FORECASTING NORTHERN ONTARIO'S ABORIGINAL POPULATION

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Abstract / Résumé

Changes in population size and age distribution affect basic social and economic variables such as demand for health care, education, housing, consumer goods, etc. Demographics are affected by fundamental economic forces, but they also play a major role in shaping regional economic development prospects. The objective of this paper is to project and compare future demographic trends in Northern Ontario's Aboriginal and the overall population. These projections can be used to provide quantitative estimates of future supply of labour, demand for healthcare, post-secondary education and other socio-economic variables in Northern Ontario.

L'évolution de la taille de la population et de la répartition selon l'áge touche des variables sociales et économiques, telles que la demande de soins de santé, de services d'éducation, de logements et de biens de consommation. Même si la démographie subit l'influence des facteurs économiques fondamentaux, elle joue un róle majeur dans l'établissement des perspectives de développement économique régional. Le présent article a pour objectif de prévoir les tendances démographiques futures des peuples autochtones et de la population en général dans le nord de l'Ontario et de les comparer. Les prévisions peuvent être utilisées pour offrir des estimations quantitatives de l'offre future de main-d'oeuvre, de la demande de soins de santé et de services d'éducation postsecondaire, ainsi que d'autres variables socio-économiques dans le nord de l'Ontario.

I. Introduction

Knowledge of population trends is important in both public and private planning. Governments and their agencies use demographics to plan public expenditures including roads, schools, hospitals, retirement homes and the like. The private sector seeks current information on population trends to make decisions on prospects for profitable business expansion or relocation. Population projections are the basis for estimating several major social and economic variables such as supply of labour, demand for healthcare, housing and post-secondary education.

In compiling data on Northern, Northeastern and Northwestern Ontario, we have included the Kenora District in Northwestern Ontario. The northeastern part of the Kenora District is usually included in the Northeastern Ontario region. However, since most of the data published on Northern Ontario is at the district level, we included the entire Kenora District in Northwestern Ontario. Therefore, our regional classifications are as follows. Northeastern Ontario includes the districts of Nipissing, Parry Sound, Manitoulin, Sudbury, Timiskaming, Cochrane, Algoma and the Sudbury Regional Municipality. Northwestern Ontario includes the districts of Thunder Bay, Rainy River and Kenora. Finally, Northern Ontario includes Northeastern and Northwestern Ontario.

The Native population represents about 9.28% of Northern Ontario's total population. They represent 15.41% of Northwestern Ontario's population and 6.72% of Northeastern Ontario's population (Moazzami 2002). Table 1 presents the age distribution of Northern Ontario's Aboriginal and total population. We have defined Aboriginal population to include all those who have reported Aboriginal origins and/or Indian registration.

Table 1 shows that 9.63% of Northern Ontario's Native population is between the ages of 0 and 4 years. In Northern Ontario, only 6.45% of the total population is between the ages of 0 and 4 years. The age distribution is almost uniform between the age categories of 5 and 39 years. Each of these categories includes about 9% of the Native population. Only about 5.15% of the Native population is 65 years and older. On the other hand, about 12.6% of Northern Ontario's total population is 65 years and older.

Table 1 also shows that 44.72% of Northern Ontario's Aboriginal population is between the ages of 0 and 25. In Northern Ontario, 34.76% of the total population is between the ages of 0 and 25 years. About 16.87% of Northern Ontario's Native population is between the ages of

Table 1
Age Distribution of Aboriginal and Total Population
Northern Ontario 1996

Age Group	Native Population	Percentage Distribution	Total Population in Northern Ontario	Percentage Distribution
0-4	7,389	9.63	53,255	6.45
5-9	7,194	9.38	58,155	7.04
10-14	6,783	8.84	60,740	7.35
15-19	6,472	8.43	60,135	7.28
20-24	6,473	8.44	54,835	6.64
25-29	6,789	8.85	51,925	6.28
30-34	7,212	9.40	65,580	7.94
35-39	6,611	8.62	70,445	8.53
40-44	5,332	6.95	63,940	7.74
45-49	4,299	5.60	58,805	7.12
50-54	3,353	4.37	46,090	5.58
55-59	2,536	3.30	40,450	4.90
60-64	2,025	2.64	37,760	4.57
65-69	1,471	1.92	34,750	4.21
70-74	1,141	1.49	28,820	3.49
75-79	785	1.02	19,740	2.39
80+	858	1.12	20,870	2.53
Total Northern Ontario	76,725	100	826,270	100
Northwestern Ontario	37,615		244,115	
Northeastern Ontario	39,110		582,155	

Source: estimated based on the 1996 census.

15 and 24, compared to 13.92% of the overall population. In general, Northern Ontario's Native population not only represents a significant percentage of Northern Ontario's population, but is and will continue to be younger than the overall regional population. With the bulk of Northern Ontario's Native population approaching young adulthood, demand for sustainable employment opportunities will grow.

II. Forecasting Northern Ontario's Aboriginal and Non-Aboriginal Population

The demographic projections in this study provide the basis for quantitative estimates of future demand for vital social and economic variables such as demand for healthcare, housing, supply of labour, family formation, etc. Demographic trends have far-reaching implications for the future growth of Northern Ontario's economy. This is particularly important at the present time since Northern Ontario is now in a period of dramatic economic and demographic change. There has been a continuous decline of employment opportunities in the traditional base industries. As a result, there has been a significant out-migration of population aged 15 to 29 years from Northern Ontario, which has resulted in a significant decline of the overall population aged 15 years and younger.

In this part of the paper we discuss a model suited to the development of age, sex, and location-specific population projections for Northern Ontario given specific assumptions on births, deaths and migration. Our population projection model is based on the regional cohort component approach. The population projection model has two major sets of components: demographic and economic. Northern Ontario population projection model includes an economic sub-model for calculating levels of regional in-migration and out-migration. The demographic components of Northern Ontario's population projection model are based on a "component method" involving separate projections of the basic components of population change. These components include:
- Northern Ontario's resident population
- Fertility
- Mortality
- Immigration
- Emigration

From these statistics, we derive estimates of the fundamental population relationships.

Northern Ontario's Resident Population

The resident population in the projection model refers to the base-year population, specifying that of the 1996 census year. The resident population is tabulated by age- and sex for age groups under 90 with a single category for age 90 and above.

Births

We have used fertility rates in Northern Ontario estimated based on the 1996 census. These rates are assumed to remain constant over the

projection period.

Deaths

National and provincial estimates for death and survival rates are provided by Statistics Canada. We assume that survival rates in Northern Ontario are similar to those elsewhere in Ontario. We also assume that these rates remain unchanged over the projection period.

Migration

As an open economy, Northern Ontario is characterized by inflow and outflow of population, goods and services and money. Therefore, the migrant population becomes the central focus of the economic components of Northern Ontario's Aboriginal population projection model. Economic and social factors interact to influence migration levels. If there was no cost to relocating, focusing on the differential returns of various jobs would be sufficient to determine the direction of factor mobility. But there are costs to mobility and especially to inter-regional mobility, since this involves geographical dislocation. Therefore, people will tend to move where their expected net return (expected benefits minus costs) is greatest. There are various models that try to explain inter-regional migration. One such model that has been used in the literature is based on the original work by Courchene (1970) in his analyses of inter-provincial migration and economic adjustment. In this model, the rate of migration from region (1) to region (2) is dependent on the following factors:

- Unemployment rate in region 1 and 2
- Earned income per employee in region 1 and 2
- The level of education of the labour force
- Distance from region 1 to region 2

Age-specific in-migration and out-migration and net migration statistics for Northern Ontario are developed based on the 1991 and 1996 census of population.

The Northern Ontario population projection model consists of the following three equations:

The first equation calculates the number of births in each period. The number of births in period t is derived by:

1. Adjusting the number of females in each of the child-bearing ages for changes due to death and migration.
2. Multiplying the resulting female population by individual ages by the fertility rates for each age.

The second equation estimates the migration rate for age based on past migration levels and prevailing economic conditions.

The third equation estimates total population. First, adjustments are

made in the base-year population data by individual ages and sex to account for changes due to death and migration in the previous period. Then, the total population is obtained by summing births from the first equation and the adjusted population from the third equation.

Population Projection for Northern Ontario

Based on the assumption that the level of net migration remains at its 1991-96 level over the projection period. Table 2 presents estimate of the overall population in Northern Ontario during 1996-2010. The results show that:
1. Northern Ontario's population total will decline from 826,270 in 1996 to 755,969 in 2010. This represents a decline of 8.51% during 1996-2010. In other words, Northern Ontario's population will decline at an average annual rate of 0.6%.
2. Northern Ontario's population is aging very rapidly. In 1996, 28.11% of Northern Ontario's population was under the age of 19 years. In 2010, this percentage will decline to 18.76%. Similarly, in 1996, 29.38% were between the ages of 20 and 39 years. In 2010, the percentage of population between the age of 20 and 39 years will be 20.10%.
3. The aging structure of Northern Ontario's population is due to the fact that under current conditions, population between the ages of 18 and 29 years are out-migrating from the region, resulting in a declining population.
4. The existing economic and social conditions in Northern Ontario will result in a reduction of population between the ages of 18 and 24 from 78,165 in 1996 to 75,838 in 2010. This represents a decline of 2.97% during 1996-2010.

Projection of Northern Ontario's Aboriginal Population

To project the Aboriginal population in Northern Ontario, we assume that fertility and death rates will remain at provincial levels. Again, age-specific in-migration and out-migration and net migration statistics for Northern Ontario's Aboriginal population are developed based on the 1991 and 1996 census of population. Based on these assumptions, Table 3 provides projections for Northern Ontario's Aboriginal population during 1996-2010.

Comparing Tables 2 and 3, we can make the following observations:
1. Northern Ontario's Aboriginal population is projected to increase from 76,725 in 1996 to 95,031 in 2010. In other words, Northern Ontario's Aboriginal population will increase by 23.86% during 1996-2010. This

Table 2
Population Projection for Northern Ontario

Age Category	1996	2000	2005	2010
0-4	53,255	45,217	41,217	39,746
5-9	58,155	55,552	45,611	41,571
10-14	60,740	59,003	55,917	45,912
15-19	60,135	60,268	58,343	55,272
20-24	54,835	54,243	54,700	52,962
25-29	51,925	48,843	47,385	47,810
30-34	65,580	52,089	47,548	46,080
35-39	70,445	67,698	51,576	47,081
40-44	63,940	68,232	66,506	50,668
45-49	58,805	61,158	66,331	64,640
50-54	46,090	54,955	58,731	63,702
55-59	40,450	42,921	52,064	55,657
60-64	37,760	36,925	39,609	48,057
65-69	34,750	33,508	32,494	34,867
70-74	28,820	27,928	26,813	26,094
75-79	19,740	20,402	19,634	18,874
80+	20,870	17,269	17,229	16,975
Total	826,270	806,210	781,709	755,969

is in contrast to the negative growth rate of 8.51% for the overall population in Northern Ontario.

2. The annual rate of growth of Northern Ontario's Aboriginal population equals 1.59% compared to –0.6% for the overall population growth rate in the region.

3. The Aboriginal population is not only a significant proportion of Northern Ontario's population, but is also growing while the overall population is declining.

III. Conclusion

Northern Ontario's Native population represents not only a significant percentage of Northern Ontario's population, but is and will continue to be younger than the overall regional population. With the bulk of Northern Ontario's Native population approaching young adulthood, demand for sustainable employment opportunities will grow.

Table 3
Projected Aboriginal Population for Northern Ontario
1996-2010

Northern Ontario	1,996	2,000	2,005	2,010
0-4	7,389	7,467	7,038	6,411
5-9	7,194	7,327	7,440	7,016
10-14	6,783	7,137	7,310	7,426
15-19	6,471	6,756	7,093	7,274
20-24	6,473	6,652	6,821	7,167
25-29	6,789	6,833	6,831	6,949
30-34	7,212	7,134	7,045	6,947
35-39	6,611	7,458	7,313	7,142
40-44	5,332	6,602	7,582	7,353
45-49	4,299	5,254	6,673	7,549
50-54	3,353	4,189	5,292	6,594
55-59	2,536	3,181	4,170	5,177
60-64	2,025	2,422	3,107	4,013
65-69	1,471	1,847	2,298	2,911
70-74	1,141	1,309	1,678	2,066
75-79	785	932	1,114	1,417
80+	858	1,050	1,326	1,620
Total	76,725	83,550	90,131	95,031

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                    unpublished manuscript.
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