origin	3,912,121	95.20%	3,900,198	94.92%	3,900,534	94.92%	3,900,201	94.92%	3,900,127	94.91%	3,900,582	94.93%	3,907,704	95.10%	3,907,370	95.09%	3,899,714	94.90%	3,898,393	94.87%	3,894,644	94.78%	3,884,314	94.53%
Migrate in Canada	164,254	4.00%	170,355	4.15%	190,924	4.65%	170,410	4.15%	168,661	4.10%	205,034	4.99%	164,258	4.00%	164,460	4.00%	144,235	3.51%	94,009	2.29%	27,259	0.66%	861	0.02%
Migrate to U.S.	32,748	0.80%	38,568	0.94%	17,677	0.43%	38,512	0.94%	40,291	0.98%	3,486	0.08%	37,208	0.91%	37,317	0.91%	65,184	1.59%	116,728	2.84%	187,261	4.56%	223,913	5.45%
Decile 1	441,425	100.00%	441,424	100.00%	441,425	100.00%	441,424	100.00%	441,424	100.00%	441,424	100.00%	441,426	100.00%	441,424	100.00%	441,426	100.00%	441,426	100.00%	441,424	100.00%	441,426	100.00%
Stay in origin	425,675	96.43%	421,289	95.44%	421,305	95.44%	421,273	95.44%	421,287	95.44%	421,312	95.44%	422,160	95.64%	422,629	95.74%	421,252	95.43%	421,145	95.41%	420,804	95.33%	419,825	95.11%
Migrate in Canada	15,556	3.52%	17,233	3.90%	18,260	4.14%	16,301	3.69%	17,097	3.87%	19,735	4.47%	16,495	3.74%	16,100	3.65%	15,057	3.41%	10,424	2.36%	3,315	0.75%	110	0.02%
Migrate to U.S.	194	0.04%	2,902	0.66%	1,860	0.42%	3,850	0.87%	3,040	0.69%	376	0.09%	2,770	0.63%	2,696	0.61%	5,116	1.16%	9,857	2.23%	17,305	3.92%	21,491	4.87%
Deciles 2 & 3	787,584	100.00%	787,582	100.00%	787,584	100.00%	787,584	100.00%	787,583	100.00%	787,584	100.00%	787,584	100.00%	787,562	100.00%	787,580	100.00%	787,582	100.00%	787,584	100.00%	787,586	100.00%
Stay in origin	748,233	95.00%	744,316	94.51%	744,366	94.51%	744,300	94.50%	744,312	94.51%	744,384	94.51%	744,369	94.51%	744,905	94.58%	744,222	94.49%	743,972	94.46%	743,220	94.37%	741,119	94.10%
Migrate in Canada	38,016	4.83%	36,206	4.60%	39,427	5.01%	35,215	4.47%	35,883	4.56%	42,446	5.39%	36,170	4.59%	35,694	4.53%	31,146	3.95%	20,894	2.65%	6,308	0.80%	203	0.03%
Migrate to U.S.	1,335	0.17%	7,061	0.90%	3,791	0.48%	8,069	1.02%	7,389	0.94%	755	0.10%	7,045	0.89%	6,963	0.88%	12,212	1.55%	22,716	2.88%	38,056	4.83%	46,265	5.87%
Deciles 4 - 7	1,689,015	100.00%	1,689,008	100.00%	1,689,010	100.00%	1,689,009	100.00%	1,688,997	100.00%	1,689,014	100.00%	1,689,021	100.00%	1,689,028	100.00%	1,689,007	100.00%	1,689,024	100.00%	1,689,012	100.00%	1,689,012	100.00%
Stay in origin	1,616,415	95.70%	1,606,978	95.14%	1,607,106	95.15%	1,606,980	95.14%	1,606,957	95.14%	1,607,143	95.15%	1,610,418	95.35%	1,609,864	95.31%	1,606,783	95.13%	1,606,281	95.10%	1,604,779	95.01%	1,600,745	164.49%
Migrate in Canada	66,583	3.94%	66,944	3.96%	74,983	4.44%	66,935	3.96%	66,282	3.92%	80,507	4.77%	64,157	3.80%	64,606	3.83%	56,660	3.35%	36,842	2.18%	10,598	0.63%	333	0.03%
Migrate to U.S.	6,017	0.36%	15,085	0.89%	6,920	0.41%	15,094	0.89%	15,758	0.93%	1,364	0.08%	14,445	0.86%	14,557	0.86%	25,565	1.51%	45,900	2.72%	73,634	4.36%	87,933	9.04%
Deciles 8 & 9	973,186	100.00%	973,186	100.00%	973,184	100.00%	973,185	100.00%	973,188	100.00%	973,188	100.00%	973,186	100.00%	973,192	100.00%	973,185	100.00%	973,189	100.00%	973,188	100.00%	973,184	100.00%
Stay in origin	924,716	95.02%	923,206	94.86%	923,302	94.87%	923,226	94.87%	923,200	94.86%	923,326	94.88%	925,596	95.11%	924,902	95.04%	923,074	94.85%	922,739	94.82%	921,799	94.72%	919,322	94.47%
Migrate in Canada	35,144	3.61%	39,707	4.08%	45,845	4.71%	40,922	4.20%	39,266	4.03%	49,076	5.04%	37,844	3.89%	38,375	3.94%	33,054	3.40%	20,850	2.14%	5,747	0.59%	177	0.02%
Migrate to U.S.	13,326	1.37%	10,273	1.06%	4,037	0.41%	9,037	0.93%	10,722	1.10%	786	0.08%	9,746	1.00%	9,915	1.02%	17,057	1.75%	29,600	3.04%	45,642	4.69%	53,685	5.52%
Decile 10	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%	217,913	100.00%
Stay in origin	197,082	90.44%	204,401	93.80%	204,435	93.81%	204,414	93.81%	204,339	93.77%	204,439	93.82%	205,137	94.14%	205,051	94.10%	204,360	93.78%	204,261	93.74%	203,999	93.61%	203,336	93.31%
Migrate in Canada	8,955	4.11%	10,265	4.71%	12,409	5.69%	11,038	5.07%	10,133	4.65%	13,268	6.09%	9,718	4.46%	9,784	4.49%	8,318	3.82%	4,998	2.29%	1,290	0.59%	39	0.02%
Migrate to U.S.	11,876	5.45%	3,247	1.49%	1,069	0.49%	2,461	1.13%	3,382	1.55%	206	0.09%	3,058	1.40%	3,077	1.41%	5,234	2.40%	8,654	3.97%	12,624	5.79%	14,539	6.67%

Females

					Alternative Simulations																			
													Aging				Border Effects							
	Observed		**Baseline Simulation**		MUAT and PHIAT Equalized		PHIAT Equalized		EGROW Equalized		Fiscal Equalization		Workforce Age: 2010/11		Workforce Age: 2025/26		10% Reduction		25% Reduction		50% Reduction		100% Reduction	
Categories	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	3,771,212	100.00%	3,771,790	100.00%	3,771,170	100.00%	3,771,177	100.00%	3,771,181	100.00%	3,771,188	100.00%	3,771,171	100.00%	3,771,211	100.00%	3,771,161	100.00%	3,771,188	100.00%	3,771,238	100.00%	3,771,201	100.00%
Stay in origin	3,620,652	96.01%	3,609,589	95.70%	3,609,886	95.72%	3,609,617	95.72%	3,609,558	95.71%	3,609,932	95.72%	3,613,802	95.83%	3,613,199	95.81%	3,609,104	95.70%	3,607,886	95.67%	3,604,130	95.57%	3,593,038	90.04%
Migrate in Canada	128,594	3.41%	136,263	3.61%	150,819	4.00%	137,899	3.66%	135,122	3.58%	157,765	4.18%	132,647	3.52%	133,200	3.53%	118,586	3.14%	82,236	2.18%	27,056	0.72%	975	0.00%
Migrate to U.S.	21,966	0.58%	25,338	0.67%	10,466	0.28%	23,661	0.63%	26,501	0.70%	3,491	0.09%	24,722	0.66%	24,812	0.66%	43,471	1.15%	81,066	2.15%	140,052	3.71%	177,188	0.41%
Decile 1	535,683	100.00%	535,684	100.00%	535,684	100.00%	535,684	100.00%	535,684	100.00%	535,684	100.00%	535,684	100.00%	535,683	100.00%	535,684	100.00%	535,682	100.00%	535,683	100.00%	535,683	100.00%
Stay in origin	521,543	97.36%	520,840	97.23%	520,837	97.23%	520,810	97.22%	520,838	97.23%	520,832	97.23%	521,504	97.35%	521,516	97.36%	520,815	97.22%	520,733	97.21%	520,442	97.15%	519,445	96.97%
Migrate in Canada	13,857	2.59%	13,496	2.52%	13,860	2.59%	12,644	2.36%	13,430	2.51%	14,483	2.70%	12,893	2.41%	12,882	2.40%	12,376	2.31%	9,581	1.79%	3,858	0.72%	159	0.03%
Migrate to U.S.	283	0.05%	1,347	0.25%	988	0.18%	2,230	0.42%	1,415	0.26%	369	0.07%	1,287	0.24%	1,285	0.24%	2,493	0.47%	5,367	1.00%	11,382	2.12%	16,079	3.00%
Deciles 2 & 3	523,685	100.00%	523,686	100.00%	523,686	100.00%	523,684	100.00%	523,687	100.00%	523,684	100.00%	523,683	100.00%	523,687	100.00%	523,687	100.00%	523,685	100.00%	523,686	100.00%	523,684	100.00%
Stay in origin	508,166	97.04%	505,567	96.54%	505,580	96.54%	505,546	96.54%	505,566	96.54%	505,578	96.54%	505,609	96.55%	505,779	96.58%	505,528	96.53%	505,408	96.51%	505,013	96.43%	503,774	96.20%
Migrate in Canada	14,631	2.79%	15,973	3.05%	16,886	3.22%	15,386	2.94%	15,870	3.03%	17,679	3.38%	15,930	3.04%	15,786	3.01%	14,292	2.73%	10,434	1.99%	3,707	0.71%	139	0.03%
Migrate to U.S.	888	0.17%	2,145	0.41%	1,219	0.23%	2,752	0.53%	2,251	0.43%	428	0.08%	2,143	0.41%	2,122	0.41%	3,867	0.74%	7,842	1.50%	14,966	2.86%	19,772	3.78%
Deciles 4 - 7	1,521,036	100.00%	1,521,038	100.00%	1,521,038	100.00%	1,521,036	100.00%	1,521,037	100.00%	1,521,036	100.00%	1,521,028	100.00%	1,521,040	100.00%	1,521,036	100.00%	1,521,034	100.00%	1,521,027	100.00%	1,521,039	100.00%
Stay in origin	1,461,855	96.11%	1,454,075	95.60%	1,454,180	95.60%	1,454,065	95.60%	1,454,065	95.60%	1,454,190	95.61%	1,455,420	95.69%	1,455,150	95.67%	1,453,898	95.59%	1,453,408	95.55%	1,451,855	95.45%	1,447,294	95.15%
Migrate in Canada	53,640	3.53%	57,476	3.78%	62,571	4.11%	57,264	3.76%	57,033	3.75%	65,405	4.30%	56,326	3.70%	56,559	3.72%	50,474	3.32%	35,448	2.33%	11,716	0.77%	418	0.03%
Migrate to U.S.	5,541	0.36%	9,487	0.62%	4,287	0.28%	9,707	0.64%	9,940	0.65%	1,440	0.09%	9,282	0.61%	9,330	0.61%	16,663	1.10%	32,178	2.12%	57,456	3.78%	73,327	4.82%
Deciles 8 & 9	969,254	100.00%	969,256	100.00%	969,253	100.00%	969,251	100.00%	969,256	100.00%	969,253	100.00%	969,257	100.00%	969,257	100.00%	969,250	100.00%	969,258	100.00%	969,256	100.00%	969,254	100.00%
Stay in origin	920,572	94.98%	917,692	94.68%	917,836	94.70%	917,748	94.69%	917,684	94.68%	917,852	94.70%	919,540	94.87%	918,995	94.81%	917,517	94.66%	917,077	94.62%	915,789	94.48%	912,259	94.12%
Migrate in Canada	39,632	4.09%	41,932	4.33%	48,123	4.96%	44,054	4.55%	41,511	4.28%	50,350	5.19%	40,453	4.17%	40,875	4.22%	35,550	3.67%	23,297	2.40%	6,882	0.71%	231	0.02%
Migrate to U.S.	9,050	0.93%	9,632	0.99%	3,294	0.34%	7,449	0.77%	10,061	1.04%	1,051	0.11%	9,265	0.96%	9,387	0.97%	16,184	1.67%	28,884	2.98%	46,586	4.81%	56,763	5.86%
Decile 10	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%	221,554	100.00%
Stay in origin	208,096	93.93%	211,444	95.44%	211,498	95.46%	211,480	95.45%	211,441	95.44%	211,503	95.46%	211,823	95.61%	211,669	95.54%	211,397	95.42%	211,284	95.36%	210,999	95.24%	210,279	94.91%
Migrate in Canada	7,254	3.27%	7,384	3.33%	9,378	4.23%	8,551	3.86%	7,278	3.28%	9,848	4.44%	7,106	3.21%	7,218	3.26%	5,893	2.66%	3,475	1.57%	893	0.40%	28	0.01%
Migrate to U.S.	6,204	2.80%	2,726	1.23%	678	0.31%	1,523	0.69%	2,834	1.28%	203	0.09%	2,624	1.18%	2,668	1.20%	4,264	1.92%	6,795	3.07%	9,662	4.36%	11,247	5.08%

Note: Column total may not add due to rounding error. The PDNL model used assigns probabilities to each of the 59 areas for each individual and these are multiplied by indivdiual weights. The program loops over indivduals and sums the probability weight products for each area. This weighting results in small differences in sample sizes between simulations.

Table 9: Migration and Destination Choice of US-Origin Males and Females By Skill Level (1995-2000):
Observed, Baseline Simulation, and Alternative Simulations

Males

					Alternative Simulations																			
													Aging				Border Effects							
	Observed		**Baseline Simulation**		MUAT and PHIAT Equalized		PHIAT Equalized		EGROW Equalized		Fiscal Equalization		Workforce Age: 2010/11		Workforce Age: 2025/26		10% Reduction		25% Reduction		50% Reduction		100% Reduction	
Categories	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	42,882,424	100.00%	42,882,292	100.00%	42,882,276	100.00%	42,882,304	100.00%	42,882,288	100.00%	42,882,276	100.00%	42,882,256	100.00%	42,882,572	100.00%	42,882,300	100.00%	42,882,292	100.00%	42,882,272	100.00%	42,882,284	100.00%
Stay in origin	38,597,750	90.01%	38,610,752	90.04%	38,610,712	90.04%	38,610,752	90.04%	38,610,752	90.04%	38,610,424	90.04%	38,770,616	90.41%	38,659,472	90.15%	38,610,744	90.04%	38,610,736	90.04%	38,610,696	90.04%	38,610,536	90.04%
Migrate in U.S.	4,282,786	9.99%	4,269,706	9.96%	4,266,866	9.95%	4,269,706	9.96%	4,269,790	9.96%	4,247,459	9.90%	4,109,878	9.58%	4,221,284	9.84%	4,269,235	9.96%	4,268,250	9.95%	4,265,617	9.95%	4,252,448	9.92%
Migrate to Canada	1,888	0.00%	1,835	0.00%	4,698	0.01%	1,846	0.00%	1,748	0.00%	24,392	0.06%	1,761	0.00%	1,817	0.00%	2,323	0.01%	3,308	0.01%	5,960	0.01%	19,302	0.05%
Decile 1	4,305,958	100.00%	4,305,959	100.00%	4,305,959	100.00%	4,305,959	100.00%	4,305,959	100.00%	4,305,961	100.00%	4,305,964	100.00%	4,305,961	100.00%	4,305,959	100.00%	4,305,958	100.00%	4,305,960	100.00%	4,305,961	100.00%
Stay in origin	3,893,250	90.42%	3,897,624	90.52%	3,897,623	90.52%	3,897,626	90.52%	3,897,625	90.52%	3,897,576	90.52%	3,900,893	90.59%	3,897,872	90.52%	3,897,624	90.52%	3,897,622	90.52%	3,897,620	90.52%	3,897,599	90.52%
Migrate in U.S.	412,671	9.58%	408,115	9.48%	407,979	9.47%	408,184	9.48%	408,125	9.48%	406,562	9.44%	404,852	9.40%	407,870	9.47%	408,057	9.48%	407,941	9.47%	407,628	9.47%	406,055	9.43%
Migrate to Canada	37	0.00%	219	0.01%	357	0.01%	150	0.00%	209	0.00%	1,822	0.04%	218	0.01%	220	0.01%	278	0.01%	396	0.01%	713	0.02%	2,306	0.05%
Deciles 2 & 3	8,734,867	100.00%	8,734,848	100.00%	8,734,850	100.00%	8,734,848	100.00%	8,734,848	100.00%	8,734,863	100.00%	8,734,855	100.00%	8,734,837	100.00%	8,734,849	100.00%	8,734,851	100.00%	8,734,851	100.00%	8,734,853	100.00%
Stay in origin	7,842,820	89.79%	7,846,703	89.83%	7,846,700	89.83%	7,846,704	89.83%	7,846,703	89.83%	7,846,654	89.83%	7,851,001	89.88%	7,834,704	89.69%	7,846,702	89.83%	7,846,701	89.83%	7,846,694	89.83%	7,846,656	92.90%
Migrate in U.S.	892,010	10.21%	887,715	10.16%	887,267	10.16%	887,785	10.16%	887,735	10.16%	883,650	10.12%	883,427	10.11%	899,698	10.30%	887,602	10.16%	887,376	10.16%	886,761	10.15%	883,678	10.46%
Migrate to Canada	37	0.00%	430	0.00%	883	0.01%	359	0.00%	409	0.00%	4,560	100.00%	427	0.00%	435	0.00%	554	0.01%	775	0.01%	1,396	0.02%	4,518	0.05%
Deciles 4 - 7	17,044,838	100.00%	17,044,828	100.00%	17,044,832	100.00%	17,044,830	100.00%	17,044,828	100.00%	17,044,836	100.00%	17,044,792	100.00%	17,044,820	100.00%	17,044,830	100.00%	17,044,828	100.00%	17,044,834	100.00%	17,044,836	100.00%
Stay in origin	15,499,940	90.94%	15,510,513	91.00%	15,510,501	91.00%	15,510,513	91.00%	15,510,513	91.00%	15,510,418	91.00%	15,581,637	91.42%	15,530,990	91.12%	15,510,511	91.00%	15,510,506	91.00%	15,510,498	91.00%	15,510,438	91.00%
Migrate in U.S.	1,544,528	9.06%	1,533,661	9.00%	1,532,679	8.99%	1,533,664	9.00%	1,533,692	9.00%	1,525,846	8.95%	1,462,533	8.58%	1,513,186	8.88%	1,533,491	9.00%	1,533,143	8.99%	1,532,211	8.99%	1,527,514	8.96%
Migrate to Canada	370	0.00%	655	0.00%	1,652	0.01%	653	0.00%	623	0.00%	8,573	0.05%	622	0.00%	645	0.00%	828	0.00%	1,180	0.01%	2,126	0.01%	6,885	0.04%
Deciles 8 & 9	8,446,034	100.00%	8,446,030	100.00%	8,446,033	100.00%	8,446,029	100.00%	8,446,030	100.00%	8,446,032	100.00%	8,446,023	100.00%	8,446,050	100.00%	8,446,029	100.00%	8,446,031	100.00%	8,446,034	100.00%	8,446,033	100.00%
Stay in origin	7,488,081	88.66%	7,489,654	88.68%	7,489,648	88.68%	7,489,652	88.68%	7,489,654	88.68%	7,489,598	88.68%	7,553,585	89.43%	7,511,139	88.93%	7,489,652	88.68%	7,489,650	88.68%	7,489,646	88.68%	7,489,616	88.68%
Migrate in U.S.	957,323	11.33%	956,007	11.32%	955,223	11.31%	955,931	11.32%	956,025	11.32%	950,368	11.25%	892,093	10.56%	934,551	11.06%	955,910	11.32%	955,714	11.32%	955,187	11.31%	952,530	11.28%
Migrate to Canada	630	0.01%	369	0.00%	1,163	0.01%	446	0.01%	352	0.00%	6,066	0.64%	345	0.00%	361	0.00%	468	0.01%	666	0.01%	1,200	0.01%	3,887	0.05%
Decile 10	4,350,727	100.00%	4,350,728	100.00%	4,350,729	100.00%	4,350,728	100.00%	4,350,728	100.00%	4,350,728	100.00%	4,350,726	100.00%	4,350,734	100.00%	4,350,728	100.00%	4,350,728	100.00%	4,350,729	100.00%	4,350,729	100.00%
Stay in origin	3,873,660	89.03%	3,866,370	88.87%	3,866,365	88.87%	3,866,369	88.87%	3,866,370	88.87%	3,866,315	88.87%	3,891,678	89.45%	3,887,420	89.35%	3,866,369	88.87%	3,866,368	88.87%	3,866,366	88.87%	3,866,352	88.87%
Migrate in U.S.	476,253	10.95%	484,196	11.13%	483,721	11.12%	484,120	11.13%	484,204	11.13%	481,042	11.06%	458,893	10.55%	463,158	10.65%	484,153	11.13%	484,068	11.13%	483,837	11.12%	482,671	11.09%
Migrate to Canada	814	0.02%	162	0.00%	643	0.01%	239	0.01%	154	0.00%	3,371	0.08%	155	0.00%	157	0.00%	205	0.00%	292	0.01%	526	0.01%	1,706	0.04%

Females

					Alternative Simulations																			
													Aging				Border Effects							
	Observed		**Baseline Simulation**		MUAT and PHIAT Equalized		PHIAT Equalized		EGROW Equalized		Fiscal Equalization		Workforce Age: 2010/11		Workforce Age: 2025/26		10% Reduction		25% Reduction		50% Reduction		100% Reduction	
Categories	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	40,370,999	100.00%	40,371,036	100.00%	40,371,036	100.00%	40,371,028	100.00%	40,371,036	100.00%	40,371,020	100.00%	40,371,020	100.00%	40371036	100.00%	40,371,032	100.00%	40,371,028	100.00%	40,371,044	100.00%	40,371,028	100.00%
Stay in origin	36,841,870	91.26%	36,852,880	91.29%	36,852,884	91.29%	36,852,888	91.29%	36,852,884	91.29%	36,852,392	91.28%	36,953,812	91.54%	36866096	91.32%	36,852,876	91.29%	36,852,860	91.29%	36,852,816	91.29%	36,852,548	91.28%
Migrate in U.S.	3,526,468	8.74%	3,515,760	8.71%	3,515,868	8.71%	3,515,748	8.71%	3,515,868	8.71%	3,500,343	8.67%	3,405,978	8.44%	3493428	8.65%	3,515,160	8.71%	3,513,988	8.70%	3,510,940	8.70%	3,496,430	8.66%
Migrate to Canada	2,661	0.01%	2,397	0.01%	2,284	0.01%	2,392	0.01%	2,284	0.01%	18,287	0.05%	11,230	0.03%	11512	0.03%	2,995	0.01%	4,181	0.01%	7,286	0.02%	22,050	0.05%
Decile 1	3,952,801	100.00%	3,952,802	100.00%	3,952,802	100.00%	3,952,802	100.00%	3,952,802	100.00%	3,952,797	100.00%	3,952,802	100.00%	3952806	100.00%	3,952,802	100.00%	3,952,801	100.00%	3,952,803	100.00%	3,952,801	100.00%
Stay in origin	3,635,660	91.98%	3,636,356	91.99%	3,636,356	91.99%	3,636,360	91.99%	3,636,356	91.99%	3,636,180	91.99%	3,639,201	92.07%	3635937	91.98%	3,636,354	91.99%	3,636,350	91.99%	3,636,342	91.99%	3,636,298	91.99%
Migrate in U.S.	316,993	8.02%	316,066	8.00%	316,083	8.00%	316,253	8.00%	316,083	8.00%	315,334	7.98%	312,688	7.91%	315946	7.99%	315,972	7.99%	315,788	7.99%	315,306	7.98%	313,030	7.92%
Migrate to Canada	148	0.00%	381	0.01%	363	0.01%	190	0.00%	363	0.01%	1,283	0.03%	913	0.02%	923	0.02%	475	0.01%	663	0.02%	1,154	0.03%	3,473	0.09%
Deciles 2 & 3	8,250,522	100.00%	8,250,520	100.00%	8,250,519	100.00%	8,250,518	100.00%	8,250,519	100.00%	8,250,524	100.00%	8,250,520	100.00%	8250530	100.00%	8,250,519	100.00%	8,250,520	100.00%	8,250,519	100.00%	8,250,517	100.00%
Stay in origin	7,598,960	92.10%	7,601,553	92.13%	7,601,554	92.13%	7,601,556	92.13%	7,601,554	92.13%	7,601,510	92.13%	7,600,129	92.12%	7584961	91.93%	7,601,551	92.13%	7,601,546	92.13%	7,601,532	92.13%	7,601,468	92.13%
Migrate in U.S.	651,414	7.90%	648,413	7.86%	648,438	7.86%	648,558	7.86%	648,438	7.86%	646,107	7.83%	648,427	7.86%	663557	8.04%	648,277	7.86%	648,009	7.85%	647,305	7.85%	643,958	7.81%
Migrate to Canada	148	0.00%	554	0.01%	527	0.01%	405	0.00%	527	0.01%	2,907	0.04%	1,965	0.02%	2012	0.02%	692	0.01%	966	0.01%	1,683	0.02%	5,092	0.06%
Deciles 4 - 7	16,174,273	100.00%	16,174,242	100.00%	16,174,242	100.00%	16,174,243	100.00%	16,174,242	100.00%	16,174,247	100.00%	16,174,230	100.00%	16174274	100.00%	16,174,242	100.00%	16,174,242	100.00%	16,174,246	100.00%	16,174,237	100.00%
Stay in origin	15,000,140	92.74%	15,007,861	92.79%	15,007,862	92.79%	15,007,863	92.79%	15,007,862	92.79%	15,007,766	92.79%	15,057,027	93.09%	15028199	92.91%	15,007,859	92.79%	15,007,852	92.79%	15,007,833	92.79%	15,007,734	92.79%
Migrate in U.S.	1,173,581	7.26%	1,165,541	7.21%	1,165,579	7.21%	1,165,589	7.21%	1,165,579	7.21%	1,160,547	7.18%	1,113,548	6.88%	1142321	7.06%	1,165,333	7.20%	1,164,925	7.20%	1,163,858	7.20%	1,158,766	7.16%
Migrate to Canada	552	0.00%	840	0.01%	801	0.00%	791	0.00%	801	0.00%	5,934	0.04%	3,656	0.02%	3754	0.02%	1,050	0.01%	1,466	0.01%	2,555	0.02%	7,737	0.05%
Deciles 8 & 9	7,764,632	100.00%	7,764,624	100.00%	7,764,625	100.00%	7,764,626	100.00%	7,764,625	100.00%	7,764,620	100.00%	7,764,630	100.00%	7764630	100.00%	7,764,625	100.00%	7,764,625	100.00%	7,764,619	100.00%	7,764,626	100.00%
Stay in origin	6,784,610	87.38%	6,787,896	87.42%	6,787,896	87.42%	6,787,893	87.42%	6,787,896	87.42%	6,787,796	87.42%	6,806,206	87.66%	6778707	87.30%	6,787,894	87.42%	6,787,890	87.42%	6,787,874	87.42%	6,787,830	87.42%
Migrate in U.S.	978,949	12.61%	976,248	12.57%	976,270	12.57%	976,046	12.57%	976,270	12.57%	971,348	12.51%	955,165	12.30%	982570	12.65%	976,130	12.57%	975,896	12.57%	975,283	12.56%	972,358	12.52%
Migrate to Canada	1,073	0.01%	481	0.01%	450	0.01%	688	0.01%	450	0.01%	5,477	0.07%	3,259	0.04%	3353	0.04%	601	0.01%	839	0.01%	1,463	0.02%	4,438	0.06%
Decile 10	4,228,771	100.00%	4,228,769	100.00%	4,228,770	100.00%	4,228,769	100.00%	4,228,770	100.00%	4,228,768	100.00%	4,228,771	100.00%	4228764	100.00%	4,228,769	100.00%	4,228,770	100.00%	4,228,770	100.00%	4,228,768	100.00%
Stay in origin	3,822,500	90.39%	3,819,155	90.31%	3,819,155	90.31%	3,819,151	90.31%	3,819,155	90.31%	3,819,085	90.31%	3,837,756	90.75%	3828444	90.53%	3,819,154	90.31%	3,819,153	90.31%	3,819,150	90.31%	3,819,133	90.31%
Migrate in U.S.	405,531	9.59%	409,473	9.68%	409,479	9.68%	409,300	9.68%	409,479	9.68%	406,997	9.62%	389,550	9.21%	398819	9.43%	409,438	9.68%	409,369	9.68%	409,188	9.68%	408,324	9.66%
Migrate to Canada	740	0.02%	142	0.00%	135	0.00%	318	0.01%	135	0.00%	2,686	0.06%	1,465	0.03%	1501	0.04%	177	0.00%	247	0.01%	432	0.01%	1,311	0.03%

Note: See note to Table 8.

Table 10: Border Effects on Cross-Country Migration of Males By Skill Level (1995-2000)
Baseline Simulation and Alternative Border Effects Simulations: Number and Migration Rate (%)[a]

	Alternative Border Effects Simulations										
	100% of Baseline[b]		90% of Baseline		75% of Baseline		50% of Baseline		0% of Baseline		
Categories	Number	%	Number	%	Number	%	Number	%	Number	%	0-100 Ratio
Total											
Migrate: U.S.-Canada	1,835	0.00%	2,323	0.01%	3,308	0.01%	5,960	0.01%	19,302	0.05%	10.52
Migrate: Canada-U.S.	38,568	0.94%	65,184	1.59%	116,728	2.84%	187,261	4.56%	223,913	5.45%	5.81
Net Migration: Canada	-36,733	-0.89%	-62,861	-1.53%	-113,420	-2.76%	-181,301	-4.41%	-204,611	-4.98%	5.57
Decile 1											
Migrate: U.S.-Canada	219	0.01%	278	0.01%	396	0.01%	713	0.02%	2,306	0.05%	10.53
Migrate: Canada-U.S.	2,902	0.66%	5,116	1.16%	9,857	2.23%	17,305	3.92%	21,491	4.87%	7.41
Net Migration: Canada	-2,683	-0.61%	-4,838	-1.10%	-9,461	-2.14%	-16,592	-3.76%	-19,185	-4.35%	7.15
Deciles 2 & 3											
Migrate: U.S.-Canada	430	0.00%	554	0.01%	775	0.01%	1,396	0.02%	4,518	0.05%	10.51
Migrate: Canada-U.S.	7,061	0.90%	12,212	1.55%	22,716	2.88%	38,056	4.83%	46,265	5.87%	6.55
	-6,631	-0.84%	-11,658	-1.48%	-21,941	-2.79%	-36,660	-4.65%	-41,747	-5.30%	6.30
Deciles 4 - 7											
Migrate: U.S.-Canada	655	0.00%	828	0.00%	1,180	0.01%	2,126	0.01%	6,885	0.04%	10.51
Migrate: Canada-U.S.	15,085	0.89%	25,565	1.51%	45,900	2.72%	73,634	4.36%	87,933	5.21%	5.83
Net Migration: Canada	-14,430	-0.85%	-24,737	-1.46%	-44,720	-2.65%	-71,508	-4.23%	-81,048	-4.80%	5.62
Deciles 8 & 9											
Migrate: U.S.-Canada	369	0.00%	468	0.01%	666	0.01%	1,200	0.01%	3,887	0.05%	10.53
Migrate: Canada-U.S.	10,273	1.06%	17,057	1.75%	29,600	3.04%	45,642	4.69%	53,685	5.52%	5.23
Net Migration: Canada	-9,904	-1.02%	-16,589	-1.70%	-28,934	-2.97%	-44,442	-4.57%	-49,798	-5.12%	5.03
Decile 10											
Migrate: U.S.-Canada	162	0.00%	205	0.00%	292	0.01%	526	0.01%	1,706	0.04%	10.53
Migrate: Canada-U.S.	3,247	1.49%	5,234	2.40%	8,654	3.97%	12,624	5.79%	14,539	6.67%	4.48
Net Migration: Canada	-3,085	-1.42%	-5,029	-2.31%	-8,362	-3.84%	-12,098	-5.55%	-12,833	-5.89%	4.16

[a] The U.S.-Canada migration rate is based on the relevant U.S. population decile(s) total. The Canada-U.S. migration rate and the net migration rate are based on the relevant Canadian population decile(s) total.
[a] This is equivalent to the full border effects observed in the data and reported in Tables 7 and 8.

Table 11: Border Effects on Cross-Country Migration of Females By Skill Level (1995-2000)
Baseline Simulation and Alternative Border Effects Simulations: Number and Migration Rate (%)[a]

	Alternative Border Effects Simulations										
	100% of Baseline[b]		90% of Baseline		75% of Baseline		50% of Baseline		0% of Baseline		
Categories	Number	%	Number	%	Number	%	Number	%	Number	%	0-100 Ratio
Total											
Migrate: U.S.-Canada	2,397	0.01%	2,995	0.01%	4,181	0.01%	7,286	0.02%	22,050	0.05%	9.20
Migrate: Canada-U.S.	25,338	0.67%	43,471	1.15%	81,066	2.15%	140,052	3.71%	177,188	4.70%	6.99
Net Migration: Canada	-22,941	-0.61%	-40,476	-1.07%	-76,885	-2.04%	-132,766	-3.52%	-155,138	-4.11%	6.76
Decile 1											
Migrate: U.S.-Canada	381	0.01%	475	0.01%	663	0.02%	1,154	0.03%	3,473	0.09%	9.12
Migrate: Canada-U.S.	1,347	0.25%	2,493	0.47%	5,367	1.00%	11,382	2.12%	16,079	3.00%	11.94
Net Migration: Canada	-966	-0.18%	-2,018	-0.38%	-4,704	-0.88%	-10,228	-1.91%	-12,606	-2.35%	13.05
Deciles 2 & 3											
Migrate: U.S.-Canada	554	0.01%	692	0.01%	966	0.01%	1,683	0.02%	5,092	0.06%	9.19
Migrate: Canada-U.S.	2,145	0.41%	3,867	0.74%	7,842	1.50%	14,966	2.86%	19,772	3.78%	9.22
Net Migration: Canada	-1,591	-0.30%	-3,175	-0.61%	-6,876	-1.31%	-13,283	-2.54%	-14,680	-2.80%	9.23
Deciles 4 - 7											
Migrate: U.S.-Canada	840	0.01%	1,050	0.01%	1,466	0.01%	2,555	0.02%	7,737	0.05%	9.21
Migrate: Canada-U.S.	9,487	0.62%	16,663	1.10%	32,178	2.12%	57,456	3.78%	73,327	4.82%	7.73
Net Migration: Canada	-8,647	-0.57%	-15,613	-1.03%	-30,712	-2.02%	-54,901	-3.61%	-65,590	-4.31%	7.59
Deciles 8 & 9											
Migrate: U.S.-Canada	481	0.01%	601	0.01%	839	0.01%	1,463	0.02%	4,438	0.06%	9.23
Migrate: Canada-U.S.	9,632	0.99%	16,184	1.67%	28,884	2.98%	46,586	4.81%	56,763	5.86%	5.89
Net Migration: Canada	-9,151	-0.94%	-15,583	-1.61%	-28,045	-2.89%	-45,123	-4.66%	-52,325	-5.40%	5.72
Decile 10											
Migrate: U.S.-Canada	142	0.00%	177	0.00%	247	0.01%	432	0.01%	1,311	0.03%	9.23
Migrate: Canada-U.S.	2,726	1.23%	4,264	1.92%	6,795	3.07%	9,662	4.36%	11,247	5.08%	4.13
Net Migration: Canada	-2,584	-1.17%	-4,087	-1.84%	-6,548	-2.96%	-9,230	-4.17%	-9,936	-4.48%	3.85

[a] The U.S.-Canada migration rate is based on the relevant U.S. population decile(s) total. The Canada-U.S. migration rate and the net migration rate are based on the relevant Canadian population decile(s) total.
[a] This is equivalent to the full border effects observed in the data and reported in Tables 7 and 8.