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Item 14 – Multiregional Projections

An alternative projection model for interprovincial migration in Canada

Patrice Dion, Statistics Canada

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Patrice Dion *
Statistics Canada

* The views and opinions expressed here are those of the author.

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INTRODUCTION

Plausible interprovincial migration projections[1] are crucial to the credibility of population projections in Canada. And for good reason: interprovincial migration is the most significant component of population growth in certain provinces and territories (Dion and Coulombe 2008). However, since this component varies greatly over time, it is often considered the hardest component to project (Smith 1986). To reflect the inherent uncertainty in interprovincial migration, Statistics Canada creates numerous scenarios in which the migration assumptions vary. These assumptions are created by varying the reference period, each one reflecting different migration patterns. However, even if the possible variations in internal migration are considered, this component is often the source of the largest gaps when a posteriori comparisons are made with observed data.[2]

The large divergences associated with the internal migration component may be the result not only of imperfect future migration assumptions, but also partly of the limits of the methodology used, the multiregional model, to project the population of the provinces and territories. Based on the calculation of inter-regional out-migration rates by age and sex, this method complicates the development of varied, plausible internal migration assumptions (Werschler and Nault 1996). Often the results of the projection are inconsistent with the intent of the analysts who created the assumptions, and the results exhibit latent effects, that is, effects of which the analysts may have been unaware (Pittenger 1978). While these issues have been known for some time, the problem is amplified by the fact that Canada is composed of regions whose size and growth vary widely (Werschler and Nault 1996).

In this document, we give a brief description of the method that Statistics Canada currently uses to project interprovincial migration, and we point out the limitations inherent in this method. We then recommend a specific model, and present two projection simulations to show how it contributes to alleviate the limitations of the multiregional model while maintaining its benefits.[3]

THE MULTIREGIONAL MODEL

Statistics Canada began projecting internal migration using rates of out-migration from the region of origin to each region of destination in its 1984 edition of the *Population Projections for Canada, Provinces and Territories*. The rates, age- and sex-disaggregated, were applied directly to the persons who were "at risk to migrate," which is consistent with the way other population growth components are normally projected. This model is often called the "multiregional model," because it can project multiple regions simultaneously. Developed in the 1970s, the model is being used increasingly (Wilson and Rees 2005).

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[1] By convention, and for brevity, "interprovincial migration" refers to migration between provinces and/or territories. For simplicity, "internal migration" will usually be used in this document.

[2] For example, Dion (2012) conducted an a posteriori assessment of the concordance between the 2005-2031 edition of projections published by Statistics Canada and observed data, and noted that even if the migration pattern most similar to reality is selected for each province and territory, interprovincial migration is, among all components, the one showing the highest divergences in eight of the 13 provinces and territories.

[3] It should be noted that these limitations of the multiregional model relate to projections made using the cohort-component model, which is used by Statistics Canada to produce the *Population projections for Canada, Provinces and Territories*, generally released every five years following the Census cycle. Hence, other models of projection, such as microsimulation models (also used by Statistics Canada for distinct projections of the characteristics of the Canadian population) are purposely ignored in this paper.

ADVANTAGES OF THE MULTIREGIONAL MODEL

The multiregional model is used to project a large number of regions simultaneously and coherently, rather than projecting each one separately (Plane and Rogerson 1994), which makes it possible to avoid a large number of conceptual pitfalls. Unlike the use of net migration rates or flows, the use of multiregional rates enables migration flows to change dynamically depending on population size, geographical distribution, and age-sex composition (Wilson and Bell 2004), and follows the "person at risk" principle (Isserman 1992). The multiregional model also respects accounting principle, that is the number of in-migrants always equals the number of out-migrants, a conceptual argument that is not guaranteed with the use of net migration rates (for example, see Rogers 1990).

LIMITATIONS OF THE MULTIREGIONAL MODEL

The multiregional model's popularity has more to do with the fact that it allows to incorporate all the population growth components into transition matrices (Le Bras 2008), which makes for a perfect fit with the largely used cohort-component method of projection. However, the multiregional model has significant limitations. The greatest limitation of the multiregional model is that migration flows are determined only by out-migration rates and the size of the region of origin, while in reality migration flows tend to vary in proportion to the regions of origin and regions of destination (Courgeau 1991, Le Bras 2008; Plane 1982, 1993; Plane and Rogerson 1994; Poulain 1982). To illustrate, consider a simple system of only two regions. When the annual growth rate, say *r,* is the same for both regions, the out-migration also increases by *r* each year in both regions. Consequently, net migration changes, but the net migration rate does not (Table 1).

TABLE 1
Internal migration in a system composed of two regions with the same growth rate (10%).

Year	Population A	Population B	Out-migration of A	Out-migration of B	Net migration of A	Net migration of B	Net migration rate of A	Net migration rate of B
1	1,000	2,000	100	200	+100	-100	+10.0%	-5.0%
2	1,100	2,200	110	220	+110	-110	+10.0%	-5.0%
3	1,210	2,420	121	242	+121	-121	+10.0%	-5.0%

Note: Both regions have the same out-migration rate, namely 10%.

By contrast, when the two regions have different growth rates the net migration rate changes over the projection period. Since out-migration increases by *r,* the region with more growth will have a decreasing net migration rate and, conversely, the region with less growth will have an increasing net migration rate. This is illustrated in Table 2, in which out-migration increases by 10% annually in region A, but only 7% annually in region B.

TABLE 2
Internal migration in a system composed of two regions with different growth rates (7% for region A and 10% for region B).

Year	Population A	Population B	Out-migration of A	Out-migration of B	Net migration of A	Net migration of B	Net migration rate of A	Net migration rate of B
1	1,000	2,000	100	200	+100	-100	+10.0%	-5.0%
2	1,070	2,200	107	220	+113	-113	+10.6%	-5.1%
3	1,145	2,420	115	242	+127	-127	+11.1%	-5.2%

Note: Both regions have the same out-migration rate, namely 10%.

Since the multiregional model disregards population size changes in the regions of destination, the changes in the net migration rates in Table 2 are the result of a purely mechanical process, namely the increase or decrease in the number of out-migrants according to growth in the regions of origin. However, unlike other demographic events such as births and deaths, migration involves more than one region (Feeney 1973, Plane and Rogerson 1994). In fact, inter-regional out-migration rates at a given time are empirically tied to the distribution of the population across the various regions of destination (Courgeau 1991, Plane 1993, Poulain 1982).[4]

The problem lies not in the use of out-migration rates, which properly measure an event that occurs regularly, but rather in the use of out-migration rates that are constant over time. In this context, to use constant out-migration rates is to deny the potential effect of changes in the distribution of the population in the regions of destination, thereby painting an incomplete picture of migration dynamics (Plane 1993, Plane and Rogerson 1994). Besides, movement in net migration rates according to changes in the relative sizes of the regions is not intuitive and is not well substantiated in the literature. On the contrary, studies in spatial interaction analysis suggest that the distribution of the population in the entire system must be considered (Plane 1993).

These limitations of the multiregional model has non negligible consequences for projections. One consequence is that it introduces latent effects that are very hard to anticipate, and the results are often strikingly different from what is expected.[5,6] Pittenger (1978) define the latent effects as effects which the analyst is unaware or over which he has only limited control, in contrast to manifest, known, expected and controlled to a certain extent by the analyst. Ideally, the results of the projection reflect intentions of the analyst (Pittenger 1978).

Another consequence of the “unintended” variations in the net migration rates is related to the great variability of observed internal migration patterns. The instability inherent to this demographic component leads to greater uncertainty about its contribution to population growth, and thus calls for the creation of multiple distinct scenarios that attempt to encompass several plausible outcomes. However, because projected migration flows are determined not only by out-migration rates but also substantially by changes in the relative population size of regions, scenarios showing similar regional growth patterns will also show similar net migration patterns, converging over time. This phenomenon contributes to reduce the variability between scenarios, and cause the uncertainty associated with the internal migration component to decrease over time, when it should theoretically increase.

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[4] Of course, there are numerous variables influencing migration other than region of destination, and the cohort-component is obviously an underspecified model of migration. Models able to incorporate more variables, such as microsimulation models, tend to perform better in regards to the issues raised here, although they are not immune to them if invariant migration rates are used. Simply, what is stated here is that in terms of the regions as variables, both origin and destination regions are needed to accurately represent migration dynamics. Besides, if it is not possible to incorporate the numerous variables tied to migration in the cohort-component model, the region of destination is, incidentally, one of the very few variables available in this model (usually with age, sex, and the origin region).

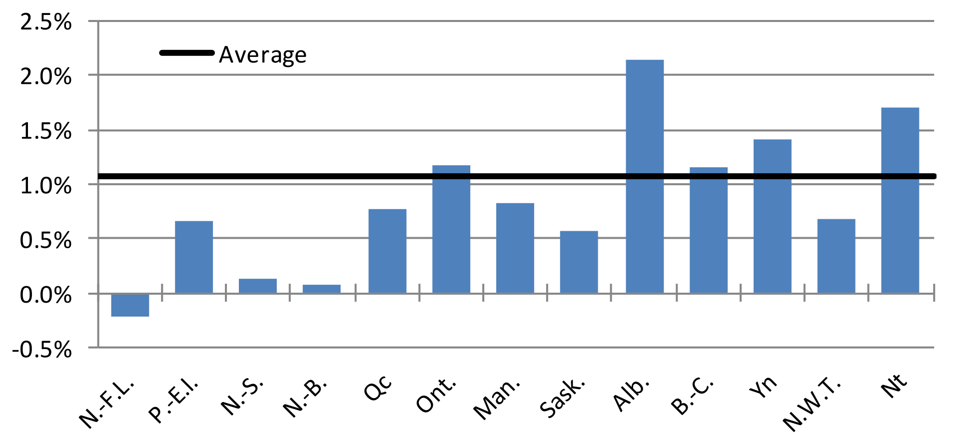
[5] This problem is especially apparent when the out-migration rates are based on a historical period, typically selected on the basis of an analysis of net migration and net migration rates. In this case, assumptions are expected to reproduce what was observed in the historical period.

[6] As evidence, the reader may refer to the two latest editions of *Population Projections for Canada, Provinces and Territories* (Statistics Canada 2005 and 2010). However, examples from the 2009-2036 edition of projections are provided later in this document that clearly illustrate this situation.

THE CANADIAN CONTEXT

The limitations of the multiregional model are especially apparent in the context of projections for the Canadian provinces and territories. The large differences observed in terms of population growth and size between the provinces and territories intensifies the variations in net migration rates (Werschler and Nault 1996). For example, in the last decade, the growth rates of eastern regions have been well under the national average (Figure 1). Furthermore, net international immigration has had a significant effect on observed disparities in growth, because it now accounts for close to two thirds of Canada's population growth and because a large majority immigrants choose to go to a small number of provinces and territories[7] (Werschler and Nault 1996). The corollary of this, in the multiregional model, is that over the projection period, a large number of immigrants would leave proportionally faster-growing provinces, which are generally the provinces that attract the largest number of international immigrants, for provinces that are generally less popular. Yet this is rarely observed (for example, see Dion 2011).

FIGURE 1
Observed average net growth rate in provinces and territories over the period 2001/2002 to 2010/2011



Ledent (1983) analyzed changes in interprovincial migration between 1961 and 1983 using a log-linear model applied to annual migration data. Note that the log-linear model makes it possible to show the contribution of various factors and interactions between factors, namely the province of origin, province of destination and time, to annual variations in interprovincial migration flows. He notes that the spatial variables (province of origin and province of destination) are somewhat more dominant than the time variable. When the interactions between the province of origin and province of destination are taken into account, the predictive power of the model increases significantly, which leads Ledent to state that any assumption of independence between the region of origin and region of destination (note that this is an underlying assumption of the multiregional model) should not be used.[8] Other findings by Ledent also cast doubt on the value of using time invariant out-migration rates in a Canadian context. Ledent notes greater variability in the force of attraction than in the force of

[7] For example, in 2011, close to three out of four (74.8%) newcomers to Canada went to Ontario, Quebec or British Columbia (Chagnon, 2013).

[8] Plane (1987) reaches a similar conclusion in a study of the geographical components of temporal changes in migration flows between states in the United States during the 1980s.

repulsion over time,[9] and he also notes that the two effects tend to move in the same direction.[10] As well, there has been a downward trend in the propensity for interprovincial migration.[11]

An alternative model

Several models have been proposed in the literature with the potential purposely or not, to mitigate the limitations of the multiregional model.[12] Most of these models are adaptation of the *gravity* model. In this section, we propose an alternative model, a simple, intuitive approach that is compatible with the multiregional model. The *Net migration rates preservation* model (NMRP), as we call it, is similar to gravity models, in that it considers the population sizes of both origin and destination regions. However, our approach differs in that it aims to tackle the very mechanism that causes the net migration rates to evolve during the projection.

Overview of the model

The NMRP model uses the multiregional model framework, with the difference that the out-migration rates are adjusted according to the relative population sizes of the destination regions. The adjustment aims specifically to project net migration rates that are much more stable and consistent with those observed during the reference period chosen for the projection assumption.

This objective raises a common objection: that net migration is but a “mathematical abstraction” (Rogers 1990).[13] For example, individuals cannot be at risk of being “net” migrants in the same way as they can be at risk of dying. However, our model suggests a slight change of perspective, a shift in viewpoint from the individual to the context in which the individual exists. Indeed, if one accepts the assumption that the internal migration of a region depends not only on the conditions and size of the population of that region, but also on the conditions in the regions of destination, the net migration rate has the advantage of summarizing in a way a global context that has led interregional migrations to a certain state. Projecting on the basis of the net migration rates then implies that it is this context that remains constant in the future, and not the probability that an individual will migrate outside its province, regardless of what is happening in the province of destination.

Besides, assumptions based on net migration rates are very intuitive because the net migration rates indicate, just as the crude death rate and gross fertility rate do, the direct impact on population growth. For these reasons, assumptions dealing with net migration rates are “more easily digested” by audiences less familiar with the mechanics of population projections (Wilson and Bell 2004). Being more concrete and intuitive, they are more easily communicated, so that more people can be included

[9] This has been noted also by Plane and Rogerson (1994) and Simmons (1980).

[10] This is consistent with the observation that there is a strong correlation between the in-migration and out-migration rates of a given region (Plane and Rogerson 1994; Simmons 1980; Cordey-Hayes and Gleave 1973).

[11] This trend appears to have continued until recently in Canada (Dion and Coulombe 2008; Coulombe 2006). It is also seen in the United States in regards to inter-state migration (see for instance Schulhofer-Wohl and Kaplan 2013).

[12] See for instance: Courgeau (1991), Feeney (1973), Plane (1982, 1993), Werschler and Nault (1996) or Wilson and Bell (2004).

[13] Net migration is even described as an artifact in a summary of the Seminar on New Conceptual Approaches to Migration in the Context of Urbanization: “(The imaginary “net migrant” is the classic illustration of how an artifact of measurement can take on concept weight.)” (IUSSP 1979).

in the process of their development. Finally, the NMRP model meets other requirements, such as following the basic accounting principles and being consistent in regards to the age structure of migrants.

Specifications

We begin by illustrating the NMRP model in a system with only two regions, and then generalize the method to a more complex system. Say we are projecting populations in a two-region system in which one region is growing much faster than the other. The relative sizes of each region in the system will therefore change over the projection period. Using fixed probabilities of transition to project internal migration, we obtain net migration rates that will likely vary greatly over time. It is neither possible, nor desirable to obtain time invariant net migration rates, since that would imply that the sum of the net migration flows may not be zero, which is theoretically incorrect. Net migration rates must therefore be allowed to change over the projection period. The question is therefore whether or not the out-migration rates can be modified to minimize net migration rate variations in a non-arbitrary, consistent and clear manner.

One could imagine a simple adjustment on the basis of changes in the relative sizes of the populations in the regions, which is the very source of variations in net migration rates over time in the multiregional model:

$$m_{ij}^{t,t+1} = m_{ij}^{t-1,t} \frac{P_j^t/(P_i^t + P_j^t)}{P_j^{t-1}/(P_i^{t-1} + P_j^{t-1})}$$

where the rate of migration from region *i* to region *j* is multiplied by the ratio of the relative size of the region of destination within the system at time *t* over the same relative size at time *t – 1*. Table 3 shows the result of this adjustment applied to the example of table 2. We see that compared to the unadjusted multiregional model, the variation in the net migration rates is contained. Specifically, because region B grows proportionally more than region A (relative size of B increases), the adjustment contributes to reduce out-migration from region B and increase out-migration from region A.

TABLE 3
Internal migration in a system composed of two regions with different growth rates (7% for region A and 10% for region B) projected using out-migration rates weighted according to the population size of the region of destination

Year	Population A	Population B	Out-migration of A	Out-migration of B	Net migration of A	Net migration of B	Net migration rate of A	Net migration rate of B
1	1,000	2,000	100	200	+100	-100	+10.0%	-5.0%
2	1,070	2,200	108	216	+108	-108	+10.1%	-4.9%
3	1,145	2,420	117	233	+117	-117	+10.2%	-4.8%

Note: Initially, both regions have the same out-migration rate, namely 10%.

In this specification, migration exchanges between two regions can be optimized to minimize the difference between the in net migration rates for exchanges between these two regions only. The result is that the total adjustment to the out-migration of a region combines the adjustments made separately for each region of destination, and these adjustments have the same weight for each region of destination (i.e. do not depend of the size of the region of destination). Accordingly, in a system composed of three regions, A, B and C, changes to the relative size of C do not affect the exchanges between A and B. That implies that potential migrants react to opportunities in only one region, independently of what happens elsewhere, which may seem contrary to certain migration theories and observations.[14] We suggest a more intuitive specification, where the regions “compete” with each other. In such a model, the origin-destination specific out-migration rate at a given time in the projection is calculated on the basis of the “nominal” out-migration rate (the parameter) and the population sizes of all regions observed during the reference period, as well as at time t:

$$m_{ij}^{t,t+1} = m_{ij}^{ref} \frac{P_j^t / \sum_k P_k^t}{P_j^{ref} / \sum_k P_k^{\mathrm{ref}}}$$

Alternatively, the adjustment could be calculated as follows, on the basis of rates and populations in the preceding year, which would provide the same results:

$$m_{ij}^{t,t+1} = m_{ij}^{t-1,\mathrm{t}} \frac{P_j^t / \sum_k P_k^t}{P_j^{t-1} / \sum_k P_k^{t-1}}$$

This form implies that a migrant considers all the possible destinations, and that each destination is compared to all the other regions of destination and not only the region of origin. This representation is probably closer to the decision process that results in a person migrating from one region to another. However the ability of a migrant to evaluate all potential regions of destination equally may seem questionable, especially when there is a large number of them (Fotheringham et al. 2000). In the end, these considerations must be placed in context: the NMRP model favours a regional perspective over the individual’s decision-making process; more for practical reasons than for correspondence to any theoretical viewpoint. The model, while very simple and transparent, makes it possible to obtain net migration flows whose sum is zero and net migration rates that are closer to nominal rates.

Finally, the long-term behaviour of the multiregional model is well known: eventually the population reaches a stable state in which it maintains a constant age, sex and regional distribution (Le Bras 2008). This result is intrinsic to the projected (time invariant) rates and the linear nature of the model, and is completely independent of the characteristics of the initial population. Conversely, when the transition probabilities become nonlinear functions of the population sizes, as in the NMRP model, non-linearity follows (Haag and Weidlich 1984, Blanchet 1998, Courgeau 1991). Aside from their practicality, there is no apriori reason to think that linear models are superior to nonlinear models, but the long-term behaviour of the latter is difficult to assess, especially since it depends on the initial conditions. However, in the case of the NMRP model, we argue that because it aims to control for the growth of the population induced by internal migration (best measured by the net migration rate), the outcome during the projection is very predictable, even more so than with the multiregional model. Additionally, under the assumption that population sizes (and the characteristics of the regions for which it may be seen as a proxy) matter, it only makes sense that the initial conditions of the system have an impact on the eventual state reached.

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[14] For example, Stouffer (1940) stated that the number of migrants between a place of origin and a place of destination is directly proportional to the presence of opportunities that exist at the distance that separates the two places, which he termed “intervening opportunities”.

SIMULATIONS

We now apply the NMRP model to two distinct scenarios of the latest edition of *Population Projections for Canada, Provinces and Territories* (the 2009—2036 edition), namely the scenarios M1 and M2 (see Statistics Canada 2010). These two scenarios are medium-growth scenarios distinct only by their internal migration assumptions, M1 reflecting the migrations observed over the period 1981-1982 to 2007-2008, and M2 being based on more recent trends, that is the years 2006-2007 and 2007-2008. The goal is to compare the results with adjusted rates to the original projections as published in 2010.

The results are presented in Figures A1 to A13 in the Appendix, which show the historical net migration rates and the projected net migration rates up to 2036 from the M1 and M2 scenarios, from the original projection and with our proposed adjustment.[15] The figures speak by themselves: the projected net migration rates are much closer to the "nominal" rates with our model. As expected, they also remain, in both scenarios, more stable over time then in the original scenarios. This is not without consequences for the projected sizes of population.

In the Atlantic Provinces, where the internal migration component is sometimes the most important component of population change, the differences are striking. Figure A14 show the original projected population compared to the population projected with adjusted rates for the province of Nova-Scotia. The original projections clearly show break of trends, especially in the M1 scenario. Two other projections are also shown in Figure A14: the first one was obtained with the microsimulation model Demosim used in Statistics Canada (Statistics Canada 2011) and the second one is the projections made by the Department of Finance of the province of Nova-Scotia. These two projections are very different from Statistics Canada's original projections because microsimulation allows for the inclusion of many more variables, in the first case, and because economic assumptions are used in the latter case. These two projections tend to more closely follow the declining trends shown by the adjusted scenarios, especially the M2 scenario. Figure A15 compares original, non-adjusted and microsimulation results for the province of Alberta, which show very different trends than Nova-Scotia. In this case, the projection by microsimulation follows closely the adjusted M1 scenario, both in terms of trends and levels.

It should be noted that the parameters need be adjusted not only during the projection, but also before the projection, this in order to "correct" for differences between the average relative sizes of the regions during the reference period compared to relative sizes of the regions in the base population, that is at the beginning of the projection. These differences explain why the projected net migration rates are often very far, in the first projected year, from the average level measured over the reference period. Additionally, the farther the reference period is from the start of the projection, the more likely the differences are to be high; thus the fact that the projected net migration rates are usually closer to the average level of the reference period in the M2 scenario than in the M1 scenario. The adjustments make these differences smaller, but cannot remove them completely.

Lastly, in part because the adjustments are not age and sex specific, the impact of our model on the composition of migrants or on net migration flows is minimal. Figure 2 shows a comparison between the age structure of projected net migration in 2019 in scenario M1 of the national projections, projected with constant out-migration rates, and the same scenario projected with the adjusted model. Clearly,

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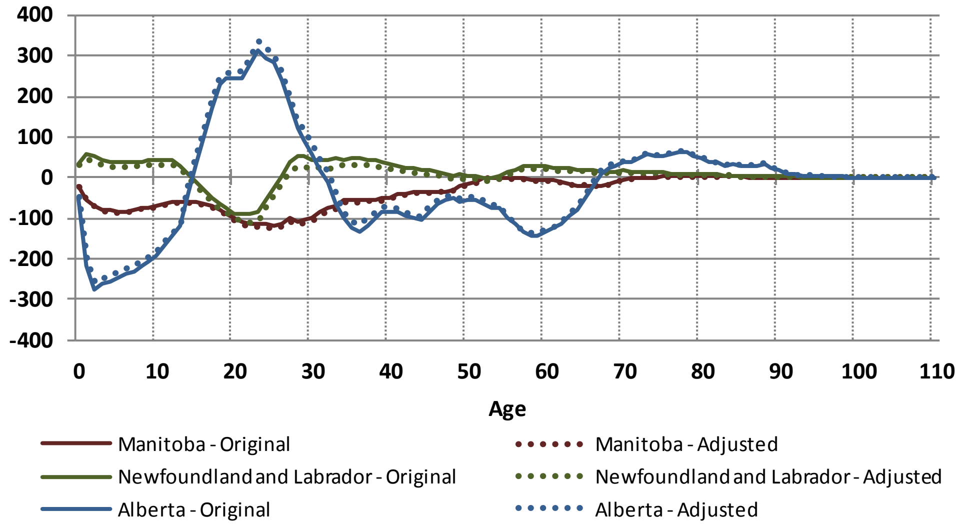
[15] Only the M2 scenario is shown in the Northwest Territories and Nunavut. This is because the creation of Nunavut in 1991 (during the M1 scenario reference period) was not taken into account, and the consequential changes in population sizes gave rise to significant distortions in the adjustment calculations.

variations in net migration by age are small and uniform, and concern mainly its volume but not so much its age patterns.

FIGURE 2
Projected net migration in 2019, M1 scenario with and without adjustment, selected provinces



CONCLUSION

The multiregional model has numerous advantages for internal migration projection. However, the use of constant out-migration rates implies the assumption that migration depends only on population changes in the region of origin, and not in the region of destination. It follows that net migration increases in regions that are shrinking and decreases in regions that are growing. This change in net migration is purely mechanical and in no way reflects recognized theoretical principles. Furthermore, it compromises the development of varied, clear migration assumptions, which are crucial given the high volatility of this component over time.

Statistics Canada, like numerous other statistics agencies, develops its internal migration projection assumptions by selecting past reference periods on the basis of the net migration rates observed during those periods. In this context, a solution that is both simple and elegant would be to correct the imperfections of the multiregional model “at the source.” It appears to us that the criterion for judging these imperfections should rightly be the net migration rate, in particular because it directly accounts for the impact migration on each region, and because it is a criterion often used in formulating assumptions. The NMRP model makes it possible to project migration flows that give rise to net migration rates that are quite close to those observed during the reference period and that are relatively stable over time, and whose changes can be explained in a fairly intuitive way. The greater control over the results thus obtained makes it possible to propose a range of projections that are more varied and therefore paint a more realistic picture of the potential impact of internal migration.

Finally, although the NMRP shares similarities with models proposed by researchers such as Feeney (1973) and Plane (1982, 1993) and hold more generally on research into spatial interaction it is rooted in a different perspective in which the goal is not to attempt to predict migration flows on the basis of incomplete information, but rather to project internal migration according to clear assumptions that deal with net migration rates. Furthermore, it fits easily with the matrix model for projections by cohort and retains its key advantages.

Acknowledgments The author is grateful to Nora Bohnert, Éric Caron Malenfant and Laurent Martel for their helpful editorial comments.

APPENDIX: FIGURES A1 TO A15

FIGURE A1
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - NEWFOUNDLAND AND LABRADOR

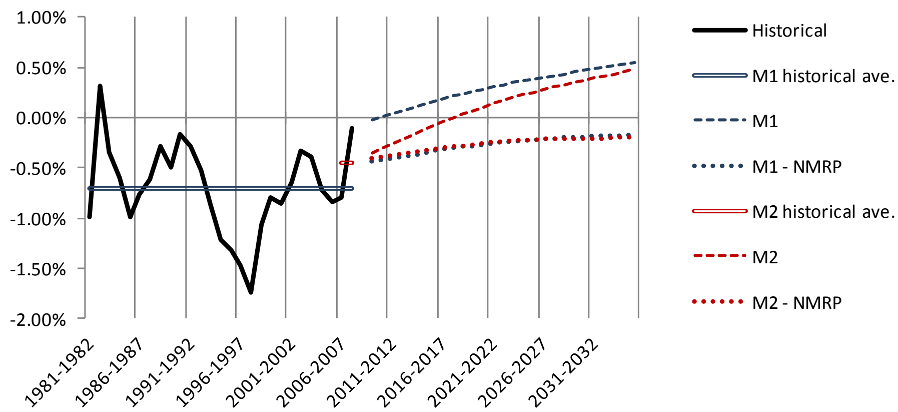


FIGURE A2
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - PRINCE-EDWARD ISLAND

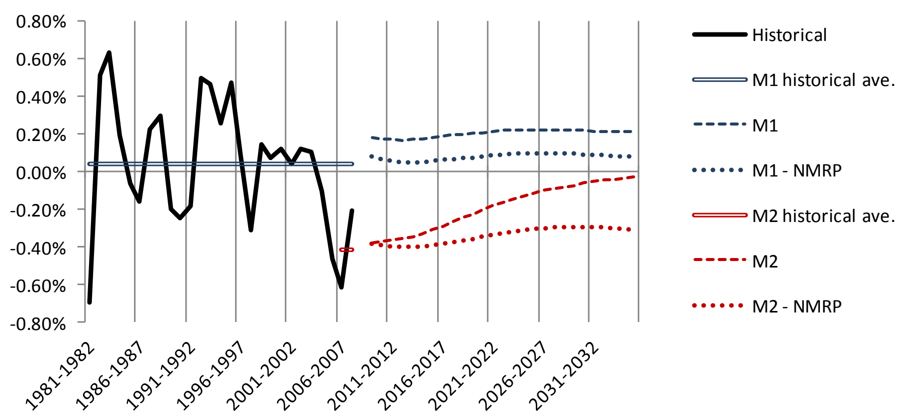


FIGURE A3
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - NOVA-SCOTIA

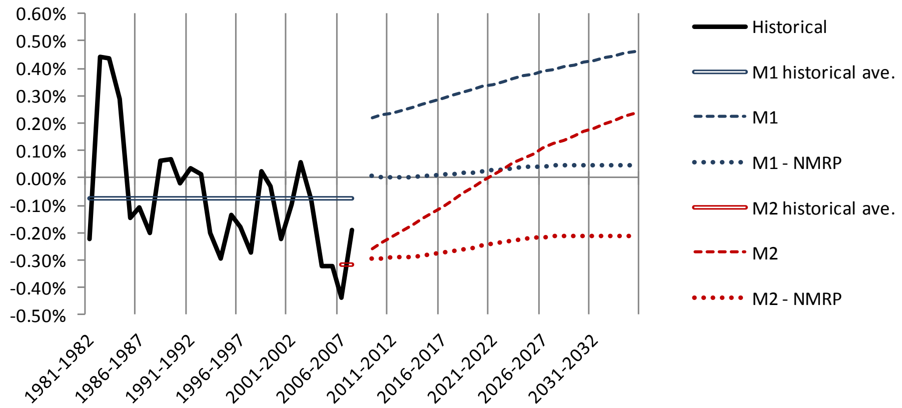


FIGURE A4
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - NEW-BRUNSWICK

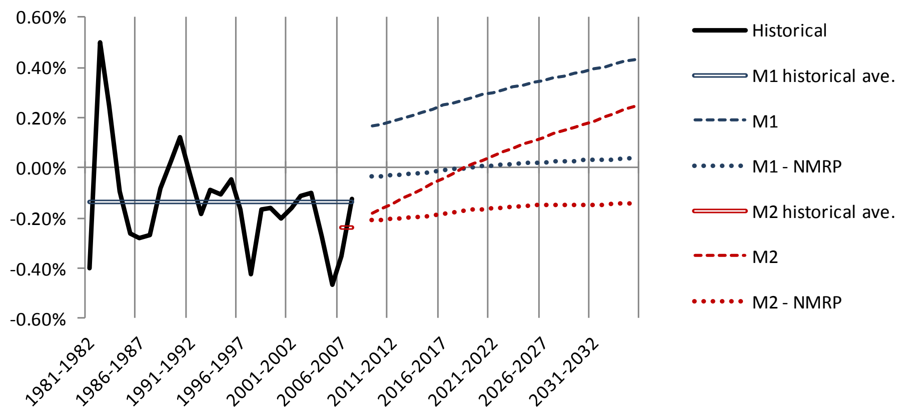


FIGURE A5
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - QUÉBEC

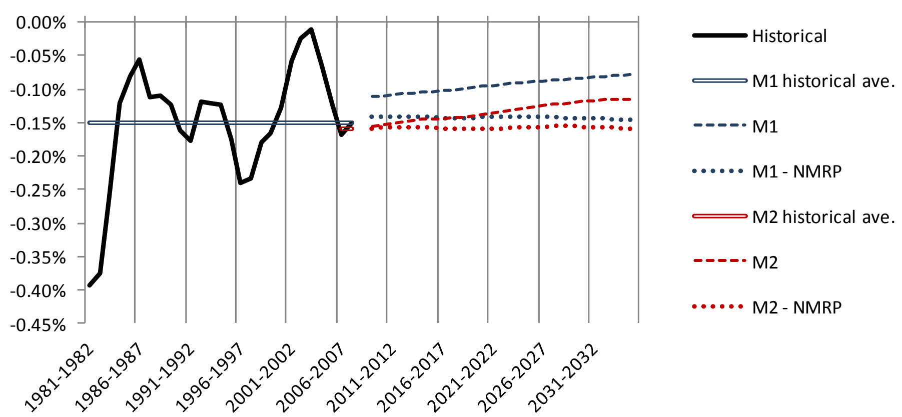


FIGURE A6
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - ONTARIO

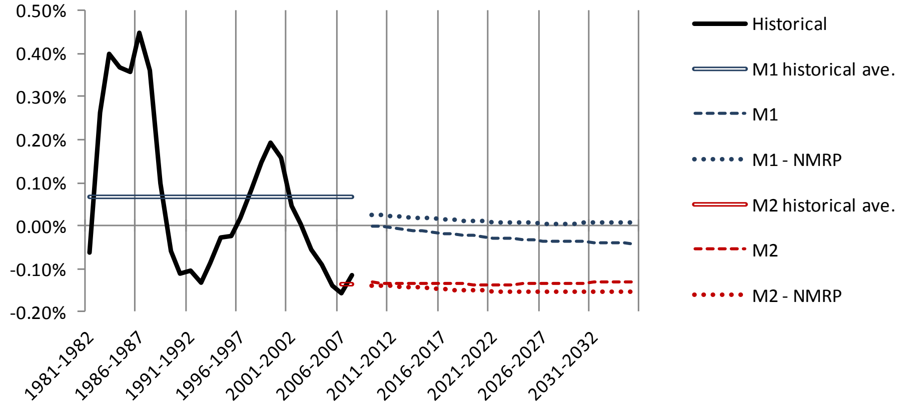


FIGURE A7
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - MANITOBA

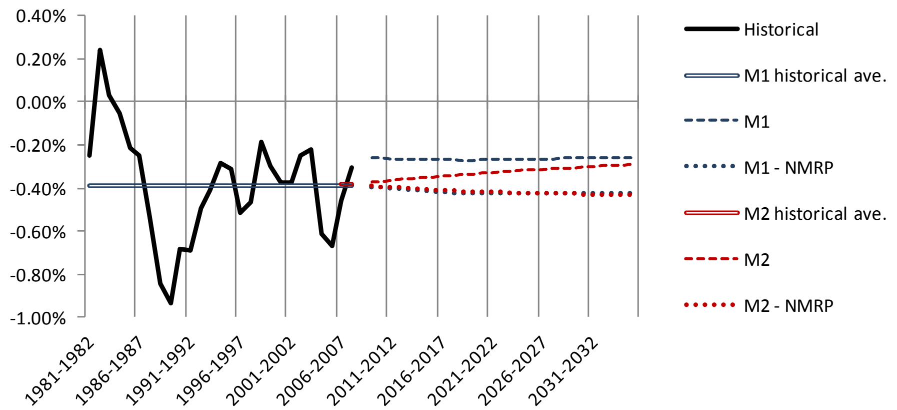


FIGURE A8
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - SASKATCHEWAN

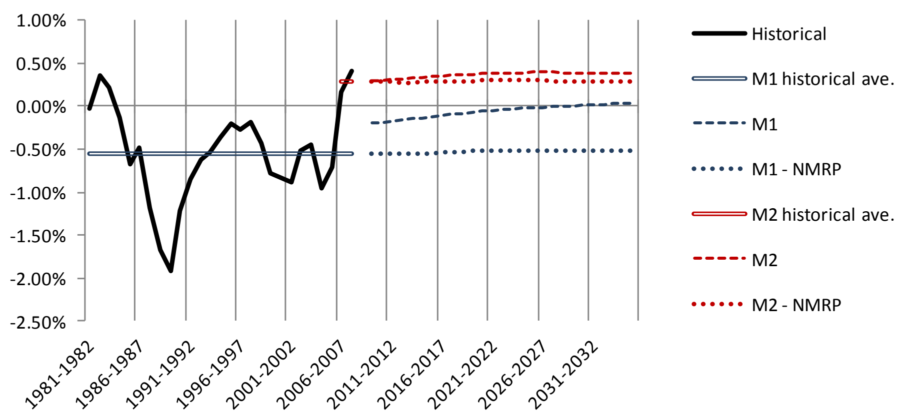


FIGURE A9
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - ALBERTA

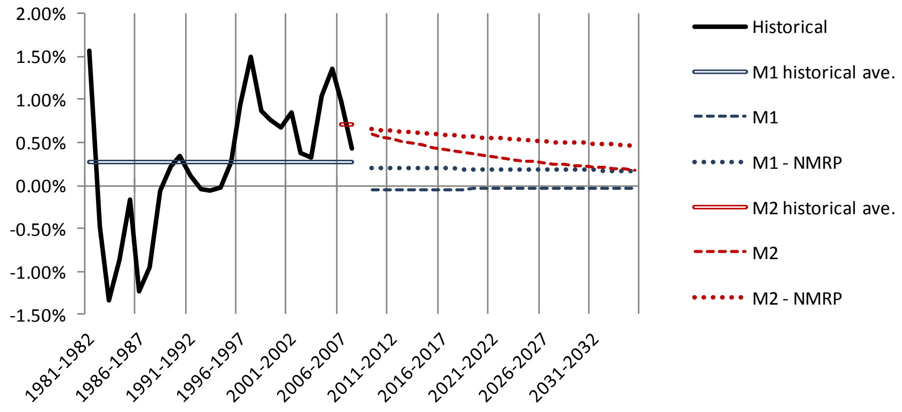


FIGURE A10
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - BRITISH-COLUMBIA

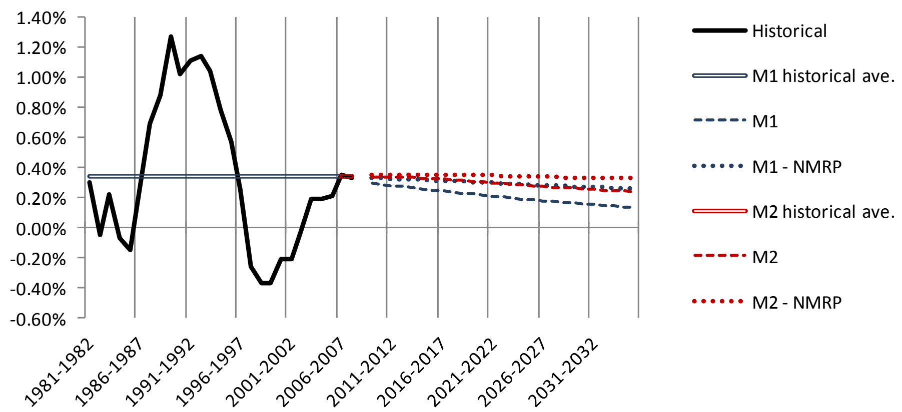


FIGURE A11
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - YUKON

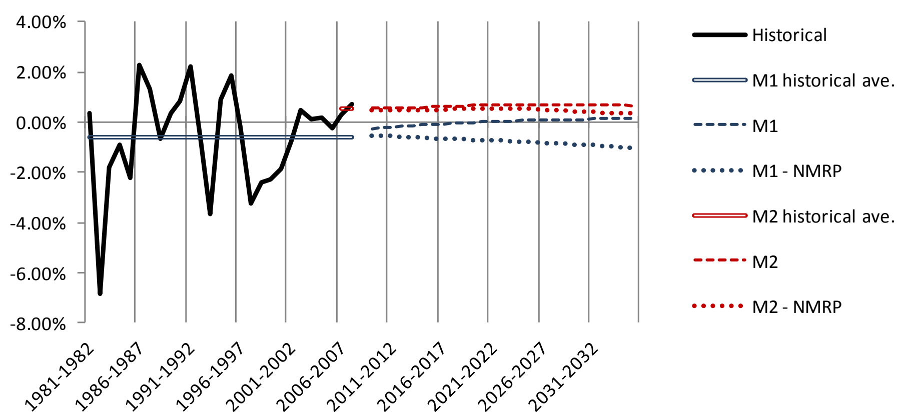


FIGURE A12
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - NOTHWEST TERRITORIES

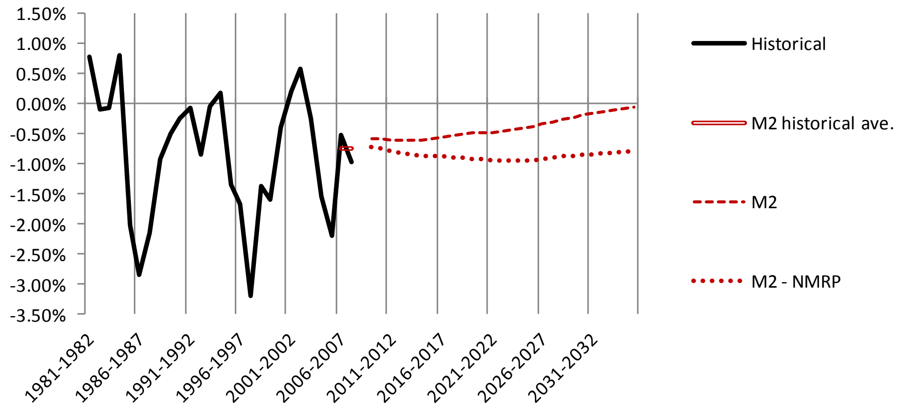


FIGURE A13
Observed (2007/2008) and projected (2009/2010 to 2009/2036) net migration rates as per various scenarios - NUNAVUT

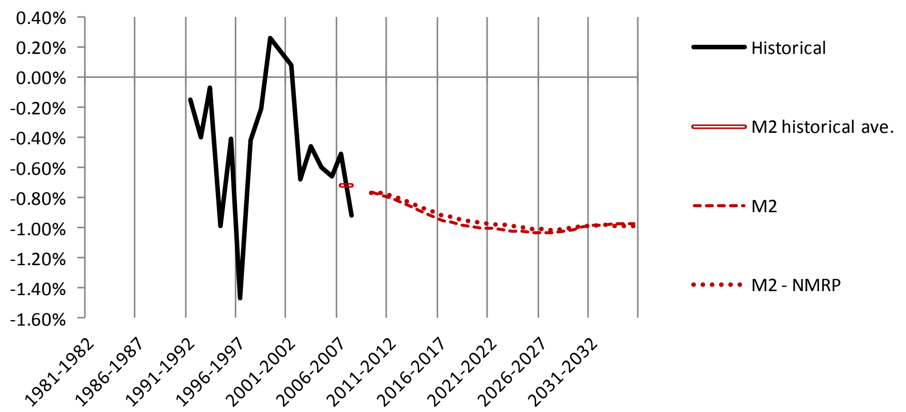


FIGURE A14
Historical (1981-2008) and projected (2010-2036) population, Nova-Scotia, Various scenarios

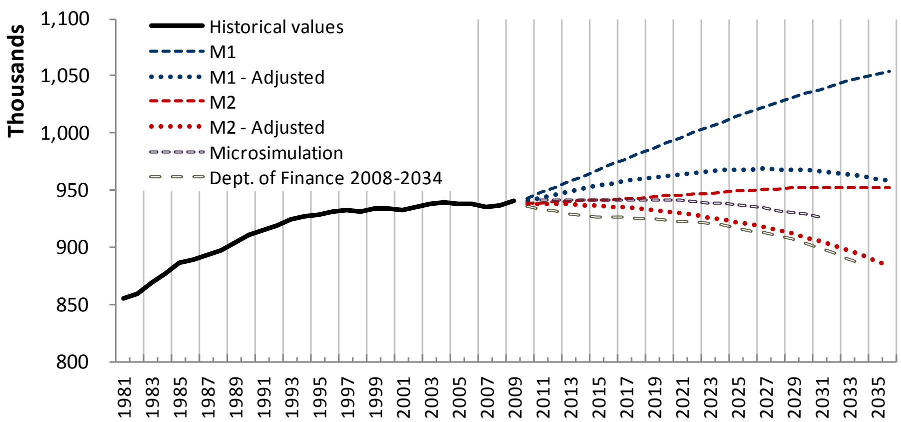
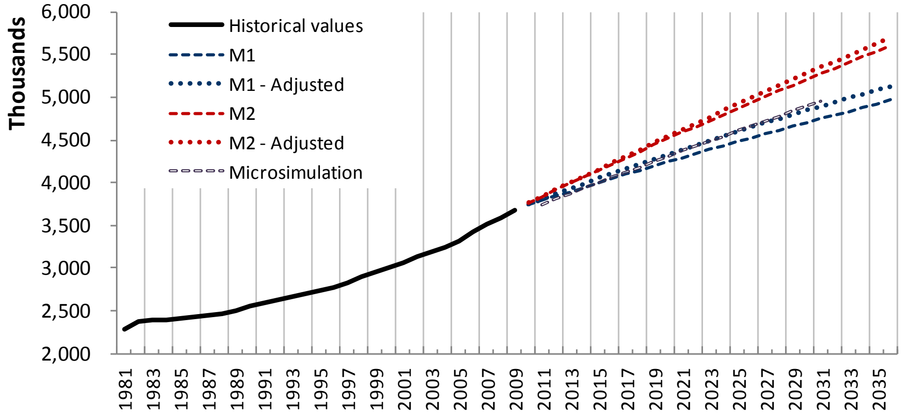


FIGURE A15

Historical (1981-2008) and projected (2010-2036) population, Alberta, Various scenarios



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