

Northeast Ontario's Economy: Structural Change and Future Challenges

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Executive Summary

The present report examines past and present trends in Northeastern Ontario's economy and forecasts its future challenges and opportunities. The report primarily focuses on the supply side of the regional economy. We examine the regional labour market including its human capital composition; employment trends; shifting composition of the employed workforce from full-time to part-time; shifting industrial composition from goods-producing to service-producing sectors; declining share of the private sector; rising dependency on the public sector and declining regional income and gross regional product.

The report consists of seven parts.

Part I examines demographic change in Northeastern Ontario, its eight districts and major communities during the past three decades. Northeastern Ontario's population grew from 566,759 in 1986 to 582,154 in 1996, but declined to 551,672 in 2001 and 551,144 in 2011. The same declining population trend appears in Cochrane, Timiskaming, Algoma and Sudbury. On the other hand, Nipissing, Manitoulin, Parry Sound and Greater Sudbury experienced population increase during 1986-2011.

The changing population closely mirrors employment trends in the goods-producing sectors of the regional economy. Total employment in forestry, mining and manufacturing industries in Northeastern Ontario declined from 57,285 in 1986 to 42,655 in 1996, 34,850 in 2006 and 30,845 in 2011.

Declining population has resulted in Northeastern Ontario's share of the provincial population falling from 6.23 percent in 1986 to 5.77 percent in 1991, to 4.83 percent in 2001 and to 4.29 percent in 2011. The declining population share has happened for various reasons. First, the region has experienced significant out-migration of youth in search of employment opportunities in other parts of Canada. The second factor contributing to slow or negative population change relates to the fact that the total fertility rate in Northeastern Ontario (1.60) has been significantly below the generational replacement rate of 2.1. In addition, the region has been receiving disproportionately low rates of immigration. According to Census data, net immigration to Ontario during 2001-2011 equaled 586,990. However, the number of immigrants in Northeastern Ontario declined by about 4,280 immigrants during the above period (due to deaths and out-migration of resident immigrants being greater than the arrival of new immigrants).

Examination of the data reveals some alarming trends. The level of natural increase (births minus deaths) has been declining in Northeastern Ontario due to the outmigration of youth between the ages of 20 and 34 along with aging of the regional population. The existing data shows that the level of natural increase has been declining and turned negative in 2002. In fact, the region experienced more deaths than births after 2002 further adding to its population decline.

The study examines various dependency indicators and finds that the total dependency ratio declined from 69 non-working age to every 100 working age persons in 1991 to 65 in 2011

suggesting an increased capacity of the region to support its non-working population during 1991-2011. The regional total dependency ratio in 2011 is higher than the provincial average of 62 non-working to every 100 working age population. This ratio is expected to rise as the baby boomers start to retire in the coming years.

Another aspect of demographic change in Northeastern Ontario relates to the cultural and linguistic diversity of the population. The Francophone population comprises 21.2 percent of total Northeastern Ontario's Population in 2011. About 34.9 percent of Francophones live in the Greater Sudbury CMA. The Aboriginal population accounts for 10.7 percent of the regional population. About 27.9 percent of the Aboriginal people live on reserve and the rest or 80.2 percent live off-reserve. About 31.9 percent of the Aboriginal population live in the Greater Sudbury region. The immigrant population accounts for 5.6 percent of the regional population. About 32.0 percent of immigrants live in the Greater Sudbury region.

Total Francophone population in Northeastern Ontario declined from 130,085 in 2001 to 114,770 in 2011, a decline of about 11.8 percent. Their share of Northeastern Ontario's total population also declined from 23.6 percent in 2001 to 20.8 percent in 2011. The total Aboriginal population in Northeastern Ontario increased from 42,425 in 2001 to 57,710 in 2011. Their share of the total regional population increased from 7.8 percent in 2001 to 10.5 percent in 2011. The immigrant population declined from 34,845 in 2001 to 30,565 in 2011. The share of immigrants in the total regional population declined from 6.3 percent in 2001 to 5.6 percent in 2011.

Part II of the study looks into the future and provides population projections for Northeastern Ontario and its eight districts during the next three decades. Based on Ontario's Ministry of Finance projections, Northeastern Ontario's total population is expected to decline from 563,548 in 2013 to 540,064 in 2041. The aging of Northeastern Ontario's population is also evident from the Ministry's projections. The number of individuals under the age of 20 is expected to decline from 116,598 in 2013 to 100,454 in 2041. Their share declines from 20.7 percent in 2013 to 18.6 percent in 2041. The number of working age people (20 to 64) is expected to decline from 341,008 in 2013 to 269,278 in 2041, a decline of about 21.0 percent. Their share of the total population declines from 60.5 percent in 2013 to 49.9 percent in 2041. The number of seniors aged 65 and older is expected to increase from 105,942 in 2013 to 170,332 in 2041, an increase of about 60.8 percent. The share of seniors is expected to rise from 18.8 percent in 2013 to 31.5 percent in 2041. The aging of Northeastern Ontario's population will have an important impact on demand for publicly funded services such as health care and education in the region.

On the other hand, the Aboriginal population is expected to increase from 59,236 in 2013 to 75,191 in 2041, a growth rate of about 27.0 percent. The number of children aged 19 and under is expected to remain relatively constant. The number of working age individuals will increase from 34,945 in 2013 to 39,518 in 2041, a growth rate of about 13.1 percent. The number of seniors aged 65 and older is expected to increase from 5,143 in 2013 to 15,206 in 2041, a growth rate of about 196.0 percent. The Aboriginal population is not only expected to increase in size, but their share of Northeastern Ontario's population is also expected to increase from 10.5

percent in 2013 to 13.9 percent in 2041. More importantly, the Aboriginal population will comprise a growing share of the working age population in Northeastern Ontario in the coming years. Their share of the prime working age population is expected to rise from 11.6 percent in 2013 to 17.0 percent in 2041.

Part III examines past, present and future trends in the number and quality of the regional workforce. Our projections show that the labour force in Northeastern Ontario is expected to decline from 264,860 in 2013 to 210,397 in 2041, a decline of about 20.6 percent during the projection period. During the same period, the Aboriginal labour force increases from 27,372 in 2013 to 30,706 in 2041, a rise of about 12.2 percent. As a result, the share of Aboriginals in the total regional labour force is expected to increase from 10.3 percent in 2013 to 14.6 percent in 2041. In fact, the share of the Aboriginal labour force varies significantly in various northeastern Ontario districts. It ranges from a low of 4.5 percent in Timiskaming to a high of about 40.0 percent in Manitoulin in 2013. Our projections suggest that the share of the Aboriginal labour force would range from a low of 6.6 percent in Timiskaming to a high of 60.9 percent in Manitoulin in 2041.

This study argues that there is a significant gap between the level of educational achievement of Aboriginal individuals and the general population. This education gap results in a severe labour market outcome disparity which influences productivity and the future productive capacity of Northeastern Ontario's labour force.

Part IV deals with the quantitative measurement of productivity and the human capital composition of Northeastern Ontario's workforce in the coming years. Defining human capital as the stock of knowledge, skills and abilities embodied in individuals that directly affects their level of productivity, we find that the human capital composition index of the working age population in Northeastern Ontario is below the levels in Ontario and Canada. We find that the human capital composition of the working age population in Northeastern Ontario is below that in Ontario and Canada. The human capital indexes for immigrants are higher than national, provincial and regional averages. On the other hand, the human capital composition of the Aboriginal labour force is significantly below the regional, provincial and national averages. Greater Sudbury region has the largest human capital indexes for both total and the Aboriginal population followed by Nipissing and Algoma. The index is lowest in Timiskaming followed by Sudbury and Cochrane. Given that a growing share of the future regional labour force will be of Aboriginal origin, a continuation of the current situation will lead to declining future labour productivity. Thus, the region will not only experience a declining size of the labour force but will also face declining productivity, a perfect storm.

The declining supply of labour and labour productivity in Northeastern Ontario are only half of the bad news. Recent technological change and the emergence of the knowledge economy have increased the skill requirements of the workforce. The study shows that the skill levels of the prime working-age population in Northeastern Ontario regions are lower than the skill levels in Ontario and Canada. More importantly, the present skill level in Northeastern Ontario's districts

is significantly below the current estimated skill requirements. The report suggests that if the skill levels of the workforce stays at its current level or declines in the future while skill requirements continue to rise, the region will end up with a dichotomy of people without jobs and jobs without people. Even if markets adjust to bring demand and supply of labour into balance, the social impact of having many unemployable people will be enormous.

Part V of the study discusses the consequences of shifting the composition of the employed labour force. The structure of Northeastern Ontario's workforce has been changing due to a population that is simultaneously declining and ageing. At the same time, the industrial and occupational composition of the employed workforce is shifting due to changing market conditions. As a result, the size and industrial makeup of the employed workforce has changed during the past three decades. There has been a continuous shift away from the goods-producing sector dominated by private businesses to the service-producing sector, a large portion of which is publicly funded. The consequences of the shifting composition of the workforce are as follows:

1. It has been accompanied by a net employment loss of 22,880 in the goods producing sectors of the regional economy since 1986.
2. The share of the private sector in employment and wealth generation in Northeastern Ontario has declined while the region has become more dependent on publicly funded programs such as health care, education and government.
3. The share of full-time and full-year jobs has declined from 58.2 percent in 2006 to 51.7 percent in 2011. The average earnings of full-time and full-year jobs equaled \$55,798 in 2011. During the same period, the share of part-time or part-year jobs rose from 41.7 percent in 2006 to 48.3 percent in 2011. The average earnings of the part-time and/or part-year jobs equaled \$24,957 in 2011. The same picture appears when we examine the composition of the employed workforce by sex.
4. The regional GDP in 2011 dollars has stayed relatively constant during 1987-2011 suggesting that the regional economy has not experienced growth during the past 25 years.
5. Recent structural change has shifted the regional economic focus from predominantly producing for export markets to mostly production for domestic consumption.

Part VI of the study looks into the future and investigates the impact of an aging regional population on demand for government program expenditures such as health care and education. The report estimates the healthcare related services that will be necessary to meet the requirements of a rapidly aging regional population? Similarly, an aging population affects student enrolments, revenues and consequently demand for various educational services in Northeastern Ontario. The report estimates the impact of aging population on demand for educational services. Finally, Part VI estimates demand for skilled tradesmen in Northeastern Ontario.

Part VII presents a summary conclusion and discusses some policy implications of the report.

Introduction

The objective of the present report is to examine past and present trends in Northeastern Ontario's economy and to forecast its future challenges and opportunities. The report primarily focuses on the supply side of the regional economy. We examine the regional labour market including its human capital composition; employment trends; shifting composition of the employed workforce from full-time to part-time; shifting industrial composition from goods-producing to service-producing sectors; declining share of the private sector; rising dependency on the public sector and declining regional income and gross regional product.

The report consists of seven parts.

Part I examines demographic change in Northeastern Ontario, its eight districts and major communities during the past three decades. Part I also provides information on the cultural and linguistic diversity of the regional population. This part also defines and estimates various dependency indicators.

Part II of the study looks into the future and provides projections for total and Aboriginal populations for Northeastern Ontario and its eight districts during the next three decades.

Part III uses the population projections discussed in Part II and estimates past, present and future trends in the size and composition of the regional labour force.

Part IV defines and quantitatively measures the human capital composition of Northeastern Ontario's workforce in the coming years. Part IV also discusses the implications of the growing application of technology in the production process and accordingly the future skill requirements of the workforce.

Part V of the study discusses the consequences of shifting the composition of the employed labour force from goods-producing, dominated by private businesses, to service-producing, predominantly financed by the public sector. It also examines the shift from full-time and relatively high paying jobs to part-time and relatively low paying jobs and the implication thereof for total regional income and GDP.

Part VI of the study looks into the future and investigates the impact of an aging regional population on demand for government program expenditures such as health care and education. This part also investigates the impact of the aging population on the supply of skilled tradesmen.

Part VII presents a summary conclusion and discusses some policy implications of the report.

Sources of Data Used in this Study

In most parts, the data used are based on detailed information regarding individual census subdivisions (CSDs) in Northeastern Ontario obtained through special tabulations from Statistics Canada. Except for the population data, the 2011 data is based on the 2011 National Household Survey (NHS). Total Population forecasts are based on data made available by the Ontario Ministry of Finance.

Population Groups Studied in this Report

The report provides information on the following four population groups:

1. Total population;
2. Francophone population defined as individuals who report their mother tongue to be French;
3. Aboriginal population defined by Statistics Canada as persons who reported identifying with at least one Aboriginal group, that is, North American Indian, Metis or Inuit, and/or those who reported being a Treaty Indian or a registered Indian, as defined by the Indian Act of Canada, and/or those who reported they were members of an Indian band or First Nation;
4. Immigrant population defined as persons who are, or have ever been, landed immigrants in Canada.

Geographical Specification of Northeastern Ontario

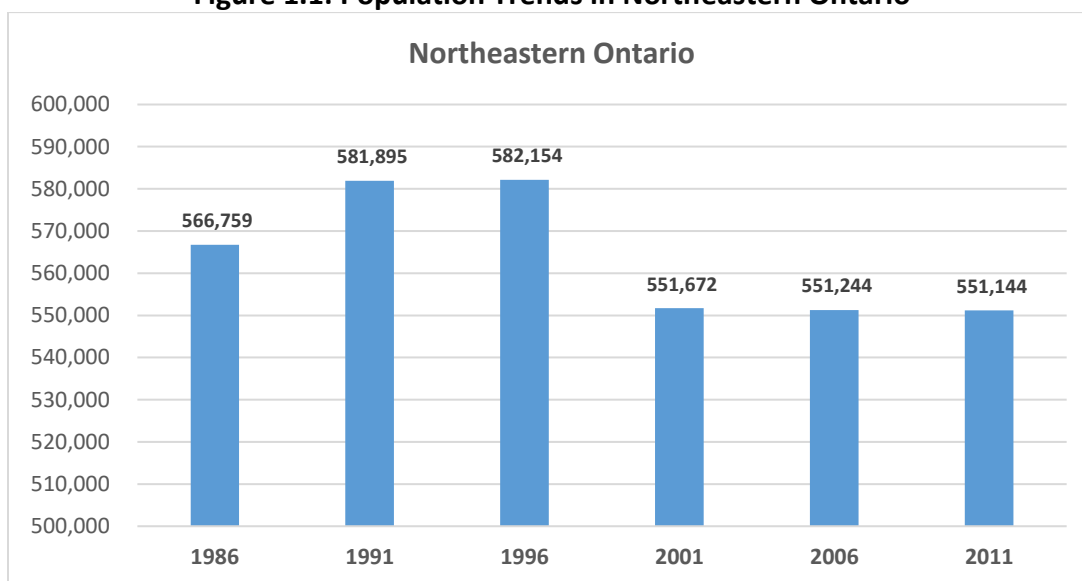
Northern Ontario is subdivided into Northwestern and Northeastern Ontario. The three most western Census districts, namely Rainy River, Kenora and Thunder Bay, constitute Northwestern Ontario. The region that lies north and east of Lakes Superior and Huron constitutes Northeastern Ontario. It is defined to include the following census divisions: Cochrane, Timiskaming, Algoma, Sudbury, Nipissing, Manitoulin, Parry Sound and Greater Sudbury. The federal government and FedNor also include Muskoka district in their definition of Northeastern Ontario. The provincial government removed the district of Muskoka from the jurisdictional area of the Ministry of Northern Development and Mines and the Northern Ontario Heritage Fund in 2004, but has continued to include Parry Sound as a Northern Ontario division. This is what we have assumed in the present study.

Part I: Demographic Change in Northeastern Ontario: The Past Three Decades

Northeastern Ontario covers about 276,124 square kilometers and recorded a population of 551,144 in 2011. It has a population density of about 2 persons per square kilometer which is well below that of Ontario (14.1). The Greater Sudbury is the largest city in Northeastern Ontario. It recorded a population of about 160,274 in 2011. Other major communities in the region include Sault Ste. Marie, North Bay, Timmins, Elliot Lake and Temiskaming Shores.

According to Statistics Canada's census of population, Northeastern Ontario's population grew from 566,759 in 1986 to 582,154 in 1996, but declined to 551,672 in 2001 and remained steady during 2001-2011 (Figure 1.1). Rising population during the 1980s and 1990s following by a decline during the 21st century is similar to that observed in Northwestern Ontario.

Figure 1.1: Population Trends in Northeastern Ontario



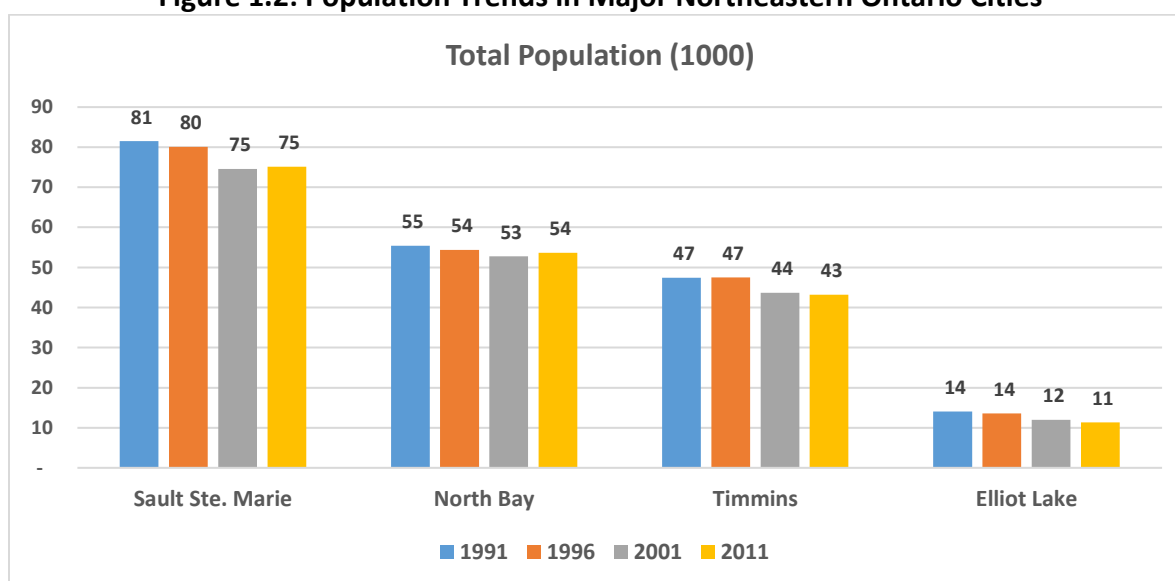
Source: Statistics Canada, Census of Population, Various issues.

In general, the same trend appears when we examine population levels in various districts in Northeastern Ontario (Table 1.1). Declining population trends can also be observed in all major cities in Northeastern Ontario (Figure 1.2). Figure 1.2 does not include Temiskaming Shores which is a city created by the amalgamation of the towns of New Liskeard and Hailbury and the township of Dymond in 2004. Its population equaled 10,400 in 2011.

Table 1.1: Populations Trends in Northeastern Ontario's Districts

	1986	1991	1996	2001	2006	2011
Cochrane	93,712	93,917	93,240	85,250	82,500	81,125
Timiskaming	40,307	38,983	37,807	34,442	33,285	32,634
Algoma	131,841	127,269	125,455	118,565	117,460	115,870
Sudbury	25,771	26,178	25,457	22,895	21,395	21,195
Nipissing	79,004	84,723	84,832	82,910	84,690	84,735
Manitoulin	9,823	11,192	11,413	12,680	13,090	13,050
Parry Sound	33,828	38,423	39,906	39,665	40,920	42,160
Greater Sudbury	152,476	161,210	164,049	155,265	157,910	160,380
Northeastern Ontario	566,762	581,895	582,159	551,672	551,250	551,149

Source: Statistics Canada, Census of Population, Various issues.

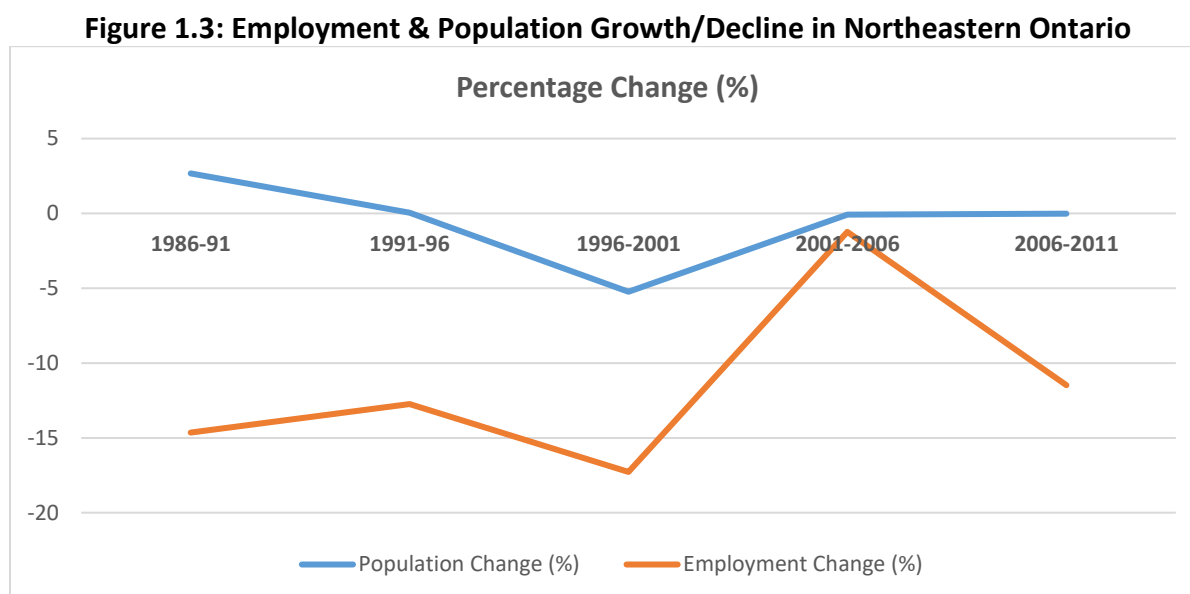
Figure 1.2: Population Trends in Major Northeastern Ontario Cities

The declining population closely follows employment changes in the major goods-producing sectors of the regional economy (Figure 1.3). Total employment in forestry, mining and manufacturing industries in Northeastern Ontario declined from 57,285 in 1986 to 42,655 in 1996, 34,850 in 2006 and 30,845 in 2011. The correlation coefficient between total regional population and employment in the above sectors during 1986-2011 equals 0.66.¹

Logging and forestry sector experienced significant employment decline during the entire period. Total employment in that sector declined from 5,005 in 1986 to 3,540 in 1991, 2,860 in 1996, 2,145 in 2001, 2,190 in 2006 and 1,300 in 2011. The mining employment declined from 17,180 in 1986 to 17,070 in 1991, 13,650 in 1996 and 9000 in 2001, but rose to 10,360 in 2006 and 13,860

¹ The upper limit of the simple correlation coefficient, which corresponds to perfect correlation, equals one.

in 2011. Manufacturing employment declined steadily from 35,100 in 1986 to 15,685 in 2011. Total employment in the above sectors declined from 57,285 in 1986 to 30,845 in 2011.

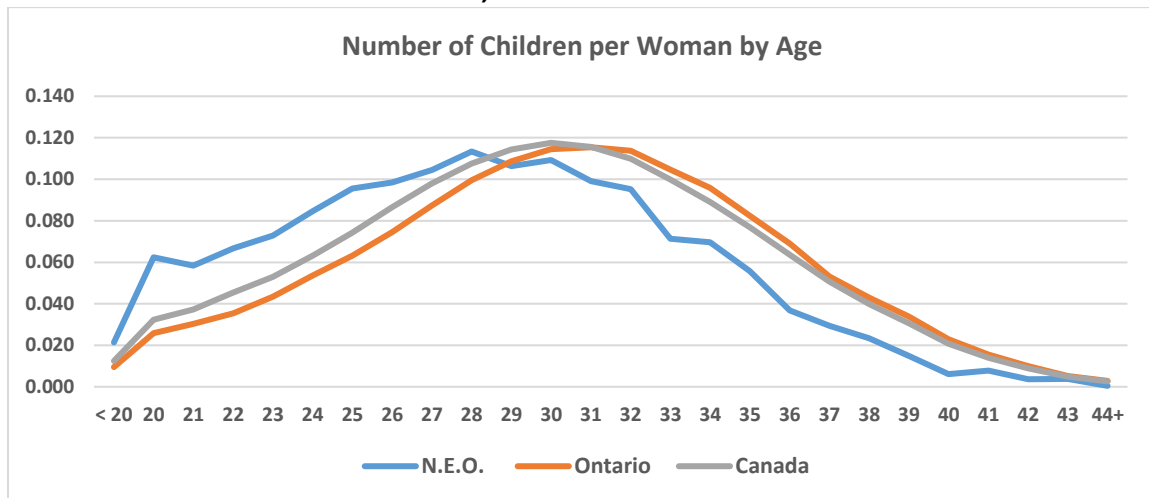


Source: Calculated based on Statistics Canada, Various Censuses and 2011 NHS, custom tabulation.

Northeastern Ontario's share of the provincial population declined from 6.23 percent in 1986 to 5.77 percent in 1991, 4.83 percent in 2001 and to 4.29 percent in 2011. The declining population share has happened for two reasons. First, as we will see below, the region has experienced significant out-migration of youth in search of employment opportunities in other parts of Canada. The second factor contributing to slow or negative population change relates to the fact that the total fertility rate in Northeastern Ontario (1.60) has been significantly below the generational replacement rate of 2.1. The total fertility rate is defined as the average number of children that a woman will have over the course of her life. In Canada, the total fertility rate equaled 1.61 in 2011 compared to 1.55 in Ontario and 1.77 in Northwestern Ontario (Figure 1.4). As Figure 1.4 shows the fertility rate is higher among women aged 28 years and younger, but is significantly lower than the provincial and national levels for those over 28 years of age.

Declining size and share of Northeastern Ontario's population are due to a variety of factors. First component of population change relates to the natural population increase or decrease defined as the number of birth minus death in the region. As Figure 1.5 shows the number of births exceeded the number of deaths in Northeastern Ontario during 1987-2001. However, the level of natural increase has been declining and turned negative in 2002. In fact, the region experienced more deaths than births after 2002 further adding to its population decline.

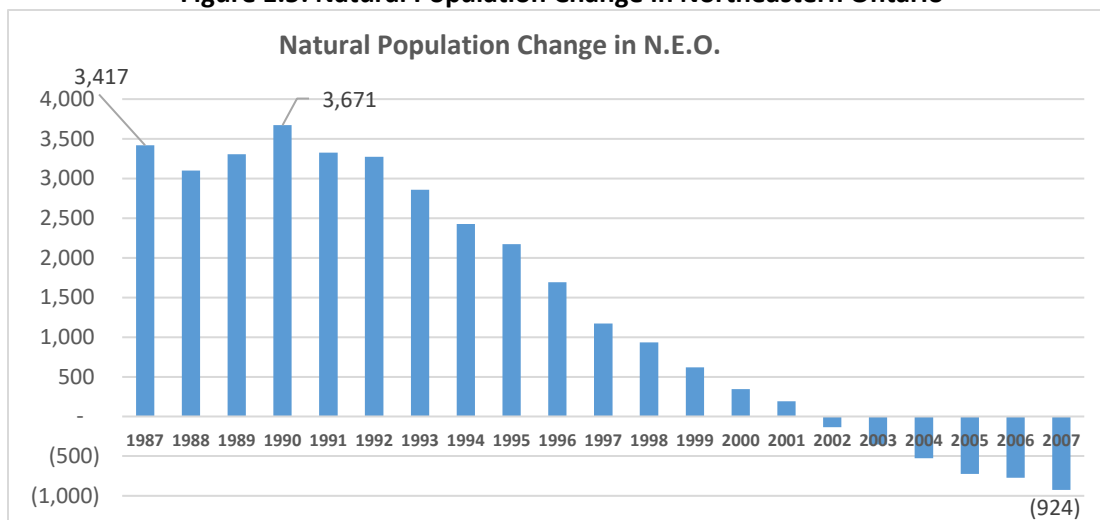
Figure 1.4: Number of Children Born per Woman by Age in Northeastern Ontario, Ontario and Canada in 2011²



Source: Statistics Canada, 2011, custom tabulation.

The declining natural population increase is due to a gradual increase in the number of deaths compared to births due to three factors. First is the aging of the population which results in a greater share of population in higher age categories and a fewer number of women in childbearing ages resulting in smaller number of birth compared to deaths. The second factor relates to the fact that the fertility rate has continued to be below the generational replacement rate of 2.1. The third factor, as we will see below, is the outmigration of women in childbearing ages from Northeastern Ontario.

Figure 1.5: Natural Population Change in Northeastern Ontario



Source: Statistics Canada, CANSIM, Table 051-0035.

² Note that to calculate the total fertility rate (which is number of children born to a woman over her lifetime) requires one to add across all the age groups in Figure 1.4.

There are other factors besides aging of the population that explain declining regional population. First, Northeastern Ontario has been receiving disproportionately low rates of immigration. According to Census data, about 1.4 million immigrants came to Canada during 2001-2011. Net immigration is defined as the number of immigrants who came minus those who left. Net immigration to Ontario during 2001-2011 equaled 586,990. However, the number of immigrants in Northeastern Ontario declined by about 4,280 immigrants during the above period (due to deaths and out-migration of resident immigrants being greater than the arrival of new immigrants).³ In other words, the region experienced negative net immigration during 2001-2011. This is one of the important factors influencing the declining population. The second and perhaps a more important factor relates to out-migration.

Figure 1.6 shows that Northeastern Ontario has experienced significant interprovincial out-migration throughout 2002-2014. Interprovincial migration refers to the movement of population from one province to another. The Ministry of Finance reports that since 2003, net interprovincial migration to Ontario has been negative, largely due to net outflows to Alberta. Over the past 30 years, net interprovincial migration into Ontario averaged 2,700 per year. However, this includes the abnormally large inflows from Quebec recorded in the years following the 1980 referendum. Excluding the extra inflows during that period, long-term net interprovincial migration to Ontario is modestly negative.⁴ Intraprovincial migration refers to the movement of population from one census division to another within the province. Figure 1.6 shows that intraprovincial migration was moderately positive during mid-2000s. This can be related to the rising mining employment opportunities during that period. The net effect of migration flows has been always negative. It was recorded as negative 1,082 in 2014.

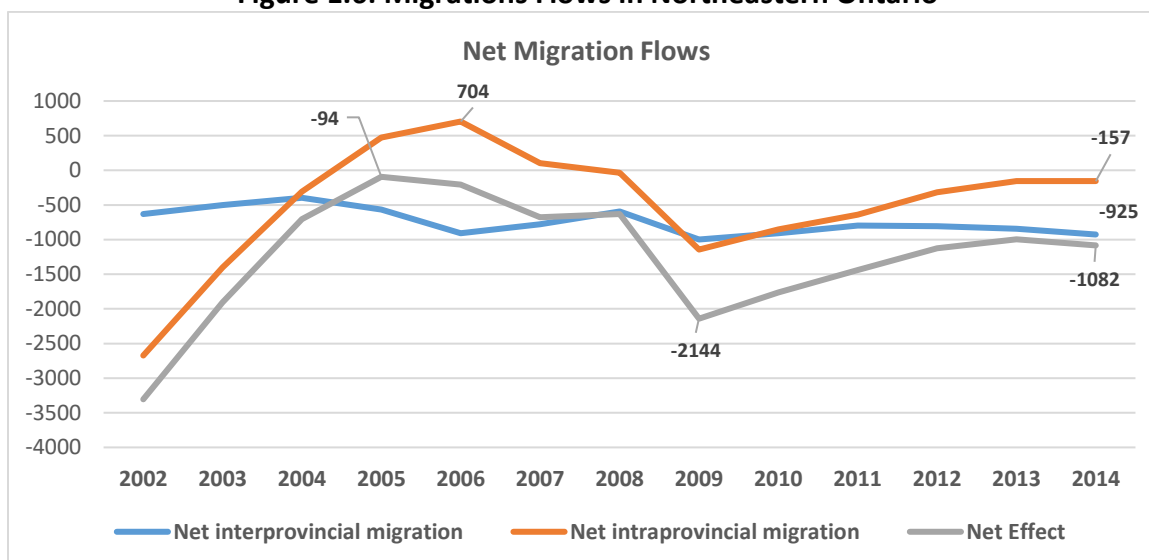
The majority of those who choose to move appear to have moved out of the province. During 2002-14, 9,661 persons moved from Northeastern Ontario to other provinces compared to 6,413 who moved out of northeastern Ontario but stayed in Ontario. Not all districts experienced net interprovincial and intraprovincial migration during 2002-14. Table 1.2 provides information on migration flows in different districts during 2002-2014. It shows that Parry Sound, Manitoulin and Greater Sudbury recorded positive net migration while the other districts experienced negative net outmigration during 2002-14.

³ According to the Census data, the number of immigrants in Northeastern Ontario declined from 34,845 in 2001 to 30,565 in 2011.

⁴ Ontario Ministry of Finance, Ontario Population Projections based on the 2011 Census 2013-2041 Ontario and Its 49 Census Divisions.

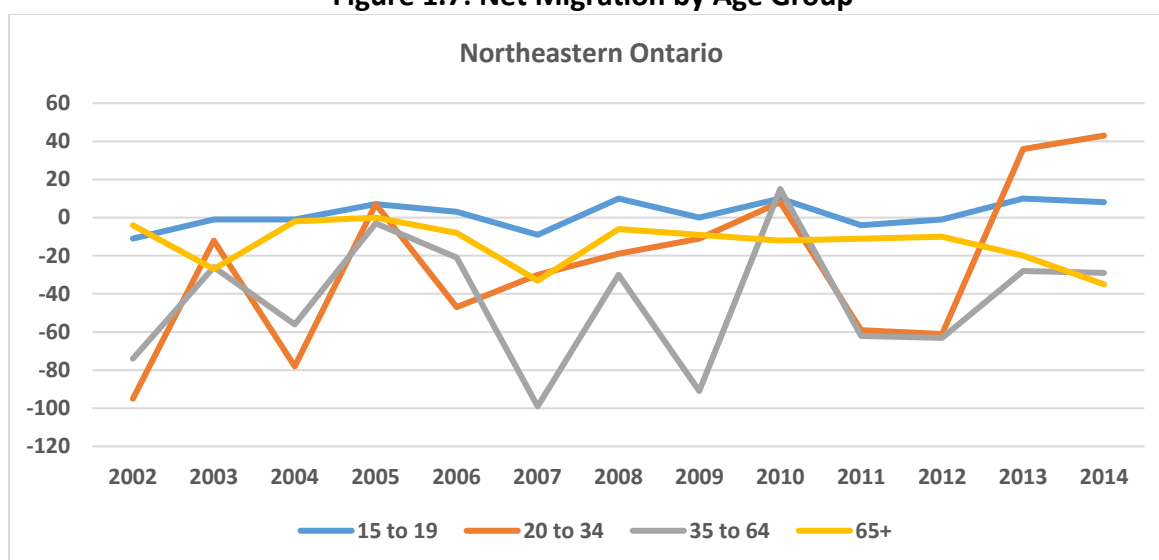
Table 1.2: Migration Flows in Various Northeastern Ontario Districts

	Net Interprovincial Migration	Net Intraprovincial Migration	Total Net Migration
Nipissing	-1,650	1,591	-59
Parry Sound	-788	3,007	2,219
Manitoulin	-50	712	662
Sudbury	-460	-2,266	-2,726
Greater Sudbury	-2,308	2,682	374
Timiskaming	-568	-1,510	-2,078
Cochrane	-1,971	-8,056	-10,027
Algoma	-1,866	-2,573	-4,439

Figure 1.6: Migrations Flows in Northeastern Ontario

Source: Calculated based on Statistics Canada, CANSIM, Table 051-0053.

It is of interest to examine the age distribution of movers. This is done in Figure 1.7. The majority of movers are between the ages of 35 and 64 followed by those between the ages of 20 and 34 years. Figure 1.7 also shows that the region has also experienced out-migration of seniors, but the level and trend has been quite stable.

Figure 1.7: Net Migration by Age Group

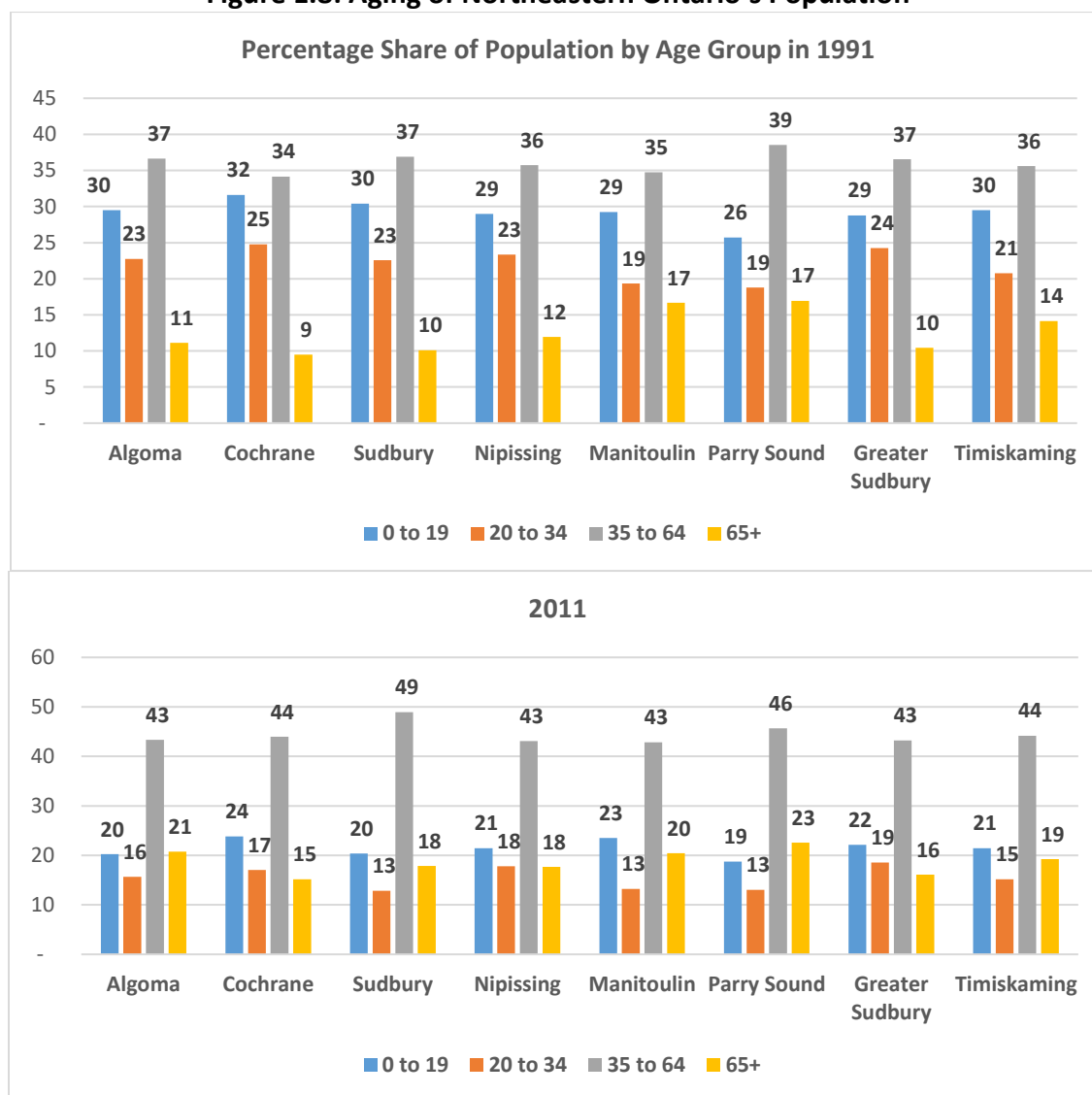
Source: Calculated based on Statistics Canada, CANSIM, Table 051-0063.

Rising life expectancy and out-migration of youth have resulted in the aging of Northeastern Ontario's population. The baby boomers were followed by much smaller generations in number primarily due to a declining fertility rate. During the same period, average life expectancy at birth in Canada increased from 71.13 years in 1960 to 81.24 years in 2012.

As a result the share of individuals in Northeastern Ontario below the age of 20 has declined from 29.4 percent in 1991 to 21.5 percent in 2011 while the share of seniors rose from 11.4 percent in 1991 to 18.0 percent in 2011. During the same period, the share of individuals in their prime working age of 20 to 44 has declined from 38.2 percent in 1991 to 28.5 percent in 2011. As Figure 1.8 shows, Parry sound district has the highest share of seniors (22.6%) in 2011 followed by Algoma district (20.8%) and Manitoulin district (20.4%). On the other hand, Cochrane district has the highest share of children under 20 years of age followed by Manitoulin district (23.5%) and Greater Sudbury (22.1%). In 2011, the share of seniors is greater than the share of children under the age of 20 in Algoma and Parry Sound districts.

Demographic changes have significant impact on social and economic conditions in the region. The baby boomers, born in the two decades following World War II, are aging and the first group of them are retiring now. The generation that came after the boomers is much smaller. As a result, the overall regional population is aging and this process has been exacerbated by the out-migration of youth. The aging process will continue into the foreseeable future and will have significant implications for the supply of labour, production capacity and the ability of the region to stay economically viable.

Figure 1.8: Aging of Northeastern Ontario's Population



Source: Calculated based on Statistics Canada, 1991 and 2011 Censuses.

One important aspect of this aging population relates to the relationship between economically active and economically dependent age groups, i.e. between the working population on the one hand and the young and elderly on the other. This ratio is a crude measure of the cost associated with demographic change in terms of raising and educating children as well as taking care of the elderly at any given time.

We examine three dependency ratios, namely old age dependency, youth dependency and total dependency ratios. We define old age dependency as the percentage share of persons aged 65 years and over relative to the working age population (20 to 64). This ratio shows the number of seniors per every 100 working age population. Similarly, youth dependency is defined as the percentage share of persons aged 20 years and under to the working age persons. This index

shows the number of children per every 100 working age individual. The total dependency ratio is defined as the percentage share of the non-working population to the working age population, i.e., population 20 to 64 years of age. This ratio is a crude measure of the cost associated with demographic change in terms of raising and educating children as well as taking care of the elderly at any given time.

Figure 1.9 shows the dependency ratios during 1991-2011. Assuming jobs are available for the working age population, a rise in the dependency ratio suggests that there are more dependent persons per each member of the working-age population. A declining dependency rate implies that there are more working persons per dependent and the region can reap the benefits of increased production capacity therefore lowering the costs associated with the declining proportion of dependents.

Figure 1.9 shows that there were 50 person under the age of 19 per every 100 working age person in Northeastern Ontario in 1991. This ratio declined to 36 in 2011 due to the fact that the number of youth declined much faster than the number of working age persons during 1991-2011. During the same period, youth dependency index declined from 44 to 38 children to every 100 working age persons in Ontario.

The number of seniors relative to working age persons rose from 19 to every 100 working age individuals in 1991 to 30 in 2011 due to an increasing number of seniors relative to the working age population. In other words, there were 5.2 working persons in 1991 per each senior. This ratio declined to 3.4 working persons per senior in 2011. The ratio of seniors to working age population in Northeastern Ontario (30) is significantly above the provincial value of 24 to every 100 working age persons in 2011. In other words, the ratio of seniors to the working age population is much higher in Northeastern Ontario compared to Ontario. This has significant budgetary implication related to health care and other expenditures required to care for the seniors in the coming years. This ratio is expected to continue to rise as working age persons retire and change their status from working to retired in the future.

Overall, the total dependency ratio declined from 69 non-working age to every 100 working age persons in 1991 to 65 in 2011 suggesting an increased capacity of the region to support its non-working population during 1991-2011. The total dependency ratio in 2011 is higher than the provincial average of 62 non-working to every 100 working age population. This ratio is expected to rise as the baby boomers start to retire in the coming years.

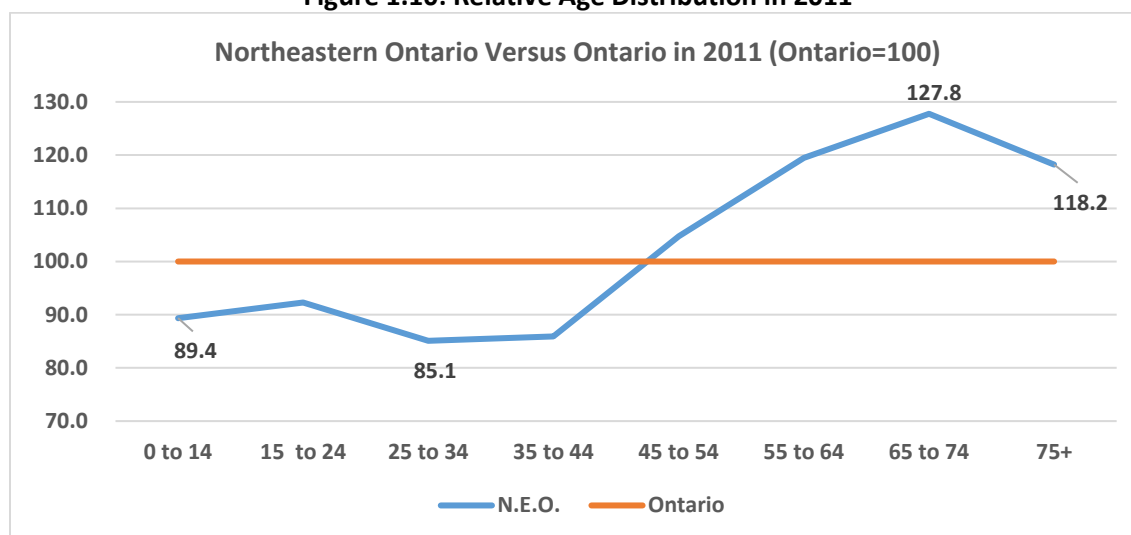
Figure 1.9: Working Age Population Relative to Other Groups in Northeastern Ontario



Source: Calculated based on Statistics Canada, 1991 and 2011 Census.

The above dependency trends suggest that the age distribution of the population in Northeastern Ontario is different from that in Ontario. As Figure 1.10 shows, compared to the provincial average, there are a relatively lower percentage of people under 45 years of age and a higher share of older people including seniors in Northeastern Ontario.⁵

Figure 1.10: Relative Age Distribution in 2011



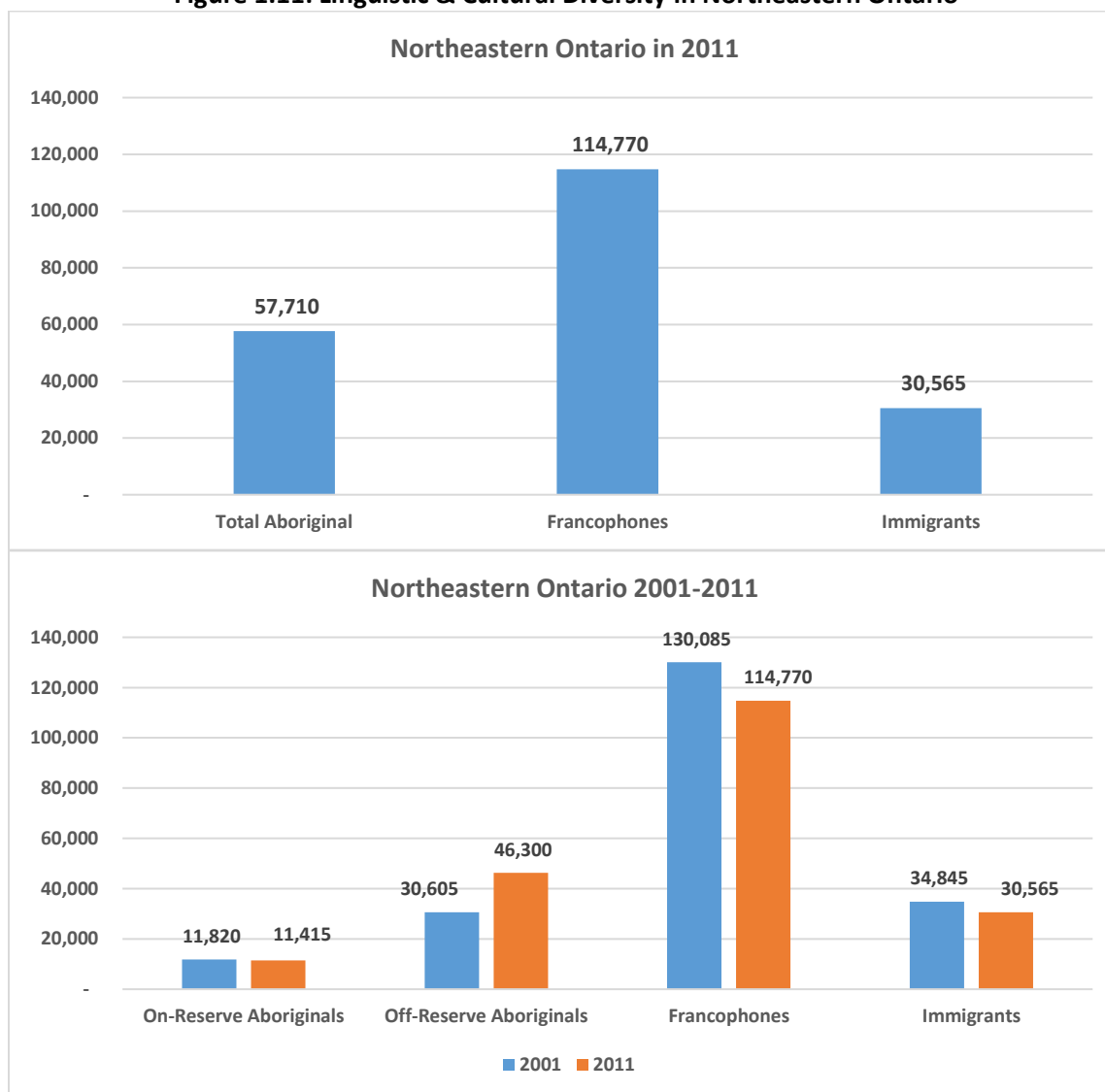
Source: Calculated based on Statistics Canada, 2011 Census.

Linguistic and Cultural Diversity of the Population in Northeastern Ontario

Another aspect of demographic change in Northeastern Ontario relates to the cultural and linguistic diversity of the population (Figure 1.11). The vertical axis shows the number of persons in each category. The Francophone population comprises 21.2 percent of total Northeastern Ontario's Population in 2011. About 34.9 percent of Francophones live in the Greater Sudbury CMA. The Aboriginal population accounts for 10.7 percent of the regional population. About 27.9 percent of the Aboriginal people live on reserve and the rest or 80.2 percent live off-reserve. About 31.9 percent of the Aboriginal population live in the Greater Sudbury region. The immigrant population accounts for 5.6 percent of the regional population. About 32.0 percent of immigrants live in the Greater Sudbury region.

Total Francophone population in Northeastern Ontario declined from 130,085 in 2001 to 114,770 in 2011, a decline of about 11.8 percent. Their share of Northeastern Ontario's total population also declined from 23.6 percent in 2001 to 20.8 percent in 2011.

⁵ In Figure 1.10, the horizontal axis shows different age groups and the vertical axis shows the percentage share of Northeastern Ontario's population in each age group relative to Ontario.

Figure 1.11: Linguistic & Cultural Diversity in Northeastern Ontario

Source: Calculated based on Statistics Canada, Census and NHS, custom tabulation.

The total Aboriginal population in Northeastern Ontario increased from 42,425 in 2001 to 57,710 in 2011. Their share of the total regional population increased from 7.8 percent in 2001 to 10.5 percent in 2011. The on- and off-reserve distribution of the Aboriginal population also changed during 2001-2011 (Figure 1.11). The on-reserve population declined by 3.4 percent while the off-reserve population rose by 51.3 percent. Overall, the number of Aboriginal population rose by about 36.0 percent during 2001-2011. The high Aboriginal population growth is not solely due to the natural demographic process. According to Statistics Canada, the traditional demographic components of growth (fertility, mortality and migration) are not the only factors that have affected the growth of the Aboriginal population in Canada. Another phenomenon that has also

affected the size, growth and composition of the Aboriginal population in recent years is referred to as a “change in reporting” or “ethnic mobility.” Ethnic mobility refers to people changing, from one census to the next, the reporting of their Aboriginal affiliations from a non-Aboriginal identity to an Aboriginal identity.⁶ The passage of Bill C31 in 1986 has been a factor in this ethnic mobility.

In addition, there has been a higher participation in the census in recent years. Statistics Canada reports that some Indian reserves and settlements did not participate in the census due to the fact that enumeration was not permitted, or it was interrupted before completion. In 2006, there were 22 incompletely enumerated reserves, down from 30 in 2001 and 77 in 1996.⁷ Other factors explaining higher Aboriginal population growth include better and more accessible health care leading to a lower mortality rate and decline in infant mortality.

Finally, one of the main factors explaining the rising share of the Aboriginal population relates to their fertility rate. The fertility rate among Aboriginal women has been significantly higher than the regional average. A report by the Ontario Ministry of Health states that: “Fertility is almost exclusively the source of population growth for Aboriginal peoples in Ontario. Provincially, some in-migration of Aboriginal people takes place from other provinces but does not substantially impact population dynamics among Ontario’s Aboriginal peoples although the impact may be greater in some urban areas. Although minimum information is directly available on Aboriginal fertility in Canada, INAC (Indian and Northern Affairs Canada) has reported a total fertility rate (TFR), which is the number of children a woman would have under current prevailing fertility rates, of 2.9 children in 2000 for Registered Indian women. In the same year, the TFR for Canadian women was approximately half that rate at 1.5 children.”⁸

In general, the Aboriginal population is much younger than the non-Aboriginal population. Therefore they will be entering the labour market in large numbers while the non-Aboriginal population is retiring. As we will see later in the report, the Aboriginal population will represent a significant share of the region’s workforce in the coming years. Therefore, there is a need to ensure that they have the necessary human capital in order for Northeastern Ontario to remain economically competitive with other regions.

Figure 1.11 also shows that the immigrant population declined from 34,845 in 2001 to 30,565 in 2011 in Northeastern Ontario. The share of immigrants in the total regional population declined from 6.3 percent in 2001 to 5.6 percent in 2011.

Population Trends in Urban & Rural Northeastern Ontario

⁶ Signer A. and Rosalinda Costa, “Aboriginal Conditions in Census Metropolitan Areas, 1981-2001”, Statistics Canada, 2005.

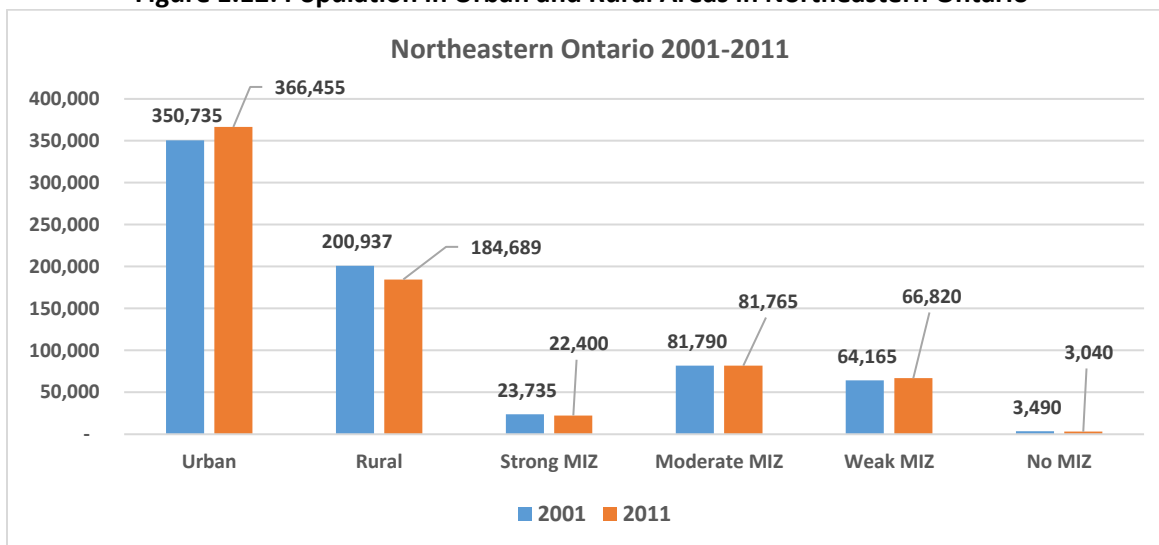
⁷ Ibid.

⁸ Ministry of Health and Long-Term Care, Health Analytic Branch, “First Nations Peoples in Ontario: A Demographic Portrait”, January 2009, page 15.

There are many ways to define rural and urban areas. The term rural is intuitively understood as an area with low population concentration dispersed at a low density. On the other hand, the term urban is often understood as a place with high population concentration at a high density. This intuitive understanding is the basis for Statistics Canada’s approach to defining an urban area as having a population of at least 1,000 and a density of 400 or more people per square kilometer.⁹ An alternative and perhaps a more appropriate definition of rural area proposed by Statistics Canada is “rural and small towns” as against “large urban centres”. This definition is based on the commuting flows between different areas. It defines urban regions as including all Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs). Both CMAs and CAs include the total population of neighboring census subdivisions (CSDs). Based on the above definition of an urban region, rural and small town (RST) areas are defined as non-CMA/CA areas. RSTs are further divided into five types of zones based on the degree of influence that large urban centres have on them.¹⁰ This is measured by the percentage of people who commute to work in an urban centre.

Using the above definition, Figure 1.12 shows the distribution of Northeastern Ontario’s population among rural and urban areas.

Figure 1.12: Population in Urban and Rural Areas in Northeastern Ontario¹¹



About 63.6 percent of the region’s population lived in urban areas in 2001. The rest or 36.4 percent lived in rural areas. The share of urban population increased to 66.5 percent in 2011. The rural Northeastern Ontario’s population declined both in size and percentage share of the total

⁹ One problem with this definition is that it can lead to misleading identification of rural and urban areas. Based on this definition, Attawapiskat Indian Reserve in James Bay area is classified as an urban area.

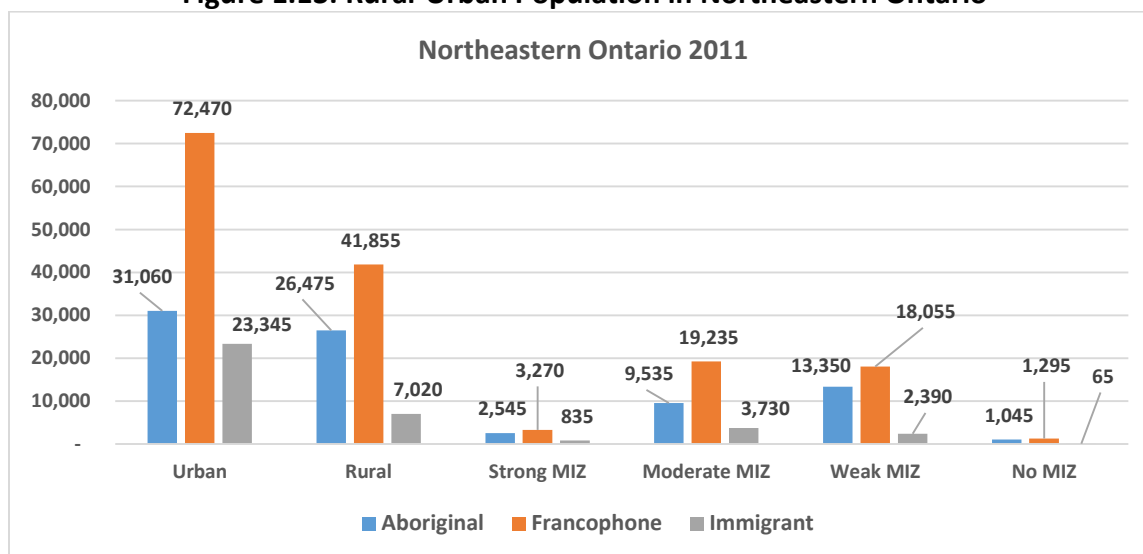
¹⁰ For a definition of various zones see Roland Beshiri and Jiaosheng He, “Rural and Small Town Canada Analysis Bulletin”, Vol. 8, No. 2, June 2009, Catalogue No. 21-006-X.

¹¹ MIZ stands for Metropolitan Influenced Zone.

population during 2001-2011. The rising share of the urban population and declining rural population reflect movements of population from rural to urban regions as well as rural to other Canadian destinations. From those who live in rural areas, 12.1 percent live in areas with a close link to urban centres. About 44.3 percent live in rural areas with a moderate link while 36.2 percent live in areas with a weak link to urban centres and 1.6 percent live in remote regions.

Figure 1.13 shows the linguistic and cultural diversity by place of residence in Northeastern Ontario.

Figure 1.13: Rural-Urban Population in Northeastern Ontario



Source: Calculated based on Statistics Canada, 2011 NHS, custom tabulation.

The majority or 54.0 percent of the Aboriginal population live in urban areas. These are mostly the off-reserve population in the region. About 46.0 percent of the Aboriginal population live in rural areas. From those living in rural regions, 9.6 percent live in areas close to urban centres while 36.0 percent reside in regions with a moderate link to urban areas. About 50.4 percent live in relatively remote areas with a weak link to urban centres. These are mostly on-reserve Aboriginal people living in remote regions. A small percentage of rural Aboriginal people live in very remote areas on Northeastern Ontario.

About 63.4 percent of the Francophone population live in urban centres. The rest or 36.6 percent live in rural areas. About 7.8 percent of the Francophones who live in rural areas reside in regions close to urban centres while about 46.0 percent live in areas with a moderate link to urban areas. About 43.1 percent of those who live in rural areas live in relatively remote areas with a weak link to urban centres. A small percentage of Francophones live in very remote regions.

A majority or about 76.9 percent of immigrants reside in urban centres. A majority of 53.1 percent of those living in rural areas live in regions with a moderate link to urban centres. About 34.1 percent live in areas with a weak link to urban areas. Less than one percent of immigrants live in very remote regions of Northeastern Ontario.

Aging of Northeastern Ontario's Population by Ethnic Origin

Table 1.2 shows the age distribution of Northeastern Ontario's population during 2001-2011. It shows that the share of the population aged 14 and younger has declined from 18.8 percent in 2001 to 15.4 percent in 2011. The average and median age of the population has also increased from 38.3 and 39.5 years in 2001 to 41.7 and 44.7 years in 2011 respectively. The median age is the age that divides a population into two numerically equal groups. One half of the population are younger than the median age and the other half are older.

A part of the increased average and median ages is due to the natural process of aging but it also reflects the relatively low fertility rate as well as out-migration of youth from the region. Table 1.2 shows that the immigrant population are significantly older than the regional population while the Aboriginal population are much younger than the other groups. Viewed from another perspective, the Aboriginal population makes up about 16.4 percent of the total regional population aged 14 and under. Similarly, they account for 14.5 percent of the population between the ages of 15 and 24 in Northeastern Ontario. In other words, the Aboriginal population accounts for about 15.5 percent of the regional population aged 24 years and younger. This implies that the Aboriginal population will make up an increasing share of the working age population of Northeastern Ontario in the coming years. This is especially true given the relatively high out-migration rate of young people, most of whom are non-Aboriginal.

Table 1.2: Percentage Age Distribution of Various Population Groups in Northeastern Ontario

Age Category	N.E.O.		Francophone		Immigrants		On-Reserve Aboriginal		Off-Reserve Aboriginal	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
0 - 14 years	18.8	15.4	14.9	11.5	2.1	2.7	33.1	26.0	27.4	23.1
15 - 64 years	67.1	67.4	70.0	68.1	58.0	52.4	60.2	66.7	67.3	69.5
15 - 24 years	12.9	12.4	11.4	10.1	2.7	3.1	14.1	16.7	16.8	16.8
25 - 34 years	11.1	10.7	11.2	9.0	4.1	5.3	13.7	11.4	13.9	12.5
35 - 44 years	16.6	12.0	17.9	11.5	10.3	8.4	15.3	13.5	17.2	13.3
45 - 54 years	15.3	17.0	16.6	20.0	19.3	12.9	10.3	14.9	11.9	15.4
55 - 64 years	11.2	15.3	12.9	17.6	21.6	22.6	6.7	10.2	7.5	11.5
65 - 74 years	8.7	10.1	9.9	12.2	22.6	21.7	4.5	5.1	3.9	5.1
75 years and over	5.4	7.2	5.2	8.1	17.3	23.2	2.2	2.2	1.4	2.4
Total - All ages	544,265	540,535	130,085	114,765	34,845	30,565	10,395	11,410	30,610	46,300
Average Age	38	42	41	45	58	60	29	32	30	34
Median Age	40	45	42	49	60	63	27	31	29	33

Source: Calculated based on Statistics Canada, Census and NHS, custom tabulation.

Part II: Demographic Change in Northeastern Ontario: The Next Three Decades

This part of the study provides population projections for Northeastern Ontario and its districts. Population projections are provided for the total population as well as the Aboriginal population in Northeastern Ontario. Estimates for the total regional population are based on the Ontario Ministry of Finance projections. Estimates for the Aboriginal population are based on Northern Ontario's Demographic Model (NODM) developed by the author.

The projections provided in this part of the study will be the basis for labour force projections in the next part of the report. Before discussing the population projections, a few words regarding the Ontario Ministry of Finance projections are in order. First, the projections are based on the 2011 Census adjusted for net undercoverage. The Ministry of Finance's 2011 population estimates are 12,404 greater than those reported by the 2011 census. The Ministry's estimates have adjusted for the undercoverage, especially of the Aboriginal population in Northeastern Ontario.

Secondly, the Ministry's estimated parameters for fertility at the census division level are modelled to maintain the regional differences. The census division-to-province ratio for mean age at fertility in the most recent period is assumed to remain constant. Thirdly, the Ministry's mortality estimates at the census division level are developed using a ratio methodology. They apply Ontario-level mortality structure to each census division's age structure over the most recent three years of comparable data and calculate the expected number of deaths. Then, these estimates are compared to the actual annual number of deaths for each census division over this period to create ratios of actual-to-expected number of deaths. These ratios were then multiplied by provincial age-specific death rates to create death rates for each census division. These were then applied to the corresponding census division population to derive the number of deaths for each census division.¹²

2.1. Population Projections for Northeastern Ontario

Based on Ontario's Ministry of Finance projections, Northeastern Ontario's total population is expected to decline from 563,548 in 2013 to 540,064 in 2041 (Table 2.1). As we noted above, the Ministry of Finance's estimate of Northeastern Ontario's population is 12,404 higher than that reported in the 2011 census. The difference, according to the Ministry of Finance, is due to the undercoverage of the population in the region.

Table 2.1: Population Projection for Northeastern Ontario

Year	0 to 19	20 to 44	45 to 64	65+	Total
2013	116,598	165,207	175,801	105,942	563,548
2014	114,729	164,125	174,234	109,044	562,132
2015	113,030	163,005	172,927	111,983	560,945
2016	111,591	161,822	171,508	115,067	559,988

¹² See Ontario Population Projections, 2013-2041, Ontario Ministry of Finance, 2014.

2017	110,624	160,600	169,924	118,080	559,228
2018	109,894	159,594	167,878	121,314	558,680
2019	109,396	158,729	165,260	124,770	558,155
2020	109,044	157,799	162,372	128,434	557,649
2021	108,825	156,887	159,480	131,960	557,152
2022	108,796	155,761	156,342	135,760	556,659
2023	108,886	154,586	153,068	139,623	556,163
2024	108,856	153,593	149,832	143,362	555,643
2025	108,896	152,351	146,668	147,175	555,090
2026	108,700	151,261	143,390	151,142	554,493
2027	108,406	150,377	140,246	154,819	553,848
2028	107,960	149,585	137,202	158,402	553,149
2029	107,453	148,809	134,491	161,633	552,386
2030	106,836	147,965	132,237	164,523	551,561
2031	106,371	146,896	130,945	166,467	550,679
2032	105,965	145,938	130,263	167,581	549,747
2033	105,446	145,156	129,763	168,404	548,769
2034	104,881	144,232	129,484	169,154	547,751
2035	104,291	142,941	129,548	169,917	546,697
2036	103,666	141,772	129,527	170,648	545,613
2037	103,018	140,631	129,827	171,033	544,509
2038	102,366	139,627	130,278	171,130	543,401
2039	101,715	138,727	130,917	170,928	542,287
2040	101,076	137,893	131,507	170,696	541,172
2041	100,454	137,213	132,065	170,332	540,064

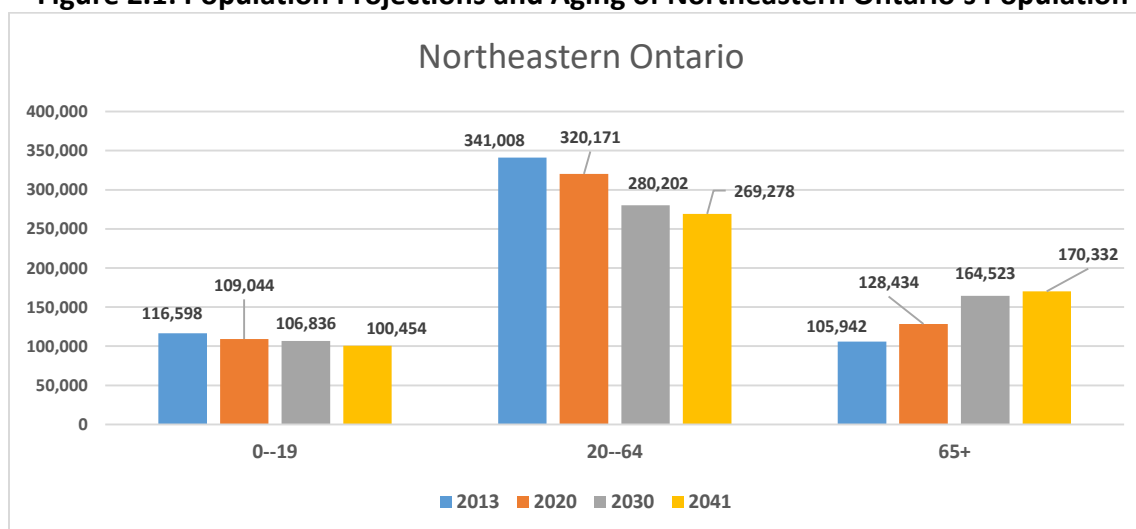
Source: Calculated based on the Ontario Ministry of Finance Projections, Ontario Population Projections

The aging of Northeastern Ontario's population is also evident from the Ministry's projections (Figure 2.1). The number of individuals under the age of 20 is expected to decline from 116,598 in 2013 to 100,454 in 2041. Their share declines from 20.7 percent in 2013 to 18.6 percent in 2041. The number of working age people (20 to 64) is expected to decline from 341,008 in 2013 to 269,278 in 2041, a decline of about 21.0 percent.¹³ Their share of the total population declines from 60.5 percent in 2013 to 49.9 percent in 2041. As we will see in the next part of the study, this dramatic decline in the number of the working age population has important implications for the future availability of a qualified labour force in the region. Figure 2.1 also shows that the number of seniors aged 65 and older is expected to increase from 105,942 in 2013 to 170,332 in 2041, an increase of about 60.8 percent. The share of seniors is expected to rise from 18.8 percent in 2013 to 31.5 percent in 2041. The aging of Northeastern Ontario's population will have

¹³ We have focused on individuals aged 20 to 64 as the core working-age population since there has been a declining trend in the labour force participation rate of Ontario's youth in recent years primarily due to a significant rise in enrolment rates in postsecondary education institutions.

an important impact on demand for publicly funded services such as health care in the region. We will examine demand for healthcare services later in this report.

Figure 2.1: Population Projections and Aging of Northeastern Ontario's Population



Source: Calculated based on the Ontario Ministry of Finance, Ontario Population Projections

Table 2.2 and 2.3 show the population projections for various Northeastern Ontario Districts. It appears that there has not been serious undercoverage of the population in any of the districts. The districts of Algoma, Cochrane, Sudbury and Timiskaming are expected to experience population decline while Manitoulin, Nipissing, Parry Sound and Greater Sudbury are expected to grow during 2013-2041.

Table 2.2: Population Projections for Districts in Northeastern Ontario

District	Age Group	2013	2020	2030	2041	Total
Algoma	0 to 19	23,130	21,375	20,486	18,796	
	20 to 44	32,041	30,016	27,610	25,407	
	45 to 64	37,070	33,149	25,792	25,297	
	65+	25,359	29,663	36,650	36,727	
	Total	117,600	114,203	110,538	106,227	
Cochrane	0 to 19	18,898	17,600	16,673	15,385	
	20 to 44	24,877	22,795	20,614	18,946	
	45 to 64	25,530	23,209	18,138	17,069	
	65+	12,984	16,130	21,209	21,665	
	Total	82,289	79,734	76,634	73,065	
Manitoulin	0 to 19	3,093	2,861	2,750	2,629	
	20 to 44	3,254	3,149	3,026	2,792	
	45 to 64	4,251	4,169	3,418	3,232	
	65+	2,940	3,556	4,593	4,913	
	Total	13,538	13,735	13,787	13,566	
Nipissing	0 to 19	17,829				
	Total	87,362				

2020	17,228	26,459	25,129	19,530	88,346
2030	17,541	25,472	20,980	25,762	89,755
2041	16,830	24,096	22,120	27,204	90,250
Parry Sound	0 to 19	20 to 44	45 to 64	65+	Total
2013	7,764	10,075	14,869	10,369	43,077
2020	7,148	9,402	14,086	12,752	43,388
2030	6,856	8,889	11,796	16,070	43,611
2041	6,520	8,121	11,488	17,192	43,321
Greater Sudbury	0 to 19	20 to 44	45 to 64	65+	Total
2013	34,684	54,106	48,816	27,481	165,087
2020	32,734	53,174	46,079	33,589	165,576
2030	32,563	50,781	39,468	43,675	166,487
2041	31,067	47,166	40,822	46,170	165,225
Sudbury	0--19	20--44	45--64	65+	Total
2013	4,173	5,014	7,800	4,099	21,086
2020	3,527	4,267	6,963	5,193	19,950
2030	3,250	3,776	5,138	6,557	18,721
2041	2,936	3,296	4,671	6,355	17,258
Timiskaming	0--19	20--44	45--64	65+	Total
2013	7,027	9,115	10,705	6,662	33,509
2020	6,571	8,537	9,588	8,021	32,717
2030	6,717	7,797	7,507	10,007	32,028
2041	6,291	7,389	7,366	10,106	31,152

Source: Calculated Based on the Ministry of Finance Projections.

The share of the population under the age of 19 is expected to decline in all districts. Similarly, the share of the working age population is expected to decline in all jurisdictions. On the other hand, the share of seniors aged 65 and over is expected to rise significantly in all districts. The percentage increase in the seniors population ranges from 11.8 percent in Nipissing to 17.4 percent in Sudbury.

Table 2.3: Percentage Share of Population by Age in Various Districts in Northeastern Ontario

Algoma	0--19	20--64	65+
2013	19.67	58.77	21.56
2020	18.72	55.31	25.97
2030	18.53	48.31	33.16
2041	17.69	47.73	34.57
Cochrane	0 to 19	20 to 64	65+
2013	22.97	61.26	15.78
2020	22.07	57.70	20.23
2030	21.76	50.57	27.68

2041	21.06	49.29	29.65
Manitoulin	0--19	20--64	65+
2013	22.85	55.44	21.72
2020	20.83	53.28	25.89
2030	19.95	46.74	33.31
2041	19.38	44.41	36.22
Nipissing	0--19	20--64	65+
2013	20.41	61.22	18.37
2020	19.50	58.39	22.11
2030	19.54	51.75	28.70
2041	18.65	51.21	30.14
Parry Sound	0--19	20--64	65+
2013	18.02	57.91	24.07
2020	16.47	54.13	29.39
2030	15.72	47.43	36.85
2041	15.05	45.26	39.69
Greater Sudbury	0--19	20--64	65+
2013	21.01	62.34	16.65
2020	19.77	59.94	20.29
2030	19.56	54.21	26.23
2041	18.80	53.25	27.94
Sudbury	0--19	20--64	65+
2013	19.79	60.77	19.44
2020	17.68	56.29	26.03
2030	17.36	47.61	35.02
2041	17.01	46.16	36.82
Timiskaming	0--19	20--64	65+
2013	20.97	59.15	19.88
2020	20.08	55.40	24.52
2030	20.97	47.78	31.24
2041	20.19	47.36	32.44

Source: Calculated Based on the Ministry of Finance Projections.

2.2: Aboriginal Population Projection for Northeastern Ontario

This part of the report employs Northern Ontario's demographic model, which is based on the Cohort Component method, to make projections of the Aboriginal population in Northeastern Ontario.¹⁴ The base year data for the Aboriginal population projection is from the 2011 National Household Survey (NHS). In projecting the future Aboriginal population, we have assumed zero

¹⁴ For a complete discussion of this model see my report entitled "It's what you know (and where you can go), Human capital and agglomeration effects on demographic trends in Northern Ontario" prepared for the Northern Ontario Policy Institute, 2015.

net migration of the Aboriginal people during the forecast period. The existing evidence suggests relatively low mobility among the Aboriginal population in the region. The fertility rate for the Aboriginal population is assumed to equal that in rural Northwestern Ontario. The mortality rate is assumed to equal the rates for the general population of Canada based on the 2011 census.

Based on the above information, Table 2.5 shows population projections for the Aboriginal people in Northeastern Ontario during the next three decades.

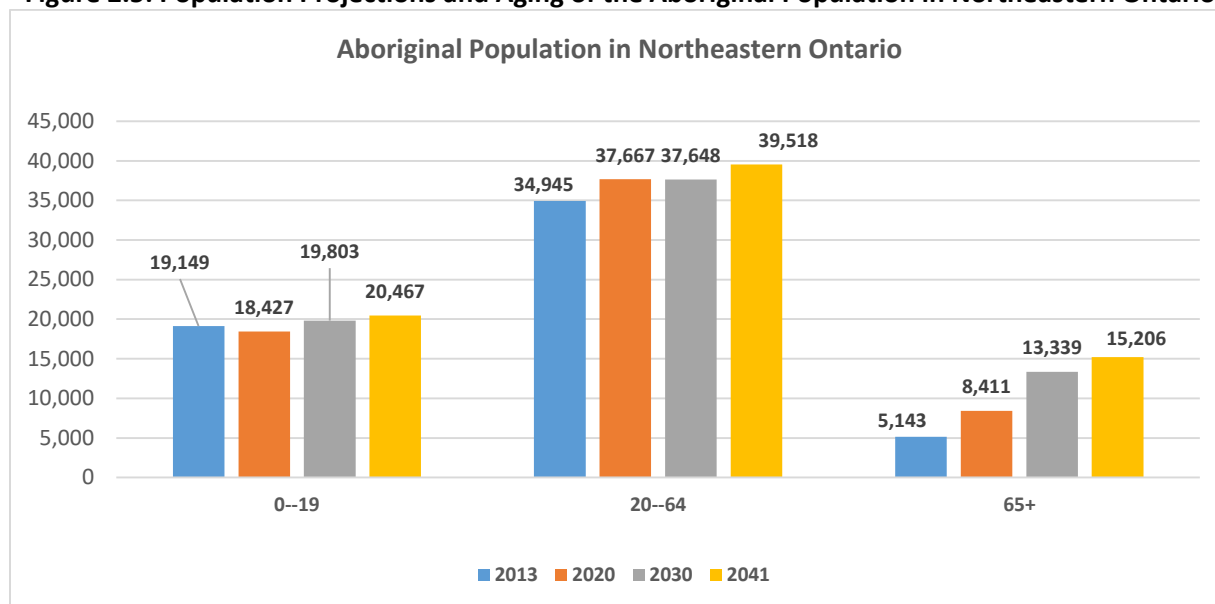
Table 2.5: Aboriginal Population Projections for Northeastern Ontario

Year	0--19	20--44	45--64	65+	Total
2013	19,157	19,167	15,777	5,143	59,244
2014	19,014	19,317	16,093	5,578	60,002
2015	18,822	19,797	16,098	6,049	60,766
2016	18,461	20,252	16,267	6,545	61,525
2017	18,440	20,493	16,412	6,935	62,280
2018	18,414	20,774	16,444	7,407	63,038
2019	18,338	21,129	16,375	7,952	63,795
2020	18,462	21,450	16,217	8,411	64,539
2021	18,488	21,796	16,088	8,902	65,274
2022	18,626	22,062	15,947	9,368	66,003
2023	18,855	22,268	15,626	9,966	66,715
2024	19,085	22,345	15,497	10,477	67,404
2025	19,245	22,363	15,473	10,988	68,069
2026	19,277	22,660	15,143	11,603	68,683
2027	19,469	22,882	14,917	12,005	69,272
2028	19,682	22,958	14,733	12,459	69,832
2029	19,875	22,967	14,682	12,843	70,367
2030	19,877	23,219	14,429	13,339	70,865
2031	20,183	23,208	14,252	13,700	71,343
2032	20,255	23,411	13,971	14,169	71,806
2033	20,308	23,648	13,971	14,317	72,244
2034	20,352	23,673	13,965	14,671	72,662
2035	20,387	23,811	14,107	14,764	73,069
2036	20,421	23,897	14,123	15,025	73,466
2037	20,451	23,905	14,335	15,158	73,849
2038	20,477	23,869	14,622	15,261	74,228
2039	20,501	23,803	14,964	15,335	74,603
2040	20,535	23,675	15,521	15,241	74,972
2041	20,576	23,378	16,179	15,206	75,339

Source: Based on Northern Ontario's Demographic Forecasting Model developed by the author.

Table 2.5 and Figure 2.5 show that Northeastern Ontario's Aboriginal population is expected to rise from 59,236 in 2013 to 75,191 in 2041, a growth rate of about 27.0 percent. The number of children aged 19 and under is expected to remain relatively constant. The number of working age individuals will increase from 34,945 in 2013 to 39,518 in 2041, a growth rate of about 13.1 percent. The number of seniors aged 65 and older is expected to increase from 5,143 in 2013 to 15,206 in 2041, a growth rate of about 196.0 percent.

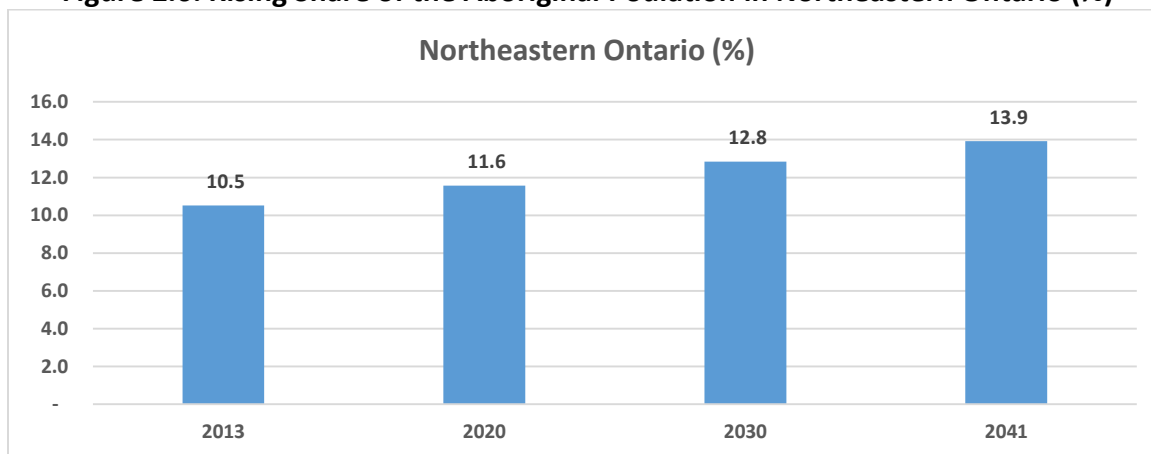
Figure 2.5: Population Projections and Aging of the Aboriginal Population in Northeastern Ontario



Source: Based on Northern Ontario's Demographic Forecasting Model developed by the author.

The Aboriginal population is not only expected to increase in size, but their share of Northeastern Ontario's population is also expected to increase. As Figure 2.6 shows, the share of the Aboriginal population is expected to rise from 10.5 percent in 2013 to 13.9 percent in 2041.

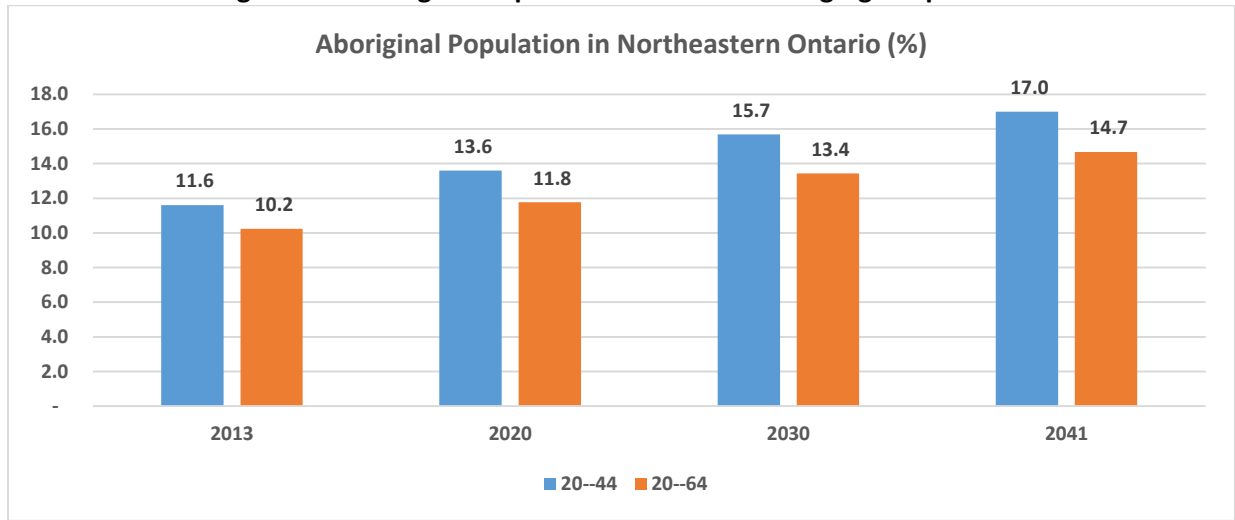
Figure 2.6: Rising Share of the Aboriginal Population in Northeastern Ontario (%)



Source: Based on Northern Ontario's Demographic Forecasting Model developed by the author.

Figure 2.7 shows that the Aboriginal population will comprise a growing share of the working age population in Northeastern Ontario in the coming years. Their share of the prime working age population is expected to rise from 11.6 percent in 2013 to 17.0 percent in 2041. Similarly, the Aboriginal population will account for about 14.7 percent of the working age population by 2041.

Figure 2.7: Aboriginal Population Share of Working Age Population



Source: Based on Northern Ontario's Demographic Forecasting Model developed by the author.

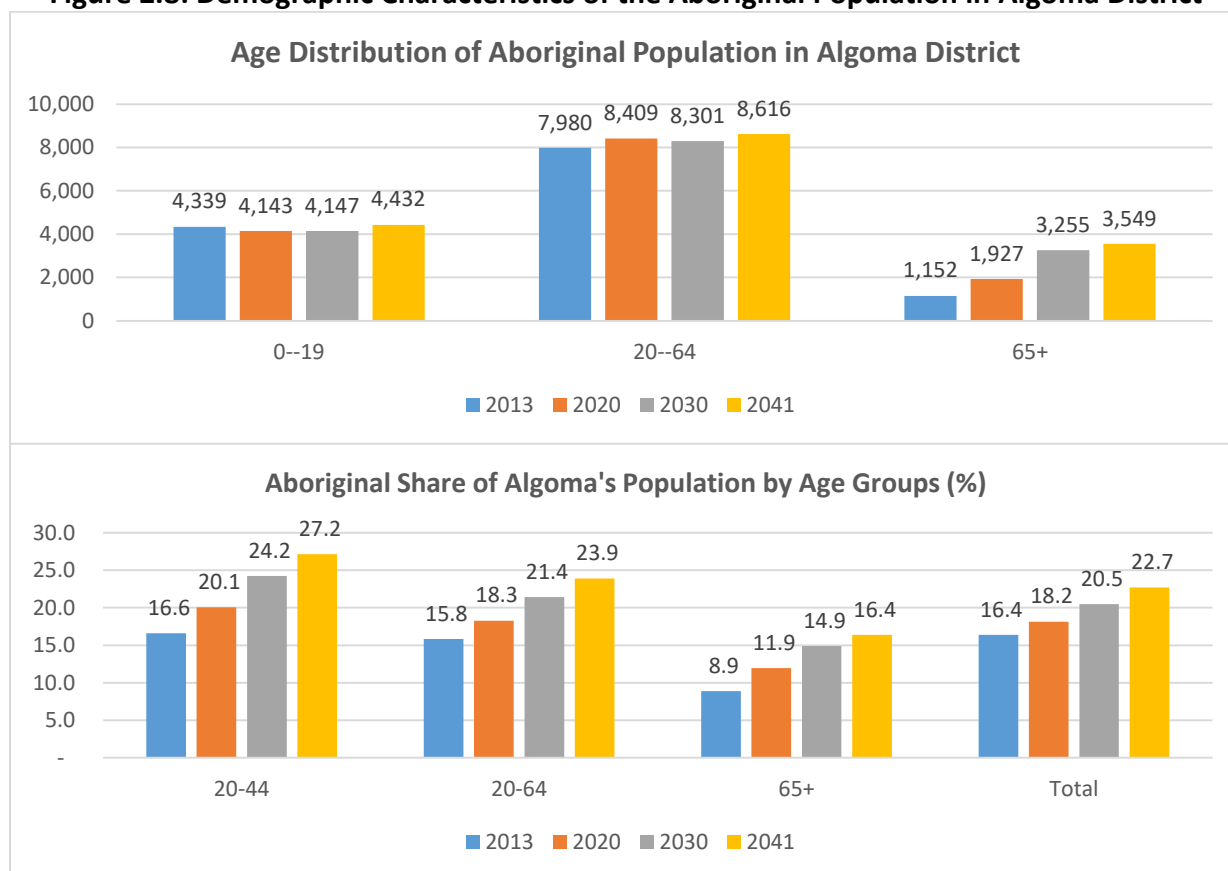
2.3: Aboriginal Population Projection for Various Districts in Northeastern Ontario

2.3.1. Algoma District

Figure 2.8 shows the population projections for the Aboriginal people in Algoma district. Total Aboriginal population in Algoma is expected to increase from 13,471 in 2013 to 16,597 in 2041, a growth rate of about 23.2 percent. The number of individuals under the age of 20 is expected to increase by about 2.1 percent. The number of working-age Aboriginals is expected to rise from 7,980 in 2013 to 8,616 in 2041, an increase of about 8.0 percent. The number of those aged 65 and over are expected to rise from 1,152 in 2013 to 3,549 in 2041, an increase of about 208.0 percent.

The Aboriginal population's share of total district's population is expected to increase from 11.5 percent in 2013 to 15.6 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 12.9 percent in 2013 to 20.3 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from 11.5 percent in 2013 to 17.0 percent in 2041. The share of Aboriginal seniors is expected to rise from 4.5 percent in 2013 to 9.7 percent in 2041.

Figure 2.8: Demographic Characteristics of the Aboriginal Population in Algoma District

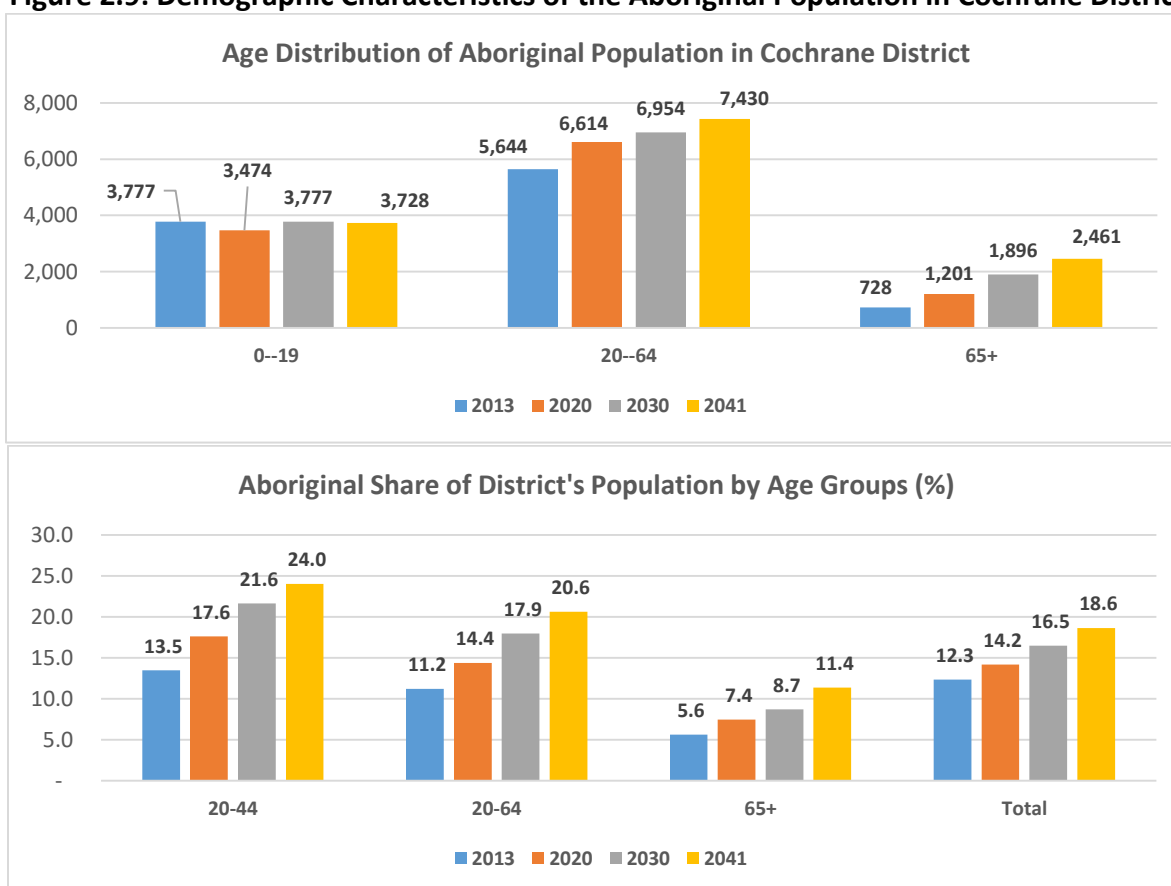


2.3.2. Cochrane District

Figure 2.9 shows the population projections for the Aboriginal people in Cochrane district. Total Aboriginal population in Cochrane district is expected to increase from 10,149 in 2013 to 13,619 in 2041, a growth rate of about 34.2 percent. The number of individuals under the age of 20 is expected to stay relatively constant. The number of working-age Aboriginals is expected to rise from 5,644 in 2013 to 7,430 in 2041, an increase of about 32.0 percent. The number of those aged 65 and over are expected to rise from 728 in 2013 to 2,461 in 2041.

The Aboriginal population's share of total district's population is expected to increase from 12.3 percent in 2013 to 18.6 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 13.5 percent in 2013 to 24.0 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from 11.2 percent in 2013 to 20.6 percent in 2041. The share of Aboriginal seniors is expected to rise from 5.6 percent in 2013 to 11.4 percent in 2041.

Figure 2.9: Demographic Characteristics of the Aboriginal Population in Cochrane District

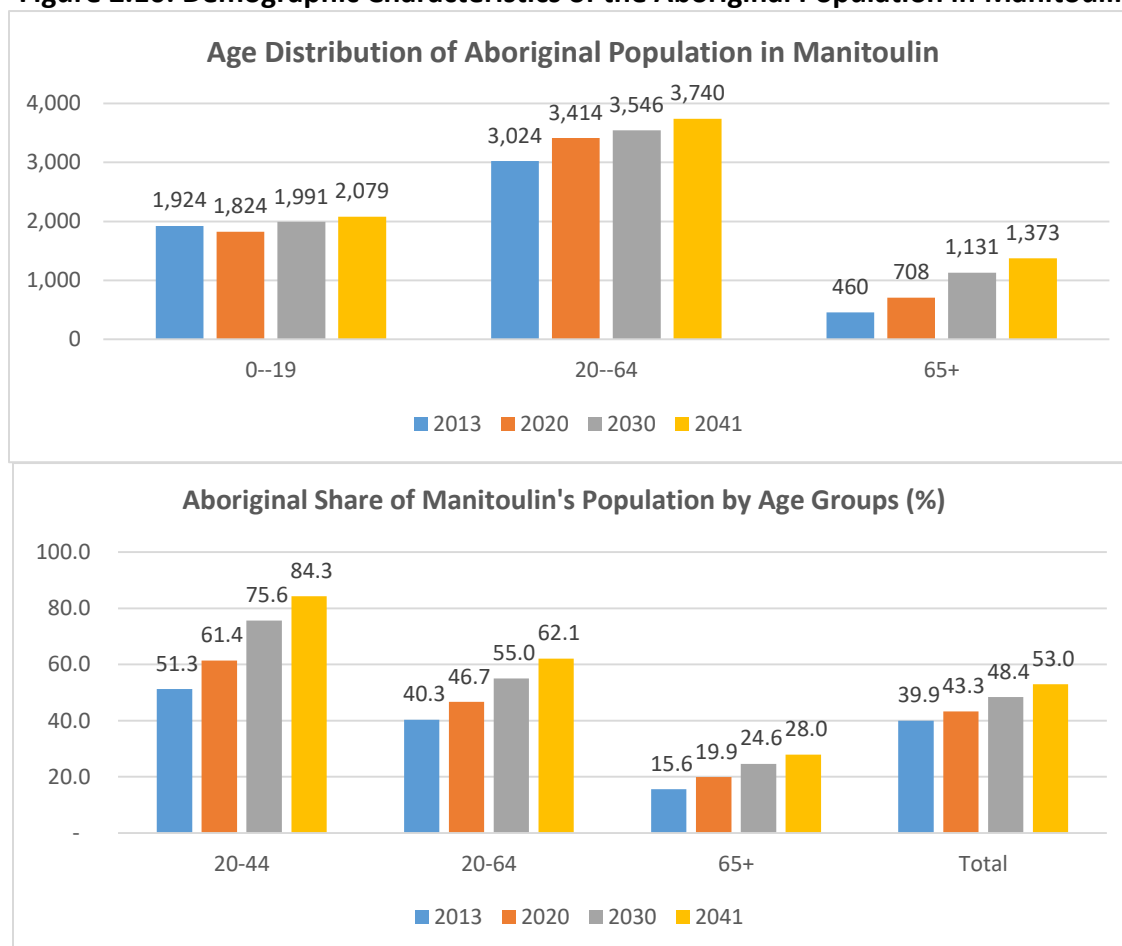


2.3.3. Manitoulin District

Figure 2.10 shows the population projections for the Aboriginal people in Manitoulin district. Total Aboriginal population in Manitoulin is expected to increase from 5,408 in 2013 to 7,192 in 2041, a growth rate of about 33.0 percent. The number of individuals under the age of 20 is expected to increase by about 8.0 percent. The number of working-age Aboriginals is expected to rise from 3,024 in 2013 to 3,740 in 2041, an increase of about 23.7 percent. The number of those aged 65 and over are expected to rise from 460 in 2013 to 1,373 in 2041, an increase of about 199.0 percent.

The Aboriginal population's share of total district's population is expected to increase from 40.0 percent in 2013 to 53.0 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 51.3 percent in 2013 to 84.3 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from 40.3 percent in 2013 to 62.1 percent in 2041. The share of Aboriginal seniors is expected to rise from 15.6 percent in 2013 to 28.0 percent in 2041.

Figure 2.10: Demographic Characteristics of the Aboriginal Population in Manitoulin

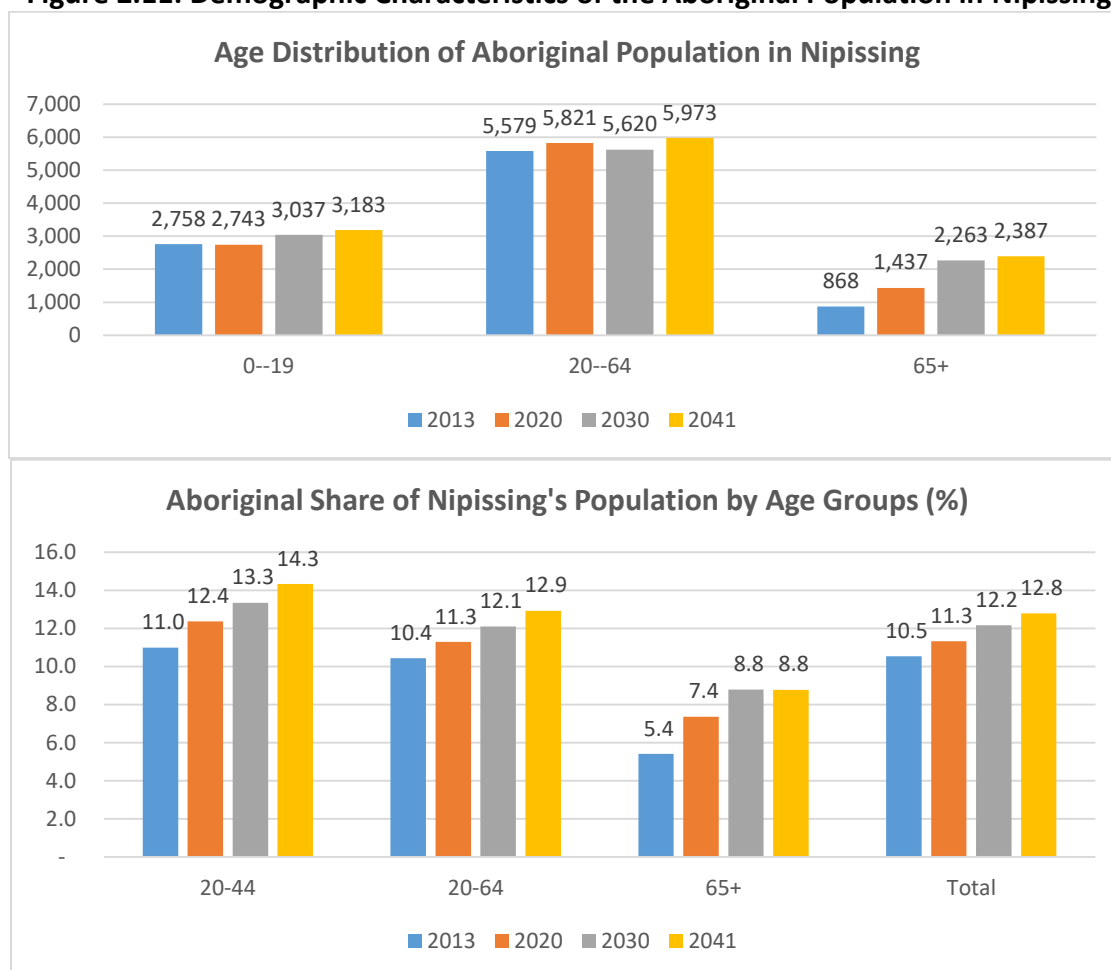


2.3.4. Nipissing District

Figure 2.11 shows the population projections for the Aboriginal people in Nipissing district. Total Aboriginal population in Nipissing is expected to increase from 9,205 in 2013 to 11,543 in 2041, a growth rate of about 25.4 percent. The number of individuals under the age of 20 is expected to increase from 2,758 in 2013 to 3,183 in 2041, a rise of about 15.4 percent. The number of working-age Aboriginals is expected to rise from 5,579 in 2013 to 5,973 in 2041, an increase of about 7.1 percent. The number of those aged 65 and over are expected to rise from 868 in 2013 to 2,387 in 2041, an increase of about 175.0 percent.

The Aboriginal population's share of total district's population is expected to increase from 10.5 percent in 2013 to 12.8 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 11.0 percent in 2013 to 14.3 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from 10.4 percent in 2013 to 12.9 percent in 2041. The share of Aboriginal seniors is expected to rise from 5.4 percent in 2013 to 8.8 percent in 2041.

Figure 2.11: Demographic Characteristics of the Aboriginal Population in Nipissing

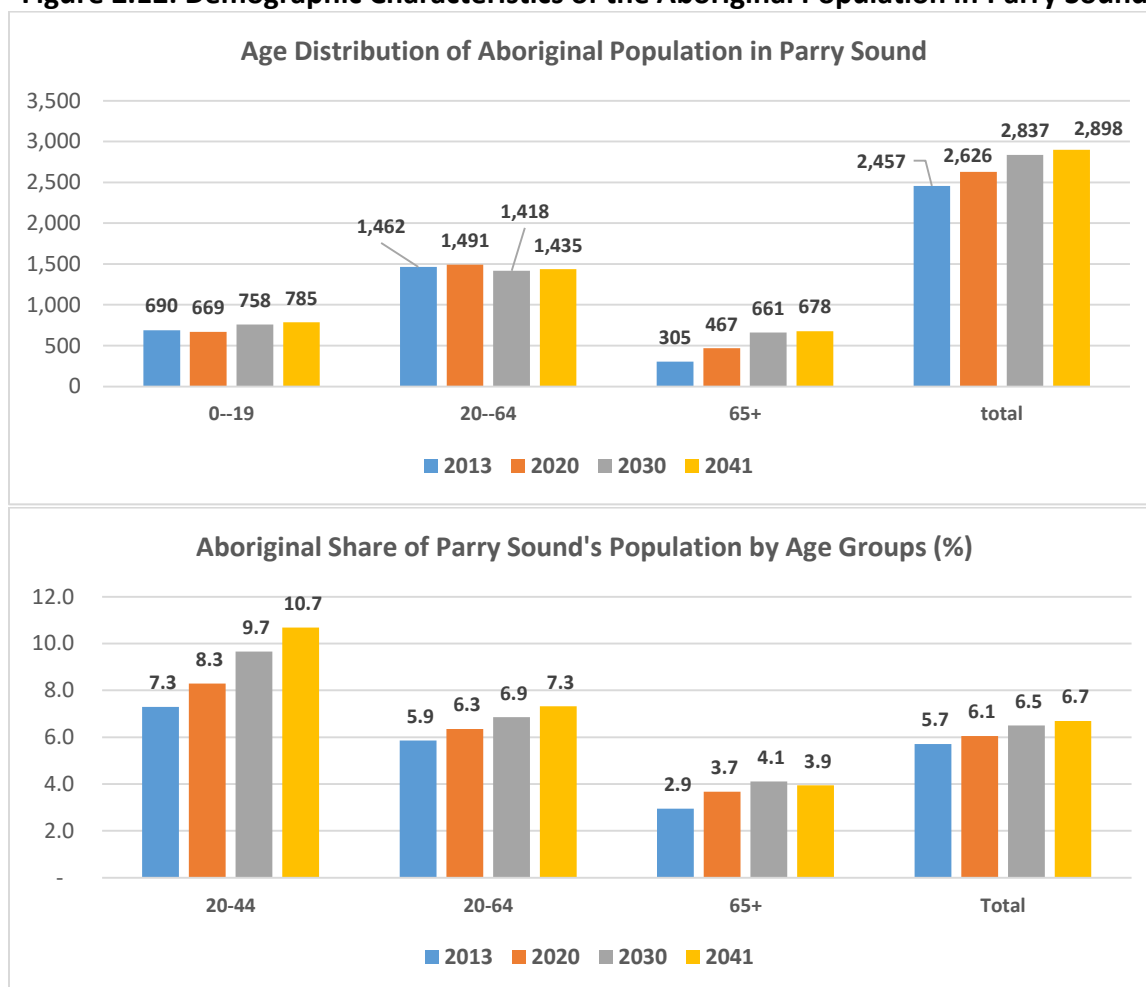


2.3.5. Parry Sound District

Figure 2.12 shows the population projections for the Aboriginal people in Parry Sound District. Total Aboriginal population in Parry Sound is projected to increase from 2,457 in 2013 to 2,837 in 2041, a growth rate of about 18.0 percent. The number of individuals under the age of 20 is expected to increase about 14.0 percent. The number of working-age Aboriginals is expected to decline by about 2.0 percent during 2013-41. The number of those aged 65 and over are expected to rise by more than 122 percent during 2013-41.

The Aboriginal population's share of total district's population is expected to increase from 5.7 percent in 2013 to 6.7 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 7.3 percent in 2013 to 10.7 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from 5.9 percent in 2013 to 7.3 percent in 2041. The share of Aboriginal seniors is expected to rise from 2.9 percent in 2013 to 3.9 percent in 2041.

Figure 2.12: Demographic Characteristics of the Aboriginal Population in Parry Sound

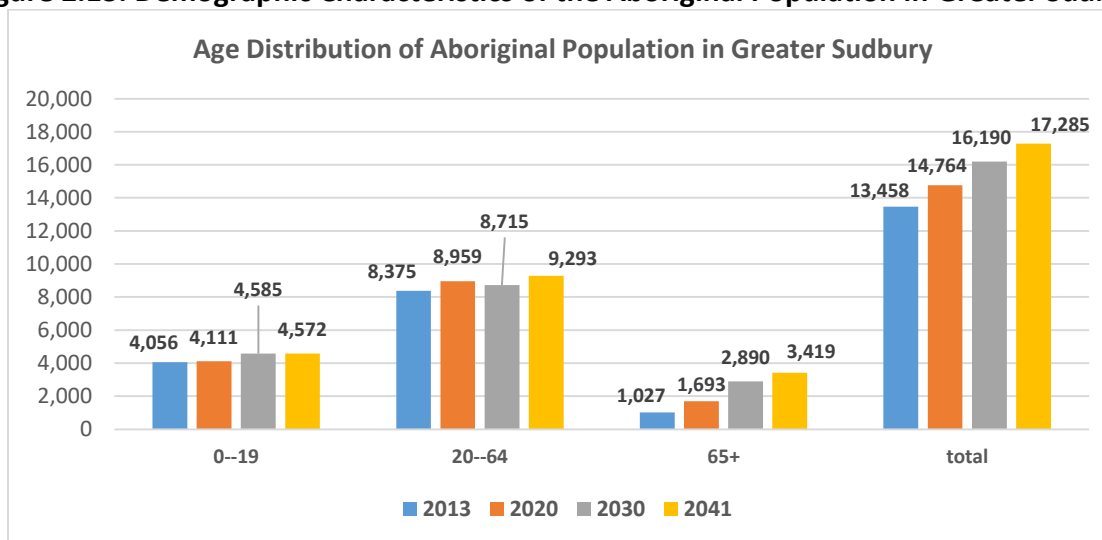


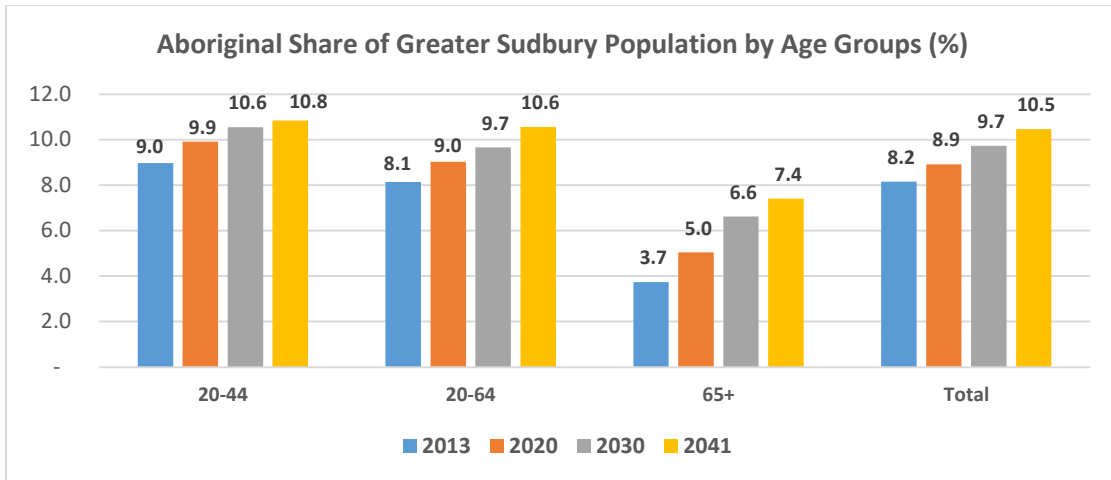
2.3.4. Greater Sudbury

Figure 2.13 shows the population projections for the Aboriginal people in the Greater Sudbury region. Total Aboriginal population in the Greater Sudbury is expected to increase by 28.4 percent during 2013-2041. The number of individuals under the age of 20 is expected to increase about 13 percent. The number of working-age Aboriginals is expected to rise by about 11.0 percent during 2013-41. The number of those aged 65 and over are expected to rise from 1,027 in 2013 to 3,419 in 2041, an increase of about 233.0 percent.

The Aboriginal population's share of total population in Greater Sudbury is expected to increase from 8.2 percent in 2013 to 10.5 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 9.0 percent in 2013 to 10.8 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from 8.1 percent in 2013 to 10.6 percent in 2041. The share of Aboriginal seniors is expected to rise from 3.7 percent in 2013 to 7.4 percent in 2041.

Figure 2.13: Demographic Characteristics of the Aboriginal Population in Greater Sudbury



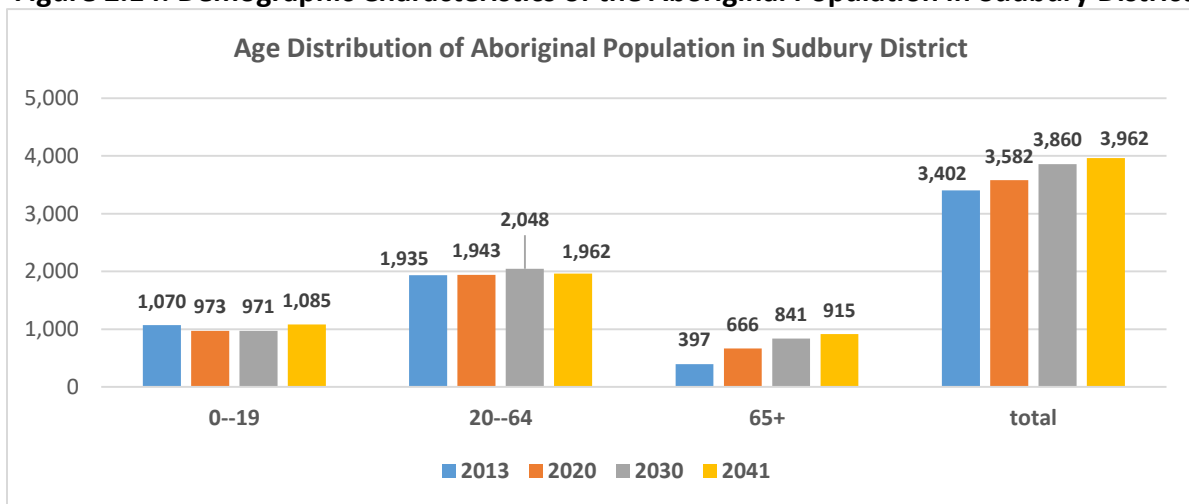


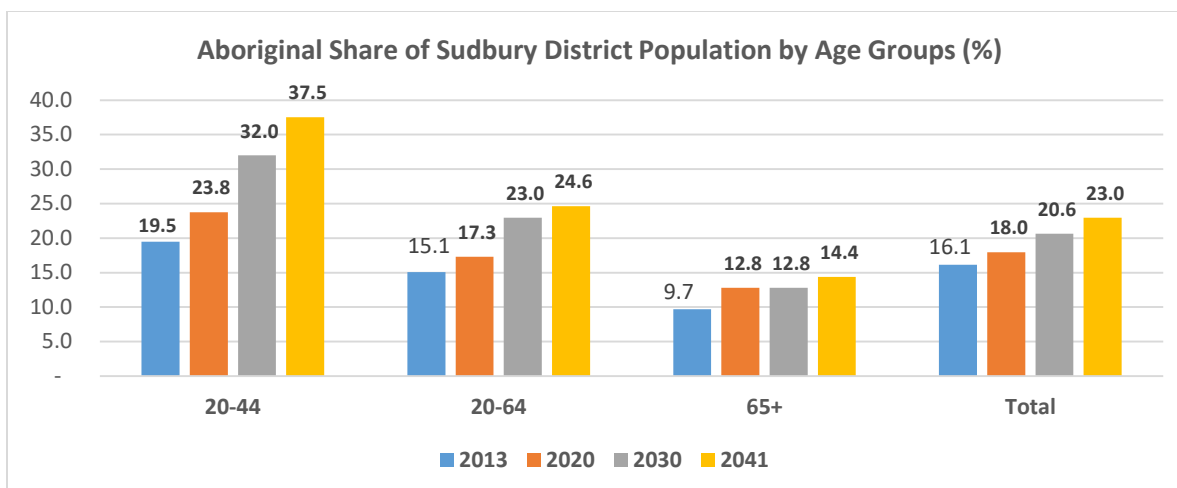
2.3.4. District of Sudbury

Figure 2.14 shows the population projections for the Aboriginal people in Sudbury district. Total Aboriginal population in the Sudbury is expected to increase by 16.5 percent during 2013-2041. The number of individuals under the age of 20 is expected to increase about 1.5 percent. The number of working-age Aboriginals is expected to rise by about 1.4 percent during 2013-41. The number of those aged 65 and over are expected to rise by about 130.3 percent during 2013-41.

The Aboriginal population’s share of total population in Greater Sudbury is expected to increase from 16.1 percent in 2013 to 23.0 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 19.5 percent in 2013 to 37.5 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from 15.1 percent in 2013 to 24.6 percent in 2041. The share of Aboriginal seniors is expected to rise from 9.7 percent in 2013 to 14.4 percent in 2041.

Figure 2.14: Demographic Characteristics of the Aboriginal Population in Sudbury District



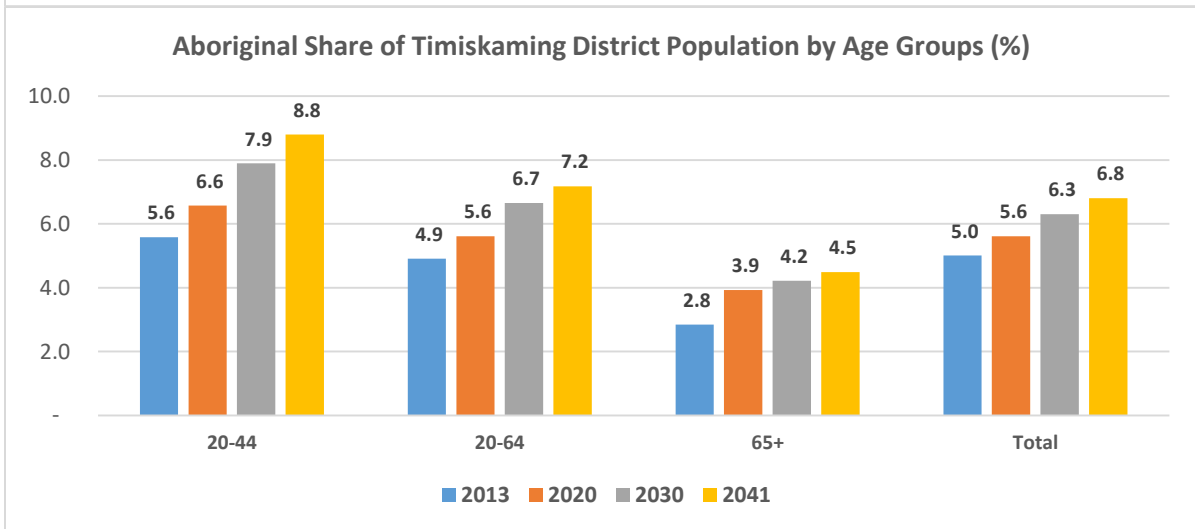
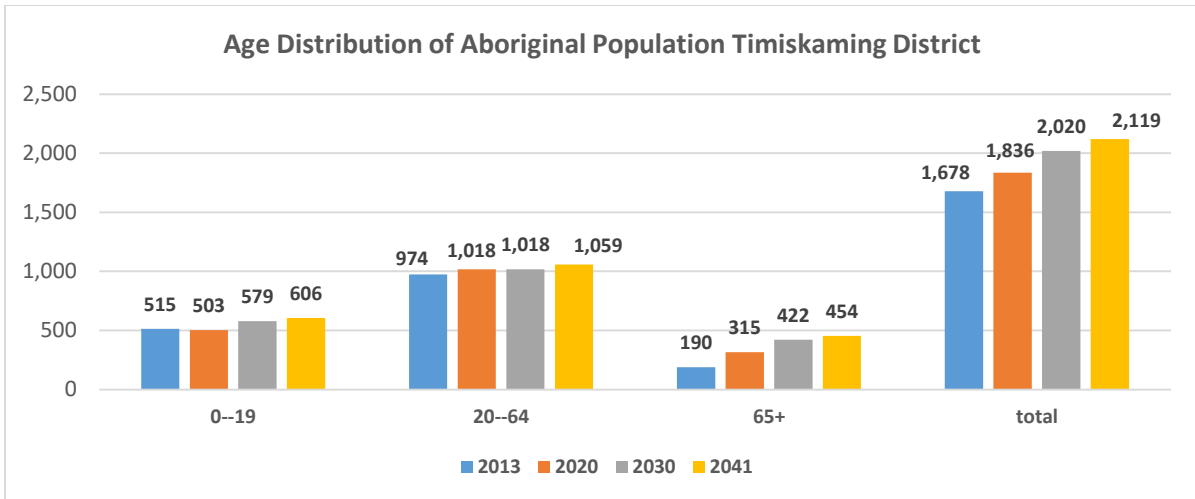


2.3.4. District of Timiskaming

Figure 2.15 shows the population projections for the Aboriginal people in Timiskaming district. Total Aboriginal population in the district is expected to increase by 26.3 percent during 2013-2041. The number of individuals under the age of 20 is expected to increase about 17.8 percent. The number of working-age Aboriginals is expected to rise by about 8.7 percent during 2013-41. The number of those aged 65 and over are expected to rise by about 139.3 percent during 2013-41.

The Aboriginal population's share of total population in Timiskaming is relatively small but growing. It is expected to increase from 5.0 percent in 2013 to about 7.0 percent in 2041. The share of prime working-age (20-44) Aboriginal population is expected to increase from 5.6 percent in 2013 to 8.8 percent in 2041. Similarly, the share of working-age Aboriginals is expected to increase from about 5.0 percent in 2013 to 7.2 percent in 2041. The share of Aboriginal seniors is expected to rise from 2.8 percent in 2013 to 4.5 percent in 2041.

Figure 2.15: Demographic Characteristics of the Aboriginal Population in Sudbury District



Part III: Northeastern Ontario's Labour Force: Past, Present and Future Trends

Demographic changes have a direct impact on the supply side of the economy through their influence on the labour force. Population aging and a declining share of working age people can seriously restrain future economic development unless productivity growth accelerates or steps are taken to increase participation of older workers, youth and other underrepresented groups in the labour force.

Part II of the study showed that the Aboriginal population represents a growing segment of Northeastern Ontario's population. We also saw that they encompass a growing segment of the working-age population in the region as well. However, there exists a significant gap between the level of educational achievement of Aboriginal individuals and the general population. This education gap results in a severe labour market outcome disparity which influences productivity and the future productive capacity of Northeastern Ontario's labour force.

This part of the study examines past, present and future labour market trends in Northeastern Ontario. The data used in this part come from the 2001 census and 2011 National Household Survey (NHS).

3.1. Labour Market Trends in Northeastern Ontario

Table 3.1 shows various labour market indicators for Northeastern Ontario during 2001-2011. The total core working-age population (ages 15 to 64) in Northeastern Ontario declined from 365,020 in 2001 to 364,100 in 2011. During the same period, labour force participation rate among women rose by 3.8 percent resulting in an increased number of people in the labour force. The Ontario Ministry of Finance reports that, "The most significant trend driving the aggregate labour force participation rate in Ontario has been the increase in the number of women in the workforce. Labour force participation rates for adult women have risen dramatically, from 57.0 percent in 1976 to 82.0 percent in 2013."¹⁵

Total employment among men declined while that among women increased during 2001-2011. The unemployment rate among men declined slightly but stayed about 2.2 percent higher than the provincial rate of 8.4 percent in 2011. The unemployment rate among women declined during 2001-2011 and equaled the provincial rate of 8.3 percent in 2011 (Figure 3.1).

¹⁵ Ontario Ministry of Finance, "Ontario's Long-Term Report on the Economy", 2014.

Table 3.1: Labour Market Trends in Northeastern Ontario

Labour Market Outcome	Men	Men	Women	Women
Northeastern Ontario	2001	2011	2001	2011
Total population 15 to 64 years of age	179,755	180,120	185,265	183,980
In the labour force	137,045	135,580	123,265	129,300
Employed	122,290	121,260	112,320	118,615
Unemployed	14,760	14,320	10,945	10,680
Not in the labour Force	42,705	44,540	61,995	54,680
Participation Rate	76.2	75.3	66.5	70.3
Employment Rate	68.0	67.3	60.6	64.5
Unemployment Rate	10.8	10.6	8.9	8.3
Francophone Population	2001	2011	2001	2011
Total population 15 to 64 years of age	44,465	37,800	46,575	40,405
In the labour force	33,855	28,640	30,285	27,975
Employed	30,060	26,125	28,230	26,390
Unemployed	3,795	2,510	2,060	1,585
Not in the labour Force	10,605	9,155	16,285	12,430
Participation Rate	76.1	75.8	65.0	69.2
Employment Rate	67.6	69.1	60.6	65.3
Unemployment Rate	11.2	8.8	6.8	5.7
Immigrant Population	2001	2011	2001	2011
Total population 15 to 64 years of age	9,555	7,345	10,650	8,660
In the labour force	7,165	5,415	6,440	5,480
Employed	6,670	5,055	6,070	5,080
Unemployed	495	355	370	400
Not in the labour Force	2,390	1,930	4,205	3,175
Participation Rate	75.0	73.7	60.5	63.3
Employment Rate	69.8	68.8	57.0	58.7
Unemployment Rate	7.0	6.6	5.8	7.3
Aboriginal Population	2001	2011	2001	2011
Total population 15 to 64 years of age	13,015	19,135	13,855	20,635
In the labour force	9,145	12,740	8,155	12,765
Employed	7,195	10,655	6,810	11,360
Unemployed	1,950	2,085	1,345	1,410
Not in the labour Force	3,870	6,400	5,700	7,870
Participation Rate	70.3	66.6	58.9	61.9
Employment Rate	55.2	55.7	49.2	55.1
Unemployment Rate	21.3	16.4	16.5	11.0

Source: Statistics Canada, 2001 Census and 2011 NHS, custom tabulation.

Figure 3.1: Labour Force Participation and Unemployment Rates in Northeastern Ontario

Source: Statistics Canada, 2011 NHS, custom tabulation.

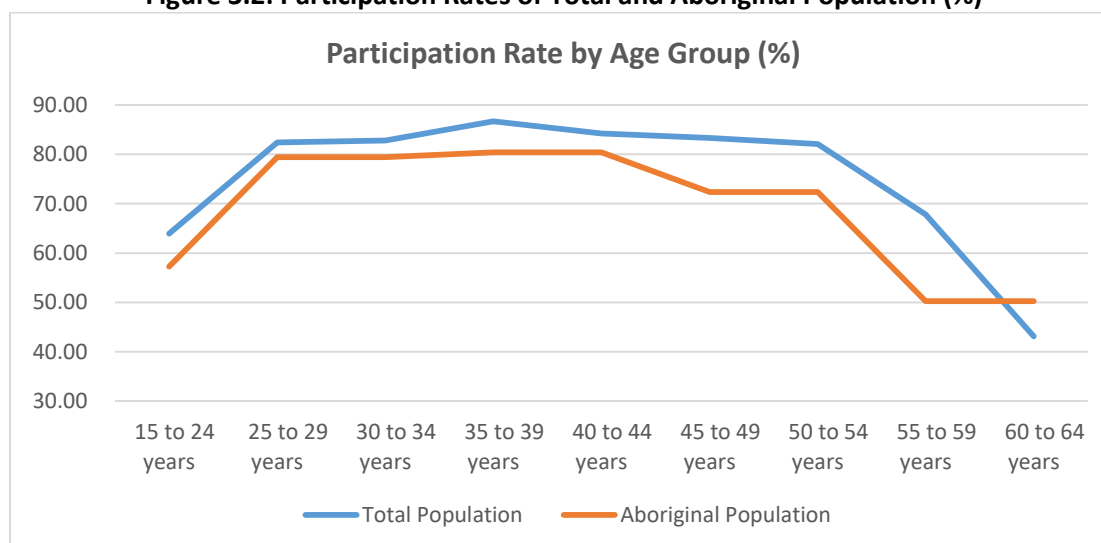
The labour force participation rate among Francophones is slightly higher but their unemployment rate is slightly lower than the regional average. The labour force participation rates of immigrants is slightly lower than the regional average. On the other hand, the unemployment rates of immigrant men and women are significantly lower than the regional average.

The labour force participation rate of Aboriginal men declined from 70.3 percent in 2001 to 66.6 percent in 2011. On the other hand, the participation rate among Aboriginal women increased from 49.2 percent in 2001 to 55.1 percent in 2011. The unemployment rate among Aboriginal men declined from 21.3 percent in 2001 to 16.4 percent in 2011. This decline can be partly attributed to the fact that some of the previously unemployed persons stopped participating in the labour force. The unemployment rate among Aboriginal women also declined from 16.5 percent in 2001 to 11.0 percent in 2011. The labour market outcome for Aboriginals who live on

reserve is different from those who live off-reserve. In general, those living on-reserve have lower participation rates and much higher unemployment rates.

In general, Aboriginals tend to underperform in the labour market relative to non-Aboriginal peoples. The labour force participation rate among Aboriginals is below the regional averages (Figure 3.2). They are seriously underrepresented in the labour force. As we saw, their unemployment rates are significantly higher than the regional averages. In fact, the lower labour force participation rate is partly attributable to the presence of the high unemployment rate among the Aboriginal workforce. It is also partly related to the fact that the level of educational attainment of the Aboriginal labour force is below the regional average. We will estimate the human capital composition index for the Aboriginal labour force later in this report.

Figure 3.2: Participation Rates of Total and Aboriginal Population (%)



Source: Statistics Canada, 2011 NHS, custom tabulation.

3.2. Labour Market Trends in Various Northeastern Ontario Districts

Tables 3.2 and 3.3 and Figure 3.3 show various labour market indicators for men and women aged 15 to 64 years for various census divisions in Northeastern Ontario. We note that the indicators for population groups with fewer than 500 individuals are not very reliable. The labour force participation rate among men ranges from a low of 68.7 percent in Manitoulin to a high of 77.6 percent in the Greater Sudbury region compared to the provincial average of 76.0 percent in 2011. Aboriginal population living on reserve have a lowest participation rate followed by those living off-reserve. The participation rate among women ranges from 66.9 percent in Timiskaming to 72.3 percent in the Greater Sudbury region. Again, the participation rate among the Aboriginal women is generally lower than the regional average.

Overall, the participation rate in Northeastern Ontario equals 72.7 percent compared to the provincial average of 76.0 percent. The participation rate among francophones, immigrants and the Aboriginals in Northeastern Ontario equal 72.4, 68.1 and 64.1 percent compared to the provincial average of 76.6, 75.2 and 67.0 percent respectively.

The unemployment rate among the working age population in Northeastern Ontario equaled 9.4 percent compared to the provincial average of 8.4 percent in 2011. The unemployment rate among men in Northeastern Ontario ranges from a low of 8.2 percent in the Greater Sudbury region to a high of 14.9 percent in Manitoulin. It reaches as high as 22.0 percent among Aboriginal men in Algoma. The unemployment rate among women ranges from a low of 6.7 percent in Cochrane to a high of a 10.3 percent in Manitoulin. The unemployment rate among off-reserve Aboriginal women reaches as high as 14.0 percent in Algoma.

The employment rate which represents the share of the working age population who were employed ranges from a low of 58.5 percent in Manitoulin to a high of 71.3 percent in the Greater Sudbury region. Again, the employment rates are generally lower for the Aboriginal population. The employment rate among the working age women ranges from 60.2 percent in Timiskaming to a high of 66.9 percent in the Greater Sudbury region. Overall, the employment rate in Northeastern Ontario equals 65.9 percent compared to the provincial average of 69.6 percent. The employment rate for francophones, immigrants and Aboriginals in Northeastern Ontario equals 67.1, 63.4 and 55.4 percent compared to the provincial average of 71.9, 68.7 and 57.7 percent respectively.

Figure 3.3: Labour Market Indicators for Northeastern Ontario in 2011

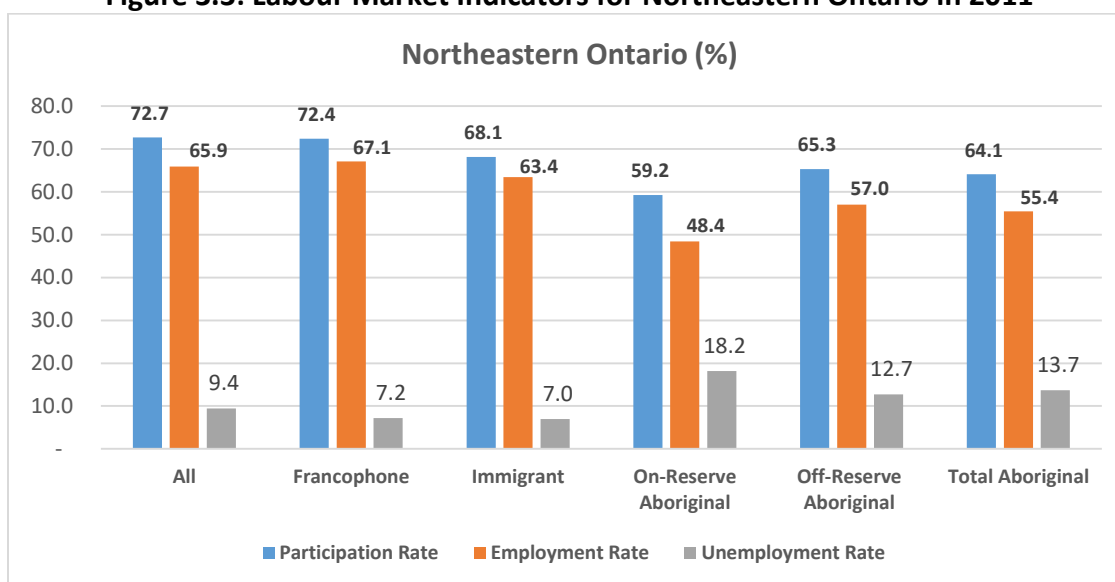


Table 3.2: Labour Market Trends for Men in Northeastern Ontario in 2011

Algoma	All Men	Francophone	Immigrant	On-Reserve Aboriginal	Off-Reserve Aboriginal
Population 15 to 64	36,695	2,170	2,115	970	3,255
Participation rate	73.1	71.9	65.6	56.9	65.7
Employment rate	63.8	64.1	60.7	44.1	51.5
Unemployment rate	12.7	10.9	7.6	22.5	21.7
Cochrane					
Population 15 to 64	26,820	11,995	660	440	2,670
Participation rate	76.1	76.8	75.9	53.9	65.9
Employment rate	68.5	70.0	72.9	42.7	55.6
Unemployment rate	9.9	8.9	3.0	22.9	15.6
Greater Sudbury					
Population 15 to 64	53,690	13,005	2,385	25	4,505
Participation rate	77.6	77	78.4	N.A.	71
Employment rate	71.3	71.4	74.2	N.A.	61.4
Unemployment rate	8.2	7.3	5.3	0.0	13.5
Manitoulin					
Population 15 to 64	4,020	95	140	1,495	240
Participation rate	68.7	72.2	57.1	60.2	65.3
Employment rate	58.5	66.7	46.4	46.8	65.3
Unemployment rate	14.9	0	18.8	22.8	0.0
Nipissing					
Population 15 to 64	27,750	6,200	1,080	310	2,780
Participation rate	74.8	74.5	72.4	67.2	68.0
Employment rate	67.2	66.8	69.1	57.4	58.1
Unemployment rate	10.3	10.4	5.1	12.2	14.8
Parry Sound					
Population 15 to 64	13,365	240	555	325	485
Participation rate	76.2	77.1	82.9	73.8	74.2
Employment rate	65	66.7	71.2	55.4	70.1
Unemployment rate	14.6	13.5	14.1	25.0	5.6
Sudbury					
Population 15 to 64	7,225	1,915	115	210	940
Participation rate	71.2	68.7	78.3	66.7	63.3
Employment rate	63.8	63.7	73.9	52.4	58.0
Unemployment rate	10.4	7.2	11.1	21.4	9.2
Timiskaming					
Population 15 to 64	10,575	2,175	295	30	470
Participation rate	73.9	76.6	81.4	N.A.	66.0
Employment rate	65.4	67.4	78	N.A.	54.3
Unemployment rate	11.6	11.7	4.2	0.0	17.7

Table 3.3: Labour Market Trends for Women in Northeastern Ontario in 2011

Algoma	Total	Francophone	Immigrant	On-Reserve Aboriginal	Off-Reserve Aboriginal
Population 15 to 64	38,420	2,245	2,615	995	3,790
Participation rate	69.0	62.7	57.1	54.0	57.7
Employment rate	62.6	58.5	54.4	46.5	50.3
Unemployment rate	9.3	6.8	4.4	14.0	12.8
Cochrane					
Population 15 to 64	26,945	12,145	725	410	3,070
Participation rate	69.1	69.5	66.2	50.0	61.4
Employment rate	64.5	66.1	63.4	42.7	56.5
Unemployment rate	6.7	4.8	5.2	14.6	8.0
Greater Sudbury					
Population 15 to 64	55,175	14,895	2,735	25	4,905
Participation rate	72.3	71.2	66.8	N.A.	67.8
Employment rate	66.9	67.1	58.2	N.A.	61.1
Unemployment rate	7.5	5.8	13.2	N.A.	9.9
Manitoulin					
Population 15 to 64	4,250	95	160	1,510	225
Participation rate	69.7	63.2	54.5	57.6	80.0
Employment rate	62.5	47.4	51.5	48.7	75.6
Unemployment rate	10.3	16.7	11.1	15.5	5.6
Nipissing					
Population 15 to 64	28,555	6,385	1,175	305	2,895
Participation rate	71.5	66.9	71.5	62.3	64.9
Employment rate	65.4	63.4	67.2	55.7	58.0
Unemployment rate	8.5	5.3	5.4	7.9	10.9
Parry Sound					
Population 15 to 64	13,065	440	735	320	515
Participation rate	69.5	69.3	63.5	69.2	58.3
Employment rate	63.2	67.0	61.5	55.4	50.5
Unemployment rate	9.0	3.3	3.2	17.8	11.7
Sudbury					
Population 15 to 64	6,925	1,755	190	230	835
Participation rate	67.6	69.8	53.8	60.9	60.5
Employment rate	61.6	62.1	51.3	54.3	58.1
Unemployment rate	8.8	10.6	0.0	10.7	5.0
Timiskaming					
Population 15 to 64	10,650	2,450	320	15	590
Participation rate	66.9	67.8	56.2	N.A.	56.4
Employment rate	60.2	64.1	56.2	N.A.	45.3
Unemployment rate	10	5.7	5.6	N.A.	19.7

Source: Statistics Canada, 2011 NHS, custom tabulation.

3.6: Size and Composition of the Future Labour Force

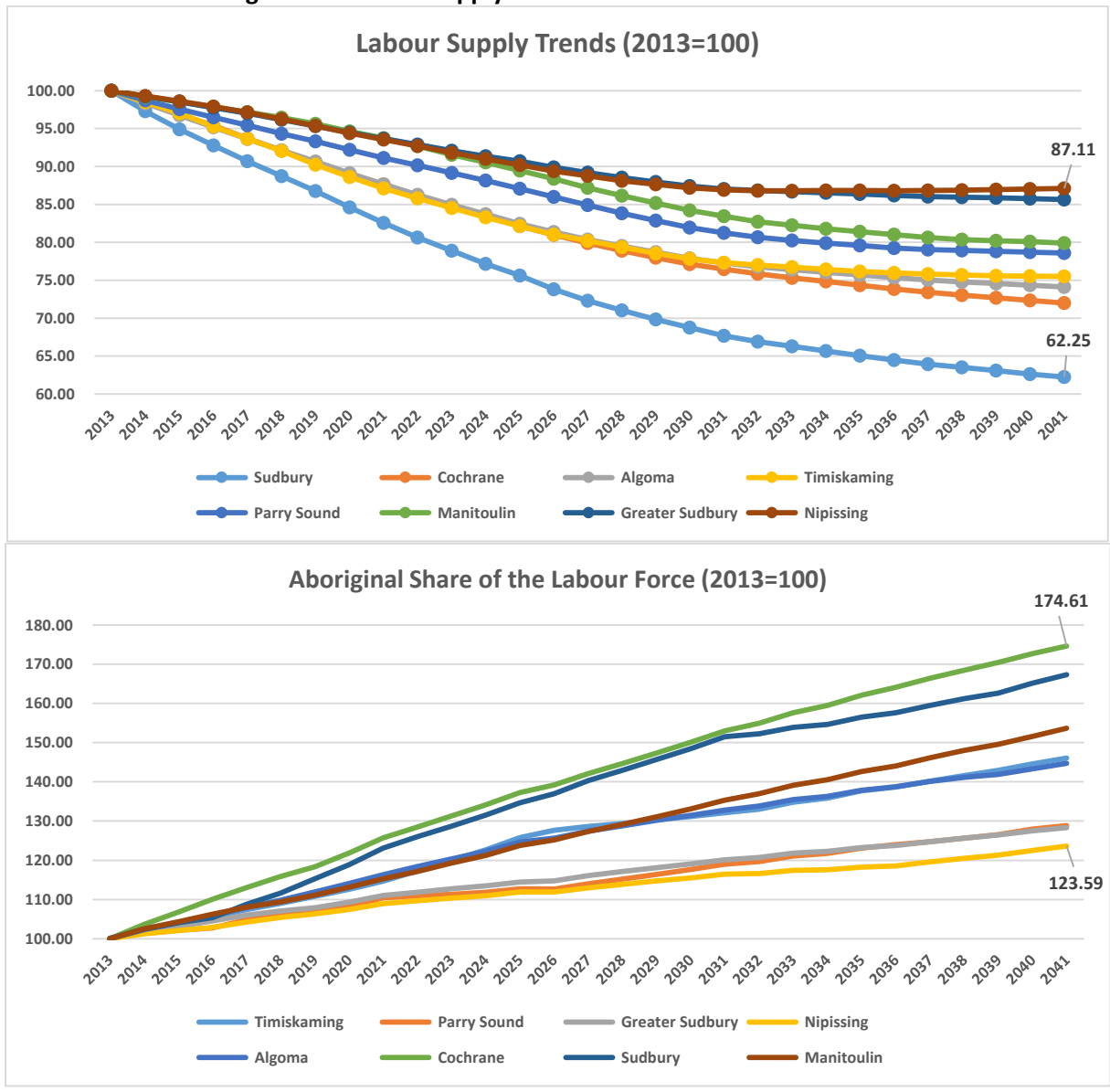
To forecast the future labour force in Northeastern Ontario and its districts, we use detailed population projections along with information regarding participation rates for men and women in different age groups. We have assumed that the participation rates during the projection period stay constant at their 2011 level. Different assumptions regarding the participation rates would alter the labour force estimates, but only to a limited extent. The main determinants of the future labour force are the size and age distribution of the population in each jurisdiction.

Tables 3.6 to 3.14 and Figure 3.6 provide labour supply projections for Northeastern Ontario and its eight districts. The projections show that the labour force in Northeastern Ontario is expected to decline from 264,860 in 2013 to 210,397 in 2041, a decline of about 20.6 percent during the projection period. During the same period, the Aboriginal labour force increases from 27,372 in 2013 to 30,706 in 2041, a rise of about 12.2 percent. As a result, the share of Aboriginals in the total regional labour force is expected to increase from 10.3 percent in 2013 to 14.6 percent in 2041. In fact, the share of the Aboriginal labour force varies significantly in various northeastern Ontario districts. It ranges from a low of 4.5 percent in Timiskaming to a high of about 40.0 percent in Manitoulin in 2013. Our projections suggest that the share of the Aboriginal labour force would range from a low of 6.6 percent in Timiskaming to a high of 60.9 percent in Manitoulin in 2041. What are the implications of the declining labour force for the future economic performance of Northeastern Ontario? What are the implications of the rising share of the Aboriginal labour force? It is known that the Aboriginal population have a lower level of educational achievement. How would this affect the human capital composition of the regional labour force in the coming years? These questions will be addressed later in this report.

As is the case for Northeastern Ontario, the labour force in all eight districts is expected to decline during the projection period. The declining trend is most pronounced in Sudbury (37.7%) followed by Cochrane district (28.0%) and Algoma district (25.9%). The declining workforce is partly due to the aging process and partly due to the out-migration of youth.

A declining regional labour force also implies that there will be more people to feed relative to each person in the labour force. For example, the number of dependent people for each person in the workforce will increase from 1.1 in 2013 to 1.6 in 2041 in Northeastern Ontario.

Figure 3.6: Future Supply of Labour in Northeastern Ontario



Source: Estimated by the author based on the population projections

Table 3.6: Future Labour Supply in Northeastern Ontario, 2013-2041

Year	Total Labour Force in N.E.O.	Aboriginal Labour Force	Aboriginal Share (%)
2013	264,860	27,372	10.33
2014	261,674	27,632	10.56
2015	258,626	27,751	10.73
2016	255,558	27,874	10.91
2017	252,470	28,059	11.11
2018	249,289	28,142	11.29
2019	246,155	28,200	11.46
2020	242,891	28,327	11.66
2021	239,896	28,554	11.90
2022	236,948	28,590	12.07
2023	234,070	28,611	12.22
2024	231,333	28,627	12.37
2025	228,687	28,737	12.57
2026	226,057	28,594	12.65
2027	223,711	28,695	12.83
2028	221,550	28,741	12.97
2029	219,616	28,813	13.12
2030	217,788	28,885	13.26
2031	216,402	29,033	13.42
2032	215,433	29,087	13.50
2033	214,669	29,304	13.65
2034	213,998	29,374	13.73
2035	213,288	29,586	13.87
2036	212,569	29,671	13.96
2037	211,992	29,880	14.09
2038	211,538	30,067	14.21
2039	211,198	30,240	14.32
2040	210,792	30,497	14.47
2041	210,397	30,706	14.59

Source: Estimated by the author based on the population projections

Table 3.7: Future Labour Supply in Algoma District, 2013-2041

Year	Total Labour Force in Algoma District	Aboriginal Labour Force	Aboriginal Share (%)
2013	53,239	6,192	11.63
2014	52,345	6,228	11.90
2015	51,502	6,234	12.10
2016	50,670	6,239	12.31
2017	49,845	6,257	12.55
2018	49,047	6,263	12.77
2019	48,267	6,283	13.02
2020	47,452	6,295	13.27
2021	46,674	6,315	13.53
2022	45,931	6,325	13.77
2023	45,234	6,330	13.99
2024	44,560	6,335	14.22
2025	43,900	6,364	14.50
2026	43,310	6,328	14.61
2027	42,791	6,343	14.82
2028	42,327	6,340	14.98
2029	41,905	6,343	15.14
2030	41,468	6,340	15.29
2031	41,139	6,353	15.44
2032	40,879	6,364	15.57
2033	40,669	6,407	15.76
2034	40,493	6,418	15.85
2035	40,301	6,460	16.03
2036	40,107	6,474	16.14
2037	39,943	6,510	16.30
2038	39,810	6,536	16.42
2039	39,706	6,552	16.50
2040	39,582	6,596	16.66
2041	39,450	6,639	16.83

Source: Estimated by the author based on the population projections

Table 3.8: Future Labour Supply in Cochrane District, 2013-2041

Year	Total Labour Force in Cochrane District	Aboriginal Labour Force	Aboriginal Share (%)
2013	39,589	4,635	11.71
2014	38,976	4,729	12.13
2015	38,354	4,795	12.50
2016	37,762	4,866	12.89
2017	37,101	4,912	13.24
2018	36,473	4,949	13.57
2019	35,862	4,970	13.86
2020	35,240	5,027	14.26
2021	34,692	5,105	14.72
2022	34,114	5,132	15.04
2023	33,554	5,160	15.38
2024	33,021	5,186	15.71
2025	32,518	5,226	16.07
2026	32,065	5,226	16.30
2027	31,625	5,262	16.64
2028	31,237	5,290	16.94
2029	30,865	5,326	17.25
2030	30,535	5,368	17.58
2031	30,266	5,424	17.92
2032	30,033	5,449	18.14
2033	29,821	5,504	18.46
2034	29,635	5,534	18.67
2035	29,433	5,588	18.99
2036	29,242	5,619	19.22
2037	29,065	5,665	19.49
2038	28,911	5,704	19.73
2039	28,779	5,744	19.96
2040	28,635	5,791	20.22
2041	28,500	5,827	20.45

Source: Estimated by the author based on the population projections

Table 3.9: Future Labour Supply in Manitoulin District, 2013-2041

Year	Total Labour Force in Manitoulin	Aboriginal Labour Force	Aboriginal Share (%)
2013	5,853	2,321	39.66
2014	5,804	2,360	40.66
2015	5,767	2,385	41.36
2016	5,726	2,412	42.13
2017	5,688	2,436	42.84
2018	5,645	2,449	43.38
2019	5,597	2,467	44.07
2020	5,538	2,485	44.86
2021	5,486	2,508	45.71
2022	5,425	2,521	46.47
2023	5,359	2,535	47.30
2024	5,299	2,548	48.08
2025	5,235	2,570	49.09
2026	5,172	2,568	49.66
2027	5,103	2,577	50.50
2028	5,041	2,582	51.21
2029	4,985	2,592	51.99
2030	4,929	2,602	52.79
2031	4,885	2,621	53.66
2032	4,841	2,630	54.32
2033	4,813	2,655	55.17
2034	4,787	2,667	55.73
2035	4,764	2,695	56.56
2036	4,742	2,709	57.13
2037	4,718	2,735	57.97
2038	4,704	2,762	58.71
2039	4,695	2,785	59.32
2040	4,688	2,818	60.12
2041	4,677	2,850	60.94

Table 3.10: Future Labour Supply in Nipissing District, 2013-2041

Year	Total Labour Force in Nipissing	Aboriginal Labour Force	Aboriginal Share (%)
2013	41,495	4,289	10.34
2014	41,203	4,313	10.47
2015	40,918	4,317	10.55
2016	40,617	4,321	10.64
2017	40,312	4,346	10.78
2018	39,933	4,352	10.90
2019	39,569	4,349	10.99
2020	39,174	4,353	11.11
2021	38,818	4,373	11.26
2022	38,461	4,360	11.34
2023	38,100	4,347	11.41
2024	37,764	4,332	11.47
2025	37,425	4,330	11.57
2026	37,090	4,292	11.57
2027	36,830	4,302	11.68
2028	36,570	4,304	11.77
2029	36,363	4,313	11.86
2030	36,174	4,321	11.94
2031	36,062	4,341	12.04
2032	36,021	4,344	12.06
2033	36,024	4,375	12.14
2034	36,034	4,381	12.16
2035	36,032	4,406	12.23
2036	36,022	4,415	12.26
2037	36,026	4,454	12.36
2038	36,050	4,490	12.46
2039	36,088	4,527	12.54
2040	36,119	4,576	12.67
2041	36,147	4,619	12.78

Table 3.11: Future Labour Supply in Parry Sound District, 2013-2041

Year	Total Labour Force in Parry Sound	Aboriginal Labour Force	Aboriginal Share (%)
2013	18,901	1,182	6.25
2014	18,661	1,183	6.34
2015	18,442	1,177	6.38
2016	18,235	1,171	6.42
2017	18,038	1,182	6.55
2018	17,830	1,182	6.63
2019	17,635	1,178	6.68
2020	17,423	1,178	6.76
2021	17,224	1,189	6.90
2022	17,037	1,181	6.93
2023	16,853	1,173	6.96
2024	16,664	1,165	6.99
2025	16,458	1,159	7.04
2026	16,251	1,144	7.04
2027	16,047	1,143	7.12
2028	15,846	1,141	7.20
2029	15,664	1,139	7.27
2030	15,489	1,139	7.35
2031	15,355	1,142	7.44
2032	15,251	1,141	7.48
2033	15,166	1,148	7.57
2034	15,106	1,149	7.61
2035	15,043	1,157	7.69
2036	14,980	1,161	7.75
2037	14,944	1,165	7.79
2038	14,917	1,171	7.85
2039	14,895	1,178	7.91
2040	14,873	1,189	8.00
2041	14,853	1,196	8.05

Table 3.12: Future Labour Supply in Greater Sudbury, 2013-2041

Year	Total Labour Force in Greater Sudbury	Aboriginal Labour Force	Aboriginal Share (%)
2013	80,642	6,503	8.06
2014	80,045	6,568	8.21
2015	79,463	6,604	8.31
2016	78,838	6,641	8.42
2017	78,228	6,683	8.54
2018	77,545	6,692	8.63
2019	76,880	6,685	8.69
2020	76,180	6,709	8.81
2021	75,544	6,761	8.95
2022	74,912	6,754	9.02
2023	74,265	6,746	9.08
2024	73,680	6,737	9.14
2025	73,137	6,746	9.22
2026	72,498	6,703	9.25
2027	71,917	6,728	9.35
2028	71,386	6,738	9.44
2029	70,931	6,753	9.52
2030	70,509	6,766	9.60
2031	70,191	6,795	9.68
2032	70,027	6,812	9.73
2033	69,898	6,863	9.82
2034	69,773	6,877	9.86
2035	69,647	6,919	9.93
2036	69,494	6,934	9.98
2037	69,387	6,978	10.06
2038	69,299	7,018	10.13
2039	69,248	7,057	10.19
2040	69,159	7,107	10.28
2041	69,077	7,144	10.34

Table 3.13: Future Labour Supply in Sudbury District, 2013-2041

Year	Total Labour Force in Sudbury	Aboriginal Labour Force	Aboriginal Share (%)
2013	9,784	1,426	14.57
2014	9,518	1,421	14.93
2015	9,283	1,408	15.16
2016	9,076	1,393	15.35
2017	8,873	1,406	15.85
2018	8,680	1,412	16.27
2019	8,487	1,426	16.80
2020	8,276	1,433	17.31
2021	8,078	1,449	17.94
2022	7,889	1,448	18.36
2023	7,720	1,448	18.75
2024	7,548	1,447	19.16
2025	7,399	1,451	19.61
2026	7,223	1,441	19.95
2027	7,073	1,446	20.44
2028	6,950	1,448	20.83
2029	6,834	1,451	21.23
2030	6,726	1,454	21.63
2031	6,623	1,462	22.08
2032	6,547	1,452	22.18
2033	6,487	1,454	22.42
2034	6,425	1,448	22.53
2035	6,366	1,452	22.81
2036	6,307	1,449	22.97
2037	6,257	1,454	23.24
2038	6,216	1,460	23.49
2039	6,171	1,462	23.70
2040	6,128	1,475	24.07
2041	6,091	1,485	24.37

Table 3.14: Future Labour Supply in Timiskaming District, 2013-2041

Year	Total Labour Force in Timiskaming	Aboriginal Labour Force	Aboriginal Share (%)
2013	15,353	692	4.50
2014	15,117	695	4.60
2015	14,893	695	4.67
2016	14,629	695	4.75
2017	14,382	695	4.83
2018	14,134	693	4.91
2019	13,855	691	4.99
2020	13,604	689	5.07
2021	13,376	690	5.16
2022	13,175	695	5.28
2023	12,980	701	5.40
2024	12,789	706	5.52
2025	12,607	714	5.66
2026	12,441	715	5.75
2027	12,316	713	5.79
2028	12,186	709	5.82
2029	12,060	707	5.86
2030	11,949	705	5.90
2031	11,872	706	5.95
2032	11,824	708	5.99
2033	11,780	715	6.07
2034	11,734	717	6.11
2035	11,690	724	6.20
2036	11,663	728	6.24
2037	11,639	734	6.31
2038	11,619	740	6.37
2039	11,605	746	6.43
2040	11,597	754	6.51
2041	11,592	762	6.57

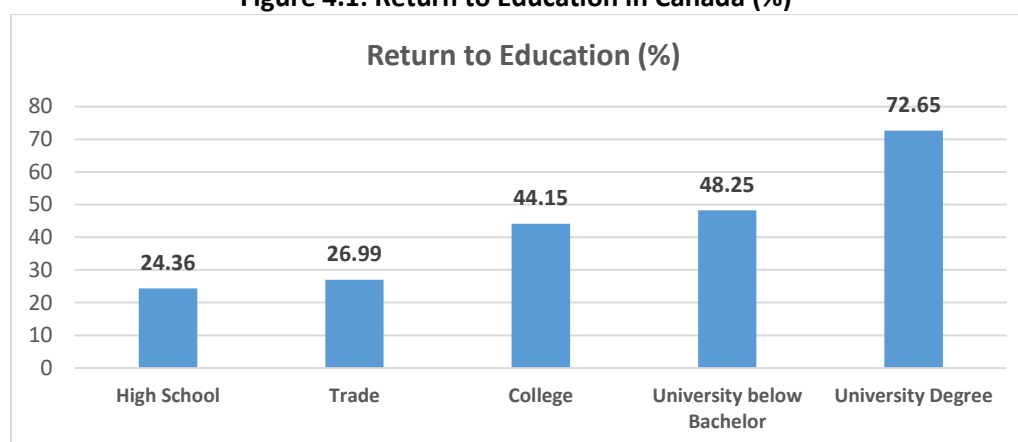
Source: Estimated by the author based on the population projections

Part IV: Productivity and Human Capital Composition of Northeastern Ontario's Workforce

Productivity growth is directly linked to the human capital composition of the workforce. We define human capital as the stock of knowledge, skills and abilities embodied in individuals that directly affects their level of productivity. Human capital includes skills and knowledge acquired through education and experience. Investing in human capital represents an avenue through which Northeastern Ontario can enhance productivity and minimize the impact of the declining labour force.

In order to estimate the human capital composition of the regional workforce, one needs to specify and measure a proxy for human capital which also reflects and incorporates a measure of productivity of the workforce in each of the districts in Northeastern Ontario. To obtain such an index, we first estimate a standard earnings model using the 2006 census micro-data file.¹⁶ We used data pertaining to all working Canadians between the ages of 15 and 64 who were not attending school and whose employment earnings were greater than \$1000 and less than \$1 million. Those with less than a high school diploma were the benchmark or reference group. The estimated return to schooling coefficients are shown in Figure 4.1.

Figure 4.1: Return to Education in Canada (%)¹⁷



Source: Estimated by the author based on Statistics Canada's Census Microdata files.

The estimated return to schooling coefficients show the increased earnings, compared to the reference group, by obtaining different levels of education in Canada. Therefore, they represent the average rate of return to schooling at the national level. For example, obtaining a high school diploma increases a person's earnings by 24.4 percent above the earnings of those without a high school diploma. Similarly, obtaining a trade or college diploma increases earnings by 27.0 and 44.1 percent respectively. A university degree increases earnings by an average of about 72.6

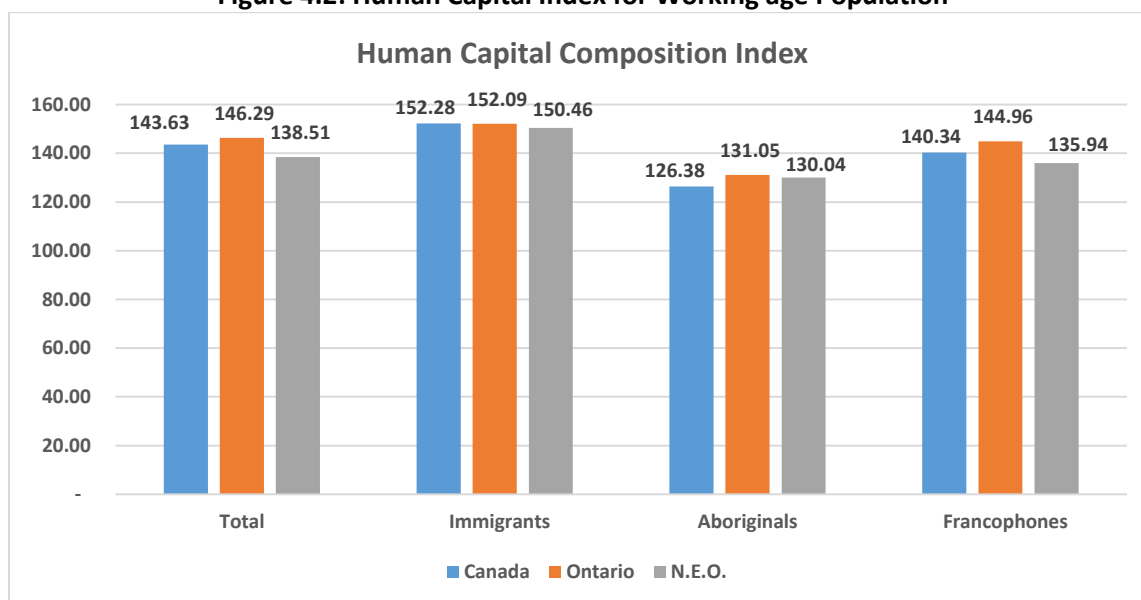
¹⁶ The earnings model is of the form: $\ln Wage = \alpha + \sum \beta_i S_i + X_i \delta_i + \varepsilon_i$, where S_i s are the highest level of schooling, X_i s are other control variables which include age categories, marital status, etc. and ε_i is an error term.

¹⁷ Note that Figure 4.1 applies to persons with education who are employed and does not include persons with education who do not have a job.

percent. The return to schooling estimates reflect higher productivity resulting from an increased level of education. The estimated return to education coefficients increase as the level of schooling rises reflecting higher earnings commensurate with higher productivity as the level of education increases.

Then, we use the estimated return to schooling coefficients as weights to calculate a weighted average index of the share of individuals aged 15 to 64 with different levels of schooling for each of the districts in Northeastern Ontario.¹⁸ The estimated human capital indexes for Aborigines, immigrants, Francophones and the total working-age population For Canada, Ontario and Northeastern Ontario are shown in Figure 4.2.¹⁹ The estimated index ranges from 100 if none of the area's residents have completed high school to about 200 if all residents have obtained a university degree.²⁰

Figure 4.2: Human Capital Index for Working age Population



Source: Estimated by the author based on Statistics Canada's Census Microdata files.

Figure 4.2 shows that the human capital composition of the working age population in Northeastern Ontario (138.5) is below that in Ontario (146.3) and Canada (143.6). The human

¹⁸ $HCI = \exp\{\sum \beta_i \cdot S_i \text{ shares}\}$ where HCI stands for Human Capital Index, exp stands for exponential and S_i shares are share of the population 15 to 64 with S_i level of education in a given CSD. The formulation of the human capital measure is based on Hall, R.E. and C.I. Jones (1999), "Why do some countries produce so much more output per worker than others?", the Quarterly Journal of Economics 114 (1), 83-116. Also see Francesco Caselli, "Accounting for Cross-Country Income Differences", First Draft, November 2003.

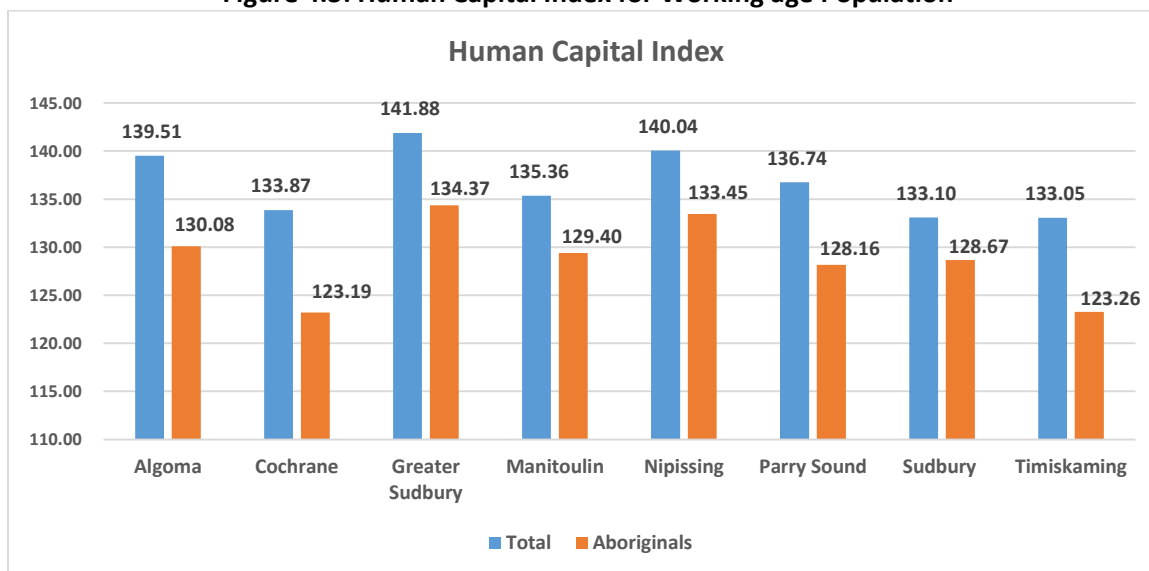
¹⁹ Note that the human capital indexes reported here are numerically different from the ones reported in my previous report since I have used return to education or productivity measure in Canada as a benchmark in calculating the above indexes where Ontario was the benchmark in my previous report. Using Canada as a benchmark has an advantage of making the indexes comparable to other provinces as well.

²⁰ The Human Capital index for immigrants and Francophones equal 144.85 and 136.29 respectively.

capital indexes for immigrants are higher than national, provincial and regional averages. On the other hand, the human capital composition of the Aboriginal labour force is significantly below the regional, provincial and national averages.

Figure 4.3 shows the human capital index for total and the Aboriginal people aged 15 to 64 in various districts in Northeastern Ontario. Greater Sudbury region has the largest human capital indexes for both total and the Aboriginal population followed by Nipissing and Algoma. It is lowest in Timiskaming followed by Sudbury and Cochrane.

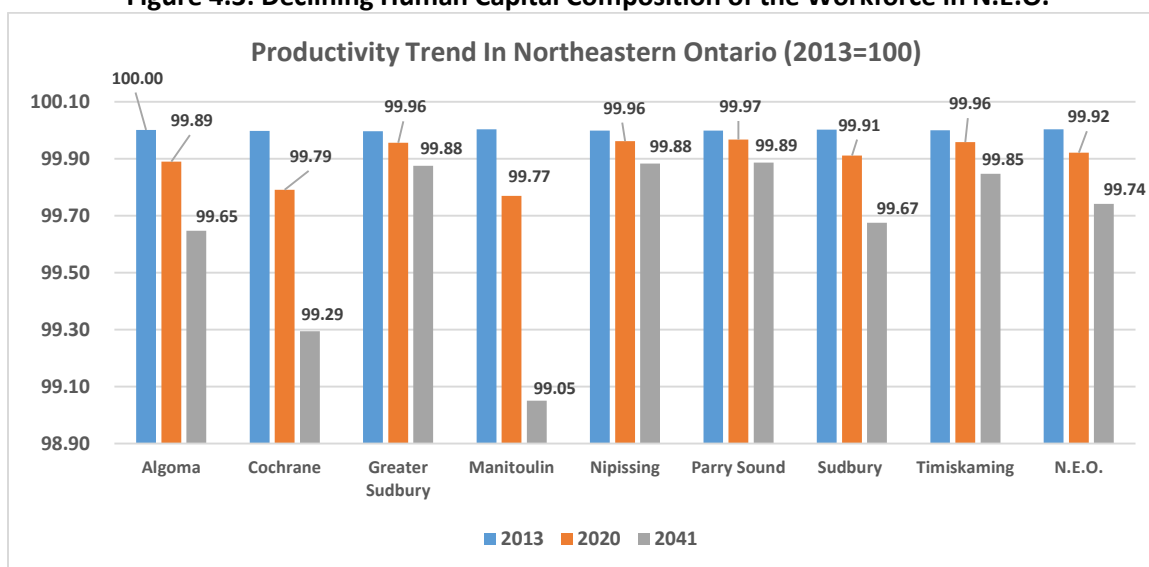
Figure 4.3: Human Capital Index for Working age Population



4.1: A Perfect Storm: Declining Labour Supply and Labour Productivity in Northeastern Ontario

Part III of the study identified two important demographic trends. First, the working-age population is declining. As a result, the supply of labour is expected to decline during the coming years. Second, a growing Aboriginal labour force can potentially offset that trend. However, at the present time, the human capital composition of the Aboriginal workforce is lower than the regional level. Therefore, continuation of the current situation will lead to declining future regional labour productivity.

To estimate the human capital composition of the future regional workforce, we combine the labour force projections with the human capital indexes for various segments of the workforce. Results are shown in Figure 4.3.

Figure 4.3: Declining Human Capital Composition of the Workforce in N.E.O.

Source: Estimated by the author based on Population projections.

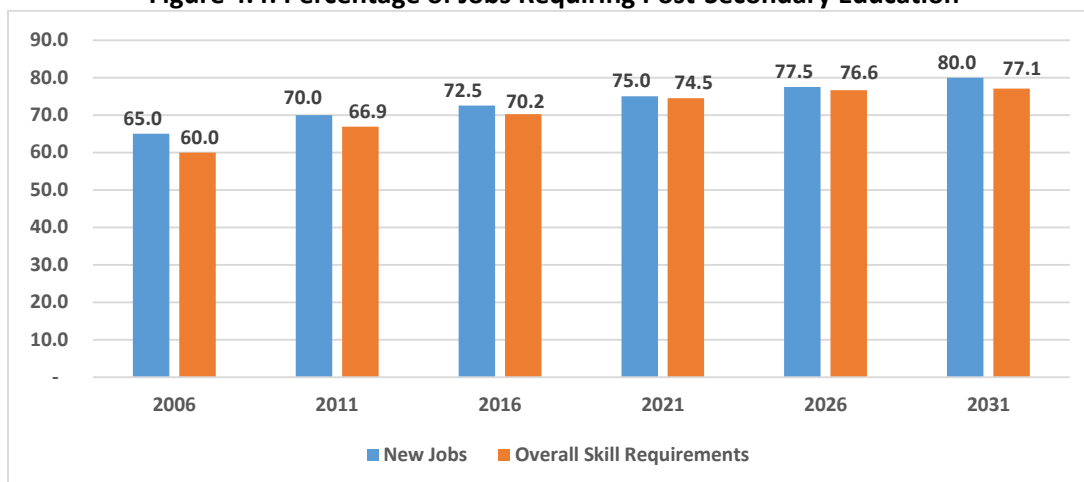
Figure 4.3 shows that if the current level of educational achievement continues, the human capital composition of the workforce will decline in the coming years. This index is positively correlated with labour productivity, labour income and output in the region. We will measure the effect of the changing composition of the workforce on regional income and output later in the report.

4.2. People without Jobs and Jobs without People

The declining supply of labour and labour productivity in Northeastern Ontario are only half of the bad news. Recent technological change and the emergence of the knowledge economy have changed the requirements of the labour market. Various studies suggest that by 2031, about 80.0 percent of the workforce need to have post-secondary credentials such as an apprenticeship, college or university degree. Currently, 70 percent of the new jobs and an average of 66.9 percent of all jobs require some post-secondary credential.²¹ Based on various studies by the Ontario Ministry of Education, Human Resources and Skills Development Canada, BC Ministry of Skills, Training and Education, Ministry of Advanced Education and Labour Market Development in British Columbia and other government agencies, Miner Management Consultants provide estimates of the percentage of new jobs requiring post-secondary education in the coming years (Figure 4.4).

²¹ Miner Management Consultants, 'Ontario's Labour Market Future- People without Jobs, Jobs without People', February 2010.

Figure 4.4: Percentage of Jobs Requiring Post-Secondary Education

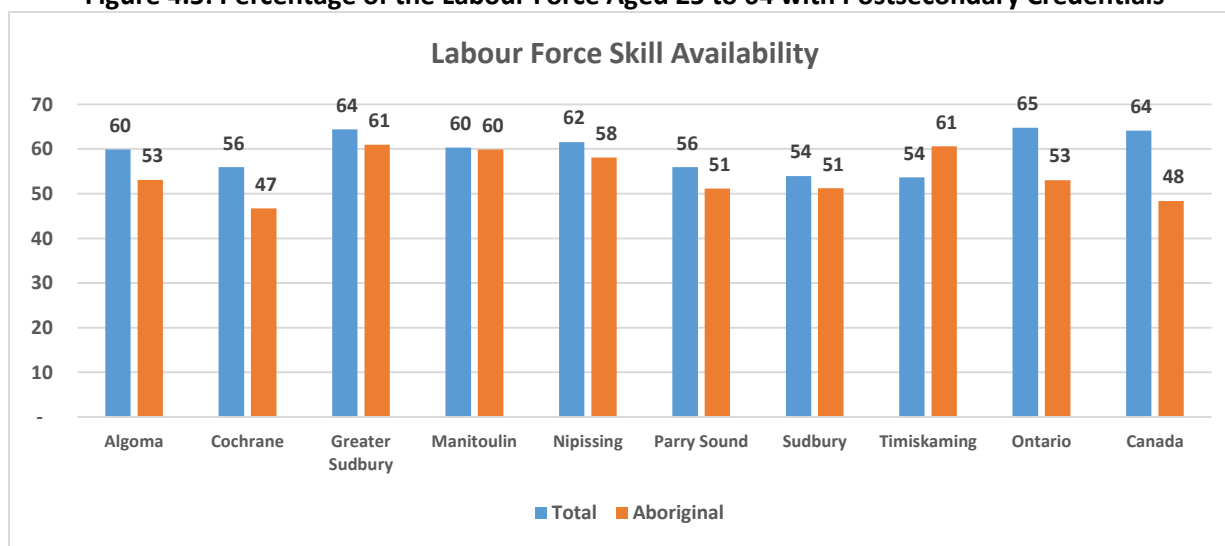


Source: Miner Management Consulting, People without Jobs, Jobs without People, 2010.

What is the actual skill availability of Northeastern Ontario's labour force at the present time? Using the 2011 National Household Survey and focusing on the prime working-age population aged 25 to 64, Figure 4.5 shows the percentage of the regional labour force who have postsecondary credentials. The skill levels of the prime working-age population in Northeastern Ontario regions are lower than the skill levels in Ontario and Canada. More importantly, the present skill level in Northeastern Ontario's districts is significantly below the current estimated skill requirements of about 66.9 percent (Figure 4.4).

Focusing on the prime working-age Aboriginal population, Figure 4.5 shows that their current level of skills lag behind the regional levels. More importantly, the current skill levels among the working age Aboriginal population are significantly below the current and future job requirements. In general, skill levels are slightly higher among Aboriginal women than men.

Figure 4.5: Percentage of the Labour Force Aged 25 to 64 with Postsecondary Credentials



Source: Estimated by the author based on NHS

Given that the Aboriginal labour force will account for a significant share of Northeastern Ontario's future workforce, it is vital to the social and economic viability of the region to adopt education policies that enable this growing segment of the regional labour force to meet the requirements of the future labour market.

Does the level of skills affect labour market performance, i.e., likelihood of employment, participation and unemployment rates? Figure 4.6 shows that a higher skill level increases the likelihood of participation in the workforce. On average, the participation rate of the prime working age population (25-64) without a high school diploma in Northeastern Ontario districts is about 53.0 percent compared to 72.0 percent for those with a high school diploma and 81.0 percent for those with a postsecondary credentials. Figure 4.6 also shows that the labour force participation rate in Northeastern Ontario districts lag behind the provincial (80.2%) and national (80.3%) averages.

Similarly, the average unemployment rate among those without a high school diploma equals 13.5 percent compared to 10.3 percent for those with a high school diploma and 6.2 percent for those with a postsecondary credentials. Overall, the unemployment rates in Northeastern Ontario districts are higher than the provincial (6.3%) and national (6.2%) averages. The only exception is the Greater Sudbury region that registers a lower unemployment rate of 5.6 percent.

The employment rate defined as the percentage of the prime working age population who are employed equals 46.0 percent for those without a high school diploma. It increases to 64.4 percent for those with a high school diploma and 76.0 percent for those with a postsecondary credential. Again, the employment rates in Northeastern Ontario districts lag behind the provincial (75.2%) and national (75.3%) averages.

Figure 4.6 shows that there is significant variation in labour market performance among different districts. This is due to the local economic conditions in those regions. However, labour mobility tends to bring labour market performance towards the regional average over time. The Greater Sudbury region appears to have a higher labour force participation rate, lower unemployment rate and slightly higher employment rate than other districts.

Figure 4.6: Highest Level of Schooling and Labour Force Performance (%)



Source: Calculated based on Statistics Canada, 2011 NHS.

The above figures suggest that one potential solution to the declining number and productivity of the region's workforce is to promote higher education by increasing access especially for the Aboriginal population who registered lower level of educational achievement. One of the benefits of investing in education is a lower likelihood of unemployment and dependency on government transfer payments. Achieving higher level of education becomes even more important in the coming years. Participation in the Trans-Pacific Partnership agreement makes labour relatively mobile among various countries. In other words, workers in Northern Ontario will not only be competing with other workers in Ontario and Canada, but will be facing competition from other countries as well. To the extent that the skill level of the workforce in Northeastern Ontario is below the estimated skill requirement needed for the emerging occupations, the region will face workers whose qualifications do not match the existing jobs and jobs that cannot find qualified workers. Recently 50 companies in advanced manufacturing, manufacturing, mining and professional and scientific services were surveyed in Northern Ontario.²² From the 50 companies surveyed, 22 had operations in Northern Ontario and other jurisdictions (multi-locational) and 28 were multinationals operating in Northern Ontario. From the 50 firms, 15 had their headquarters in Northern Ontario, 11 were located in Northwestern Ontario and 39 were located in Northeastern Ontario.

When asked to rank barriers or factors negatively affecting their firm's growth and/or investment, the top ranked barrier turned out to be difficulty finding qualified employees. About 29.0 percent of multi-locational and 24.0 percent of multinational firms identified finding qualified employees as the most difficult barrier they faced. Finding qualified employees ranked well ahead of transportation costs (11%), government regulations (9%), poor infrastructure (7%), energy costs (7%) and shipping cost (5%). Another report by the Canadian Council of Chief Executives surveyed more than 100 of Canada's largest employers in all industrial sectors and regions of the country in March of 2014. More than 70.0 percent of the companies identified scarcity of skilled workers as the primary barrier to filling the available positions.²³

It appears that if the skill levels of the workforce in Northeastern Ontario stays at its current level or declines in the future while skill requirements of the workforce rises, the region will end up with people without jobs and jobs without people. Even if markets adjust to bring demand and supply of labour into balance, the social impact of having many unemployable people will be enormous.

²² B. Moazzami, HDR Decision Economics Inc. and Oraclepoll Research Limited, "Multinational and Multi-locational Enterprise Initiative, Survey of Northern Ontario Companies", 2012.

²³ The Canadian Council of Chief Executives, "Taking Action for Canada: Jobs and Skills for the 21st Century", March 2014.

Part V: The Consequences of Shifting the Composition of the Employed Labour Force

The structure of Northeastern Ontario's workforce has been changing due to a population that is simultaneously declining and ageing. At the same time, the industrial and occupational composition of the employed workforce is shifting due to changing market conditions. As a result, the size and industrial makeup of the employed workforce has changed during the past three decades. There has been a continuous shift away from the goods-producing sector dominated by private businesses to the service-producing sector, a large portion of which is publicly funded. Using data from various Censuses of Canada as well as the 2011 NHS, Figure 5.1 and Table 5.1 show the changing industrial composition of the employed workforce in Northeastern Ontario.

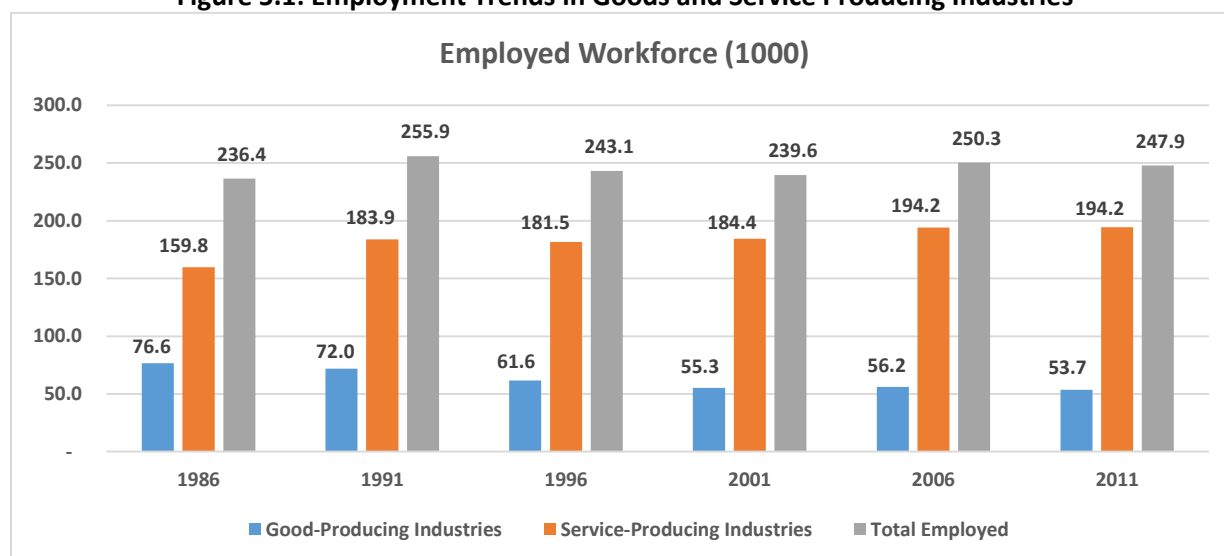
The shift away from the goods-producing sector has seen a net employment loss of 22,880 or 29.9 percent since the mid-1980s. Total employment in the logging and forestry sector declined from 5,005 in 1986 to 1,915 in 2011, a decline of about 61.7 percent. Similarly, mining employment has declined from 17,180 in 1986 to 13,860 in 2011, a decline of about 19.3 percent. Within the manufacturing sector, employment in the wood and paper and allied industries saw a decline of about 61.9 and 76.3 percent respectively during 1986-2011. Employment in the primary metal industries declined from 15,705 in 1986 to 4,235 in 2011, a decline of about 73.0 percent. The only industries within the goods producing sector that experienced growth are fabricated metal products, machinery and transportation equipment industries. As a result, employment in the goods-producing sector of the regional economy declined from 76,560 in 1986 to 53,680 in 2011, a decline of about 29.9 percent. It is imperative to acknowledge that the goods-producing sector is a major component of the region's economic base and its decline has serious impact on the region's long-term economic growth potential. The multiplying effect between employment in goods-producing industries and total regional employment equals 1.87. In other words, each employment in the goods-producing industries supports 1.87 employment in the regional economy.

Table 5.1: Changing the Industrial Composition of the Employed Workforce 15+

National Industrial Classification	1986	1991	1996	2001	2006	2011
Agricultural and related service industries	3,705	3,775	3,275	2,930	2,240	2,340
Fishing and trapping industries	330	195	260	160	210	80
Logging and forestry industries	5,005	3,540	2,860	2,875	2,890	1,915
Mining (including milling), quarrying and oil well industries	17,180	17,070	13,650	9,000	10,360	13,860
Manufacturing industries	35,100	28,280	26,145	24,140	22,300	15,685
Major Group 25 - Wood industries	5,840	4,645	5,765	6,425	5,055	2,225
251 Sawmill, planing mill and shingle mill products industries	3,675	2,980	3,740	3,920	2,675	1,310
252 Veneer and plywood industries	990	550	1,145	2,230	1,890	680
Major Group 27 - Paper and allied products industries	5,475	5,010	4,320	3,345	2,525	1,300
271 Pulp and paper industries	5,295	4,680	4,235	3,325	2,450	1,290

Major Group 28 - Printing, publishing and allied industries	1,405	1,470	1,620	405	270	315
Major Group 29 - Primary metal industries	15,705	10,380	7,225	5,910	5,810	4,235
291 Primary steel industries	8,180	5,865	4,695	3,995	2,845	3,210
295 Non-ferrous metal smelting and refining industries	6,595	3,590	1,650	1,560	1,940	410
Major Group 30 - Fabricated metal products industries (except machinery and transportation equipment industries)	1,110	1,270	1,630	1,485	1,785	1,590
Major Group 31 - Machinery industries (except electrical machinery)	1,045	1,135	1,350	1,695	1,660	1,665
Major Group 32 - Transportation equipment industries	495	635	620	800	765	610
Construction industries	12,360	16,310	12,895	14,065	15,925	17,590
Utility industries	2,880	2,795	2,510	2,105	2,235	2,210
Goods Producing Industries	76,560	71,965	61,595	55,275	56,160	53,680
Transportation and storage industries	12,895	12,620	12,300	13,750	14,130	12,285
Wholesale trade industries	7,735	6,950	8,595	6,260	7,120	6,805
Retail trade industries	32,120	35,670	35,970	32,325	32,290	32,570
Finance and insurance industries	5,100	6,475	5,190	6,250	5,745	5,870
Real estate operator and insurance agent industries	3,185	2,855	3,820	3,185	3,625	3,730
Government service industries	18,910	25,090	17,660	17,325	17,985	21,770
Educational service industries	18,770	21,430	20,170	18,760	20,295	21,505
Health and social service industries	20,875	26,510	29,320	28,925	32,320	36,365
Accommodation, food and beverage service industries	17,540	19,590	19,570	19,090	18,525	15,775
Other service industries	22,660	26,730	28,880	38,495	42,135	37,550
Service Producing Industries	159,790	183,920	181,475	184,365	194,170	194,225
Total - All industries	236,350	255,875	243,075	239,640	250,330	247,905

Source: Calculated based on Statistics Canada, 1986 to 2006 Censuses and 2011 NHS, custom tabulation.

Figure 5.1: Employment Trends in Goods and Service Producing Industries

Source: Calculated based on Statistics Canada, 1986 to 2006 Censuses and 2011 NHS, custom tabulation.

The growth of the service sector over the past three decades was particularly pronounced in other services (65.7%), health care and social services (74.2%), public administration (15.2%) and educational services (14.6%). In fact, the growth of education, health care and public administration, which are referred to as quasi-base sectors since they are financed from outside the region, has to a large extent mitigated the decline in the traditional base sectors of the economy. The correlation coefficient between employment in service-producing industries and total regional employment equals 0.66 which is positive and relatively high.

Changing industrial composition of the workforce has also been accompanied by a shift in the occupational structure of the employed workforce (Table 5.2). Employment in the natural and applied sciences, health occupations and occupations in social sciences and education has increased while employment in sales and services, occupations unique to primary and processing industries has declined during 1996-2011. Overall, total employment of individuals aged 15 to 64 has declined by about 1.2 percent during the above period. There has also been a shift in the employment of men and women. During 2001-2011, employment among men aged 15 to 64 declined from 122,290 in 2001 to 121,265 in 2011. This decline has been most pronounced in management occupations (14.2%), sales and service occupations (5.0%) and occupations unique to processing (36.2%).

During the same period, women employment rose from 112,325 in 2001 to 118,620 in 2011. The increased employment has been most pronounced in health occupations (30.1%) and those in social sciences and education (30.7%).

Table 5.2: Employed Labour Force 15 to 64 Years by Occupation

Occupation Category	1996	2001	2011	% Change 1996-2011
A Management occupations	20,265	22,510	20,740	2.34
B Business, finance and administrative occupations	40,320	37,105	40,450	0.32
C Natural and applied sciences and related occupations	9,420	10,555	12,690	34.71
D Health occupations	13,565	14,365	18,790	38.52
E Occupations in social science, education, government service and religion	18,940	20,090	24,720	30.52
F Occupations in art, culture, recreation and sport	4,095	3,680	4,350	6.23
G Sales and service occupations	68,810	63,475	58,465	-15.03
H Trades, transport and equipment operators and related occupations	40,800	41,420	42,185	3.39
I Occupations unique to primary industry	12,635	9,975	10,125	-19.87
J Occupations unique to processing, manufacturing and utilities	13,960	11,435	7,375	-47.17
Total Employed Workforce (15-64)	242,810	234,610	239,890	-1.20

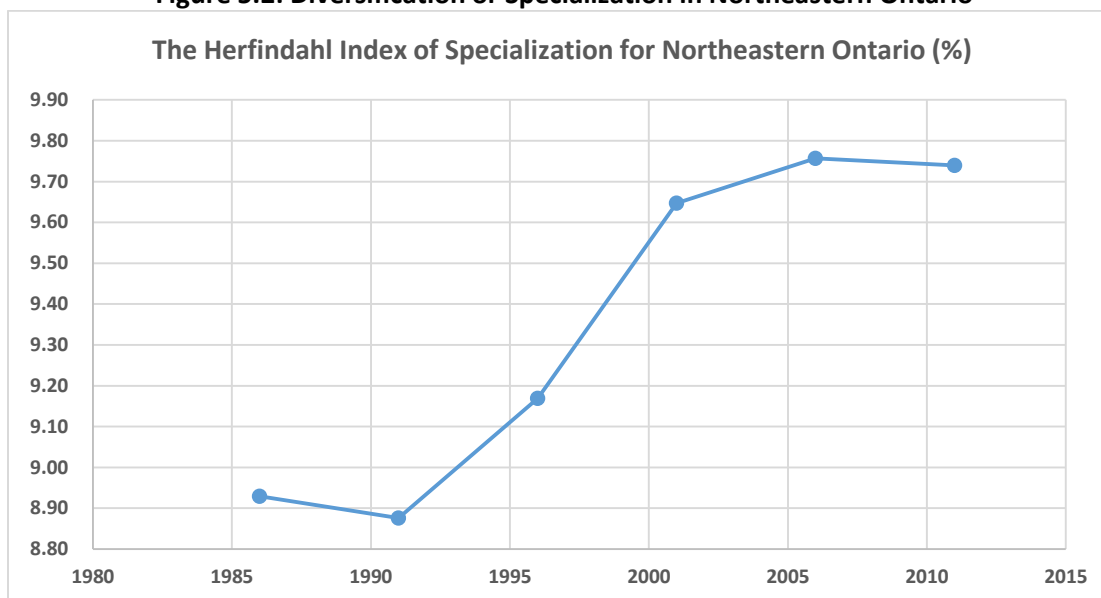
Source: Statistics Canada, Census and NHS, custom tabulation.

Has the region become more or less specialized in certain industries? A report by Statistics Canada examined Northern Ontario's economic diversification, specialization and growth.²⁴ The study uses a Herfindahl Index (HI) to measure economic diversification. The index shows the degree to which a community's workforce is spread across various industries. The report finds that, on average, Northern Ontario regions and communities underwent economic specialization during 1981-2001. The authors argue that (p. 5): "In general, communities in Northern Ontario that had a diversified economy in 1981 were more likely to have a growing workforce. However, interestingly, the tendency was for the labour force to grow through economic specialization". Figure 5.2 shows the estimated Herfindahl Index for Northeastern Ontario during 1986-2011.²⁵ The lowest index which corresponds to the most diversified economy equals 5.0 percent suggesting an equal number of employees per each sector.²⁶

²⁴ Ray D. Bollman, Roland Beshiri and Verna Mitra, "Northern Ontario's Communities: Economic Diversification, Specialization and Growth", Catalogue No. 21-601-MIE-No. 082, October 2006.

²⁵ Herfindahl index (HI) = (employment share of industry 1)² + (employment share of industry 2)² + ... + (employment share of industry n)². The least possible sum, or the most diversified HI, equals $n \times (1/n)^2 = 1/n$ where n is the number of industrial sectors. The largest possible sum is 1 or 100% when one industrial sector accounts for all the region's employment.

²⁶ In the present case, we have 20 industrial sectors each having 1/20 or 5.0 percent of the workforce. Therefore, the HI index would equal: $20 \times (1/20)^2 = 0.05$ or 5%.

Figure 5.2: Diversification or Specialization in Northeastern Ontario

Source: Estimated based on Statistics Canada, Census and NHS, custom tabulation.

Figure 5.2 shows that HI was relatively low during 1986-91 suggesting that the economy was more diversified during that period. During that period, the goods producing sectors accounted for about a third of the employed workforce. However, employment share of the goods producing industries declined to about a fifth of total workforce in 2011. On the other hand, the share of employment in the service producing sectors rose significantly during 1986-2011. Industries that experienced rising employment share include finance and insurance, real estate, public sector, education and health and social services. Rising HI signals increased specialization of the local economy away from goods-producing industries and towards service producing sectors.

Education, government and healthcare sectors are the main contributing factors to the rising index. Northeastern Ontario has become more concentrated in and dependent on quasi-based and publicly funded sectors for employment and income generation. In other words, the share of private sector in employment and wealth generation in Northeastern Ontario has declined while the region has become more dependent on publicly funded programs.

Why has the share of the private sector declined so dramatically in Northeastern Ontario? Why has the region not been able to attract private investment? Are the cost of doing business in Northern Ontario greater than other regions in Ontario and Canada? Are the cost conditions improving or deteriorating? The abundance of natural resources in Northern Ontario has provided ample opportunity for resource-based industries to become regionally, nationally and internationally competitive. Similar natural endowment has given rise to many internationally

competitive industries in other countries.²⁷ A small local market is compensated for by proximity to the huge U.S. market. The presence of strong and diversified demand in the U.S. has been a constant source of stimuli for Canadian producers. Also, the absence of strong rivalries in Northern Ontario is largely compensated for by proximity and competition from U.S.-based rivals. Thus, why is it that Northern Ontario has not been able to grow beyond what Porter (1990) called its natural factor-driven stage of development while its neighbors to the south and east have been able to do so?²⁸

What are the implications of changing industrial and occupational structure of the employed workforce? Do the employment numbers accurately reflect the extent of the impact of the changing industrial and occupational composition of the work force on Northeastern Ontario's economy? Using 2006 Census and 2011 National Household survey, Table 5.3 shows changing composition of the employed workforce by highest level of schooling and average employment earnings during 2006-2011.

Table 5.3: Changing Composition of the Employed Workforce in Northeastern Ontario*

Highest Level of Educational Achievement		2006	2011	Average Earnings 2011 Dollars
Total Employed				
	% Worked FT & FY	58.25	51.67	55,798
	% Worked PT & PY	41.75	48.33	24,957
No certificate or diploma				
	% Worked FT & FY	43.63	32.85	40,265
	% Worked PT & PY	56.37	67.15	14,157
High School				
	% Worked FT & FY	53.68	45.03	45,328
	% Worked PT & PY	46.32	54.97	18,703
Trade				
	% Worked FT & FY	64.29	55.14	53,502
	% Worked PT & PY	35.71	44.86	34,535
College diploma				
	% Worked FT & FY	63.35	59.42	54,130
	% Worked PT & PY	36.65	40.58	28,016
University				
	% Worked FT & FY	65.47	61.14	78,714
	% Worked PT & PY	34.53	38.86	40,485

*FT: Full-time; FY: Full-year; PT: Part-time; PY: Part-year.

Source: Calculated based on Statistics Canada, 2006 Census and 2011 NHS, custom tabulation.

²⁷ See Moazzami (2004, 2005, 2006)

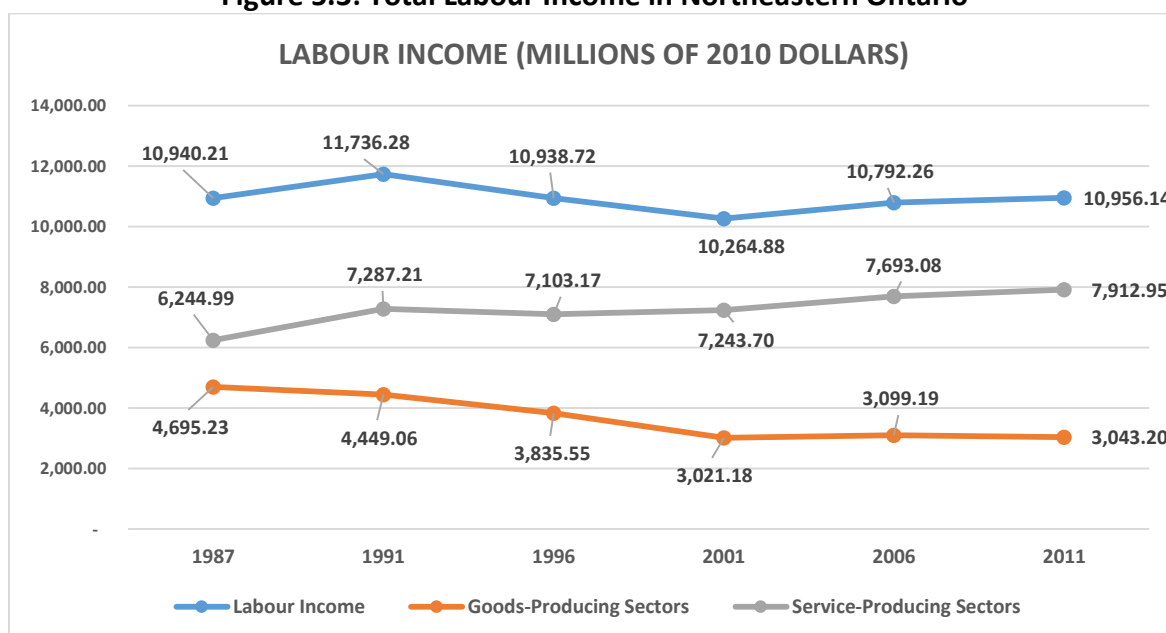
²⁸ For a comparison of industrial clusters in Northern Ontario and other regions see Moazzami (2004, 2005, 2006).

Table 5.3 shows that the composition of the employed workforce has changed during 2006-2011. The share of full-time and full-year jobs has declined from 58.3 percent in 2006 to 51.7 percent in 2011. The average earnings of full-time and full-year (FT & FY) jobs equaled \$55,798 in 2011. During the same period, the share of part-time or part-year (PT or PY) jobs rose from 41.7 percent in 2006 to 48.3 percent in 2011. The average earnings of the part-time or part-year jobs equaled \$24,957 in 2011. The same picture appears when we examine the composition of the employed workforce by sex. Rising part-time and declining full-time employment have happened across all levels of education.

Workers without a high school diploma have the highest incidence of part-time or part-year work and their average earnings are lowest among all employed people in the region. Individuals with a university degree have the highest incidence of full-time employment and have the highest earnings among all workers. The unemployment rate is lowest among individuals with a university degree (5.6%) and college diploma (6.7%) and highest among those with a high school diploma (12.2%) and those with no certificate or diploma (16.5%).

Changing size and composition of the employed workforce impacts total labour income and output in Northeastern Ontario. Using detailed employment by occupation and industry data along with average employment earnings by industry and occupation, we have estimated trends in total labour income in 2010 dollars in Northeastern Ontario. This is shown in Figure 5.3. Labour income is influenced by size, productivity as well as the occupational composition of the employed workforce. It was high when employment was high in the resource-based sectors of the economy and declined as those high paying jobs disappeared.

Figure 5.3: Total Labour Income in Northeastern Ontario

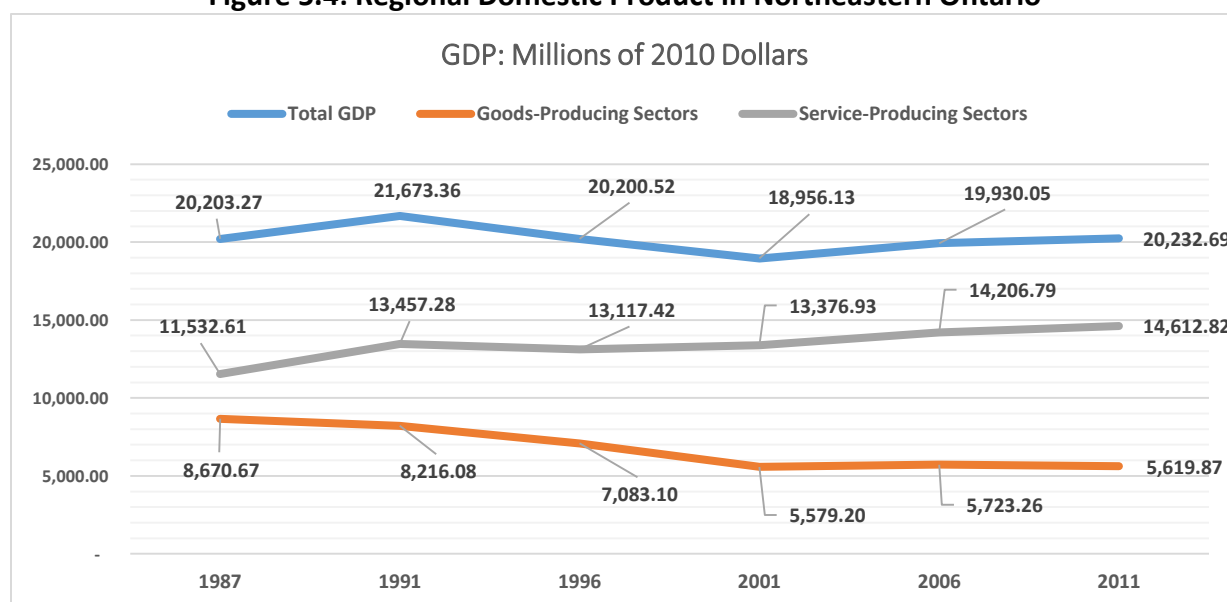


Source: Calculated based on Statistics Canada, Census and NHS, custom tabulation.

Figure 5.3 also shows that total employment income generated in the goods-producing industries declined by about 35.2 percent during 1986-2011. During the same period, total income in the service-producing industries rose by 26.7 percent.

Wages and salaries are a significant share of the regional Gross Domestic Product. In Ontario, wages, salaries and supplementary labour income accounted for an average of about 54.15 percent of the provincial GDP during 2000-2010. Assuming that this share also applies to Northeastern Ontario and stayed relatively constant, a rough estimate of the regional domestic product can be estimated for 1986-2011.²⁹ This is shown in Figure 5.4.

Figure 5.4: Regional Domestic Product in Northeastern Ontario



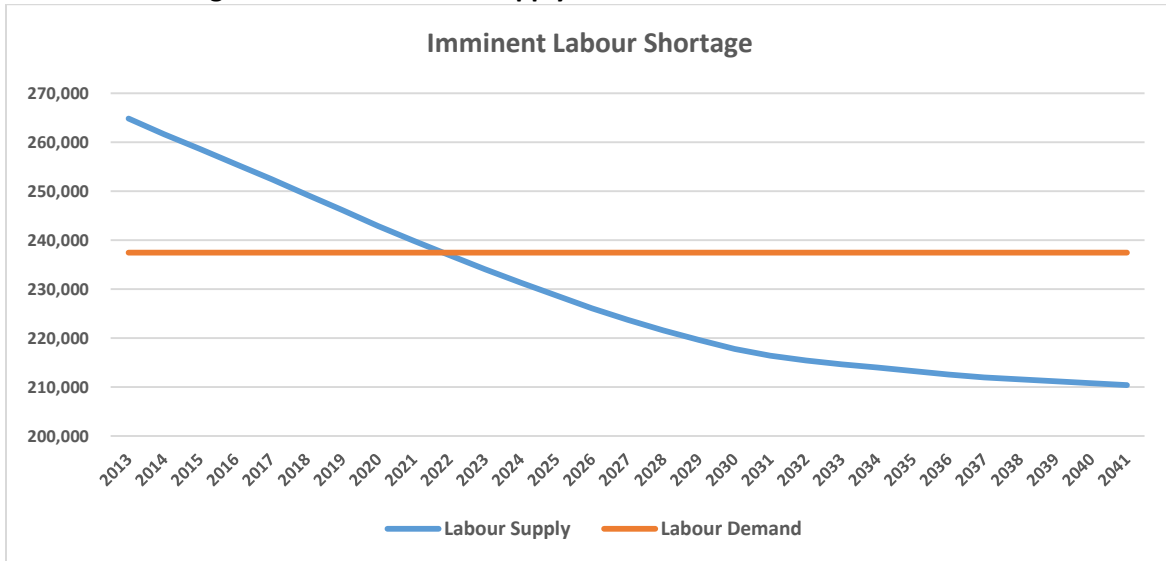
Source: Estimated based on Statistics Canada, Census and NHS, custom tabulation.

Figure 5.4 shows that the regional GDP has stayed relatively constant during 1987-2011. The decline in the goods-producing sectors has been compensated for by a rise in the service-producing sectors. Regional GDP is highly correlated with employment as well as labour productivity in various industries. The higher the labour productivity, the greater the output and income. The relative constancy of the regional GDP suggests that the regional economy has not experience growth during the past 25 years. As we discussed above, the human capital composition of the regional workforce is expected to decline. As a result, labour productivity, output and income is expected to decline as well.

²⁹ In fact, this indirect approach to estimating regional GDP is more precise than using employment ratios (such as those reported by the Conference Board of Canada) because this approach is based on the labour income estimates that are very precise. The only assumption and potential source of error is the assumption regarding the ratio of labour income to regional GDP. This assumption affects the magnitude of the estimated GDP not its trend. Otherwise, trends in employment income mirror GDP trends with a very high degree of certainty.

What are the implications of declining size and productivity of the regional workforce? Assuming that total employment or demand for labour stays at its 2011 level and using the labour supply estimates provided above, Figure 5.5 shows that the region will face a labour shortage by the mid-2020s. That is assuming that the qualifications and human capital composition of the workforce matches the requirement of future employment. Without improvement in the human capital composition of the future labour force, the perceived shortage will be much greater than the one portrayed in Figure 5.5.

Figure 5.5: Demand and Supply of Labour in Northeastern Ontario



Source: Calculated based on population projections.

Figure 5.6 shows total labour income in 2010 dollars in various Northeastern Ontario districts during 2001-2011.

Figure 5.6: Labour Income in Northeastern Ontario Districts

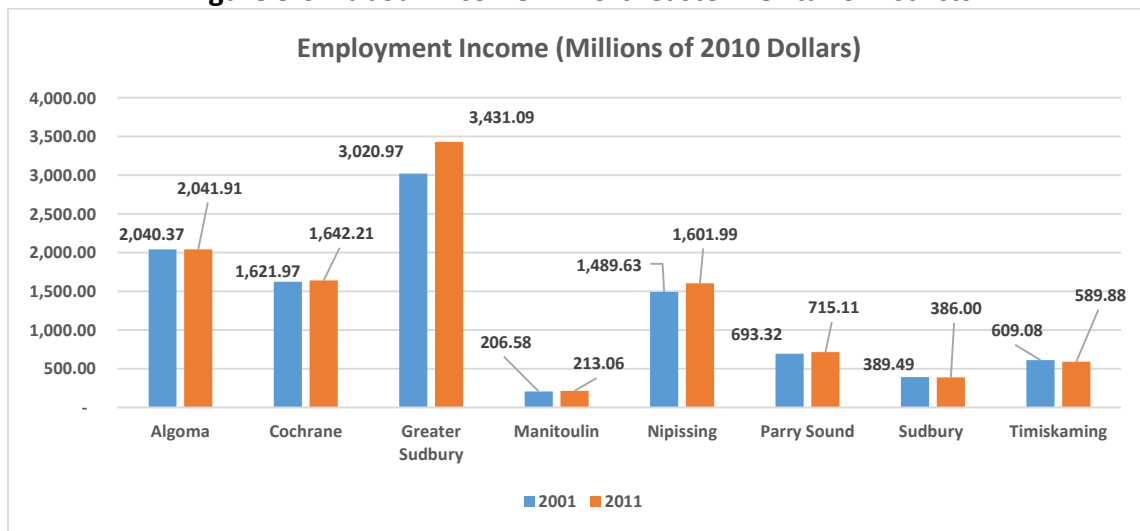
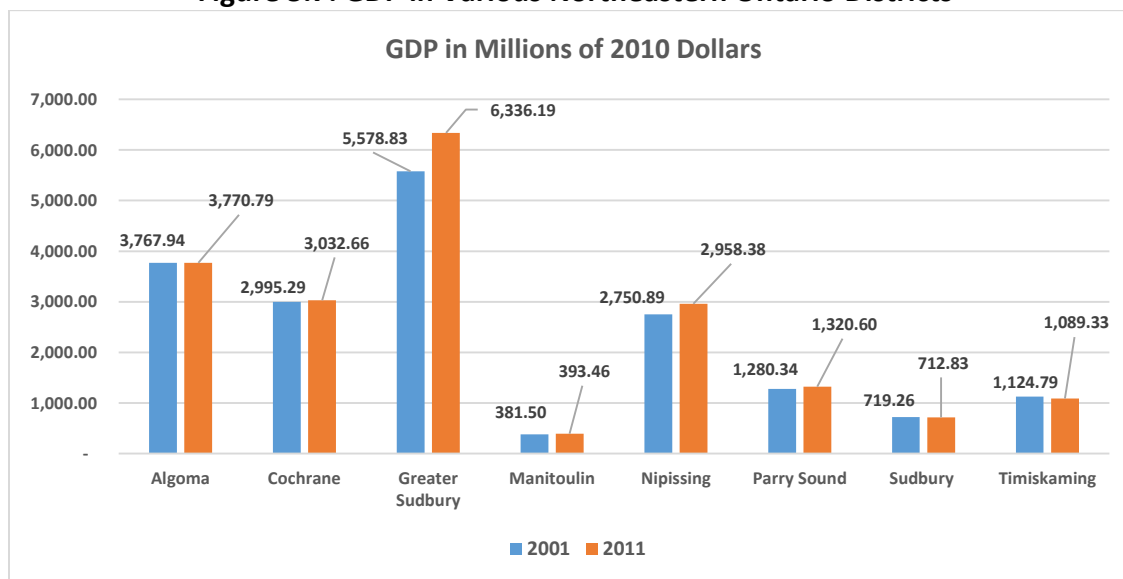


Figure 5.6 shows that during 2001-2011, total labour income experienced growth in the Greater Sudbury region (13.6%), Nipissing (7.6%), Parry Sound (3.1%), Manitoulin (3.1%) and Cochrane (1.2%). Total labour income stayed relatively constant in Algoma, declined in Sudbury (1.0%) and Timiskaming (3.2%). Assuming that the share of labour in regional GDP stayed relatively constant during 2001-2011, Figure 5.7 shows estimates of district's GDP during 2001-2011.

Figure 5.7: GDP in Various Northeastern Ontario Districts



Assuming that the share of employment income in GDP has remained constant, we observe that GDP has risen in Greater Sudbury region Nipissing, Parry Sound, Manitoulin and Cochrane, has stayed relatively constant in Algoma, but declined in Sudbury and Timiskaming.

Overall, major changes have occurred in the structure of Northeastern Ontario's economy, its population and workforce. Ageing and declining population along with a rising Aboriginal workforce have resulted in a declining supply of labour which has a lower level of human capital than necessary for the jobs of the future. In the past, Northeastern Ontario's economic prosperity has been based on a staples economy relying on the export of natural resources. In other words, regional economic development was dependent on internal economic factors namely growth of the goods-producing sectors of the economy. These sectors formed a major component of the region's economic base and had very high value-added and multiplier effect. Recent growth of education, healthcare and public sectors have to a large extent mitigated the declining economic base and have stabilized the regional economy.

Are Current Employment Levels Sustainable?

As we saw above, Northeastern Ontario's economy has undergone a significant structural change in recent decades. There has been a shift from goods-producing sectors to service-producing industries. How has this change affected the base and non-base employment in the region? The base employment is usually perceived as the main driver of employment and prosperity in the region. Those are industries usually dominated by private businesses. In this section, we estimate employment trends in Northeastern Ontario's base and non-base sectors and examine the relationship between base employment, total employment and income in the regional economy.

In general, the regional economy can be classified into three sectors. First are the industries that produce most of their products and services for export to other regions as well as international markets. These industries that have historically been linked to regional forestry and mineral resources are referred to as the economic base sectors. Businesses providing services to the base-industries are also considered as a part of the economic base. The base industries also link Northeastern Ontario to international markets, which make activity and employment levels extremely sensitive to international economic and business conditions.

The second sector includes industries that act like base industries in a sense that they are supported by funds from outside the region. These industries are referred to as quasi-base sectors. They include federal and provincial public administration, health care, tourism and education.

The final sector, which is referred to as the service or non-base sector, produces goods and services to satisfy the needs of regional residents. The level of economic activities in the service sector depends on the income generated in the base and quasi-base sectors. Growth in base and quasi-base sectors result in a growth in the local or service sector.

Therefore, knowledge of the factors that affect economic activity and employment in Northeastern Ontario's base, quasi-base and service sectors allows us to forecast regional employment and economic trends.

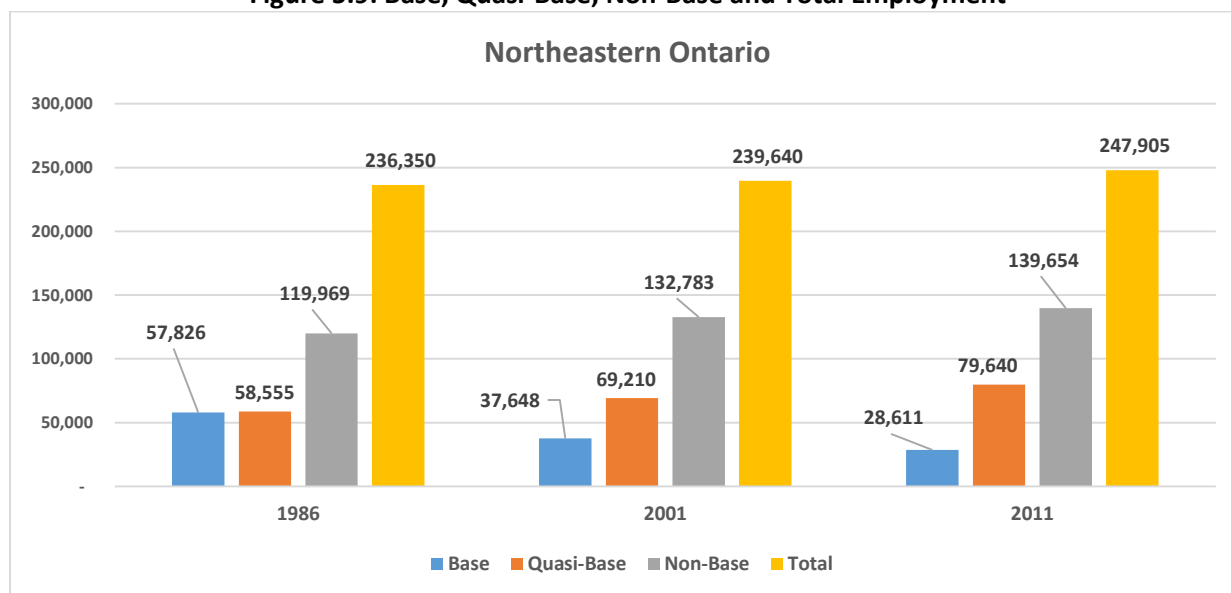
Northeastern Ontario's Base and Non-Base Sectors

Various methods are used to identify base and non-base industries.³⁰ Location Quotient (LQ) index is one of those methods that is commonly used in the literature. Using the LQ index relative to Canada, Figure 5.9 shows employment trends in base and non-base sectors of the regional economy. One can make two observations from Figure 5.9. First, the ratio of service employment to base and quasi-base employment was 1.03 in 1986. It rose to 1.24 in 2001 and 1.29 in 2011. In other words, the base and quasi-base sectors are supporting more jobs than before. It can be

³⁰ For a detailed discussion of those methods see Moazzami, B., "Northern Ontario's Economy: Challenges and Opportunities", May 2009, prepared for Ministry of Northern development and Mines as a part of the Growth Plan for Northern Ontario.

that the quality of jobs has diminished or the current level of employment is not sustainable. Secondly, employment in the private sector of the economy has declined while public sector has become more important in maintaining the level of economic activities in the region. Given the existing and growing federal and provincial budget deficits, how long can the public sector be the main drive of the regional economy is in question.

Figure 5.9: Base, Quasi-Base, Non-Base and Total Employment



Source: Calculated based on Statistics Canada, Census and NHS, custom tabulation.

One may argue that the regional employment has already adjusted to the new base and quasi-base levels of employment because the full-time and full-year jobs have been replaced by part-time and part-year jobs. This may be true and thus suggest that the total regional employment has stabilized and reached its sustainable level for as long as the base and quasi-base employment stay at their current levels.

Recent structural change has basically shifted the regional economic focus from predominantly producing for export markets to mostly production for domestic consumption. The share of the private sector and private investment in the regional economy has declined and the public sector's share has increased significantly.

Part VI: Looking into the Future

Aging population influences demand for government program expenditures such as health care and education. What healthcare related services will be necessary to meet the requirements of a rapidly aging regional population? How many doctors, nurses and other type of healthcare providers do we need to train and or attract to replace the aging healthcare providers while satisfying the growing demand for healthcare services?

Aging population also affects student enrolments, revenues and therefore demand for various educational services in Northeastern Ontario. What would be the impact of demographic change on demand for teachers and educators and therefore employment and income in that sector of the regional economy?

Various regional and national surveys indicate shortage of skilled tradesmen in various regions in Ontario and other regions of Canada. How has aging population affected the supply and availability of tradesmen in Northeastern Ontario? Are we training enough tradesmen to satisfy our current needs as well as preparing for the upcoming mining and forestry renewal? Otherwise, importing those expertise will seriously reduce the economic benefits of any resource-development in Northeastern Ontario.

These are questions that we will try to look into in this part of the study. Before investigating the above queries, it is useful to provide a general overview of the regional labour market. This is done in the next part of the study.

Overview of Demand and Supply of Labour in Northeastern Ontario

Fluctuating employment levels reflect changes in demand for the skills of workers in a given occupation.³¹ Occupational supply refers to the number of workers with specific occupational skills who are either employed or unemployed. During times of weak economic growth, demand for labour declines causing excess supply of workers who cannot find employment. During times of economic expansion, demand for workers increases resulting in rising employment and declining unemployment. Therefore, examination of the unemployment rate in a given occupation signals whether demand for that occupation is growing or declining.

The supply side of the labour market includes first-time new entrants into the workforce after having completed their education. After accounting for new entrants, in-migration acts as the residual supply of workers to meet demand requirements. In other words, when economic climate improves and the available new entrants are not sufficient to meet demand, in-migration balances the difference between local demand and supply. Similarly, when economic conditions

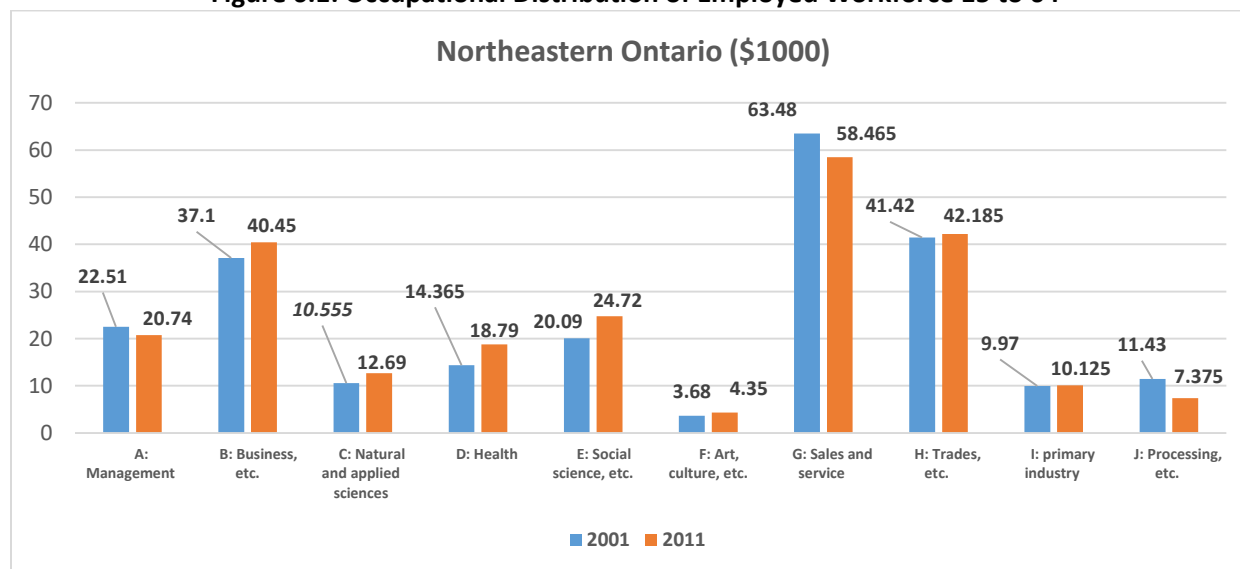
³¹ We define demand as a stock variable referring to the number of people working at a given point of time. On the other hand, changes in demand is considered a flow variable referring to the number of new workers required during an economic expansion or the number of workers becoming unemployed or exiting the workforce during an economic contraction.

weaken, out-migration balances the difference between supply and demand for labour in the region.

Figure 6.1 shows employment trends in various occupational groups in Northeastern Ontario during 2001-2011. The occupational groupings are based on the 2006 National Occupational Classification system (NOC). Figure 6.1 shows that employment in all occupational groups has increased during 2001-2011, except for occupations in management, sales and services and processing, manufacturing and utilities. The largest percentage increase has happened in Health care occupations (30.8%) followed by occupations in social science, education, government services and religion (23.1%).

As mentioned above, an aging population increases demand for healthcare services and is the primary driver of increased health-related employment in the region. Total employment in health-related occupations rose from 13,565 in 1996 to 14,365 in 2001 and 18,790 in 2011. Would this rising health-related employment trend continue into the future? On the other hand, aging of the population can negatively impact demand for educational services. Total employment in professional occupations in educational services increased from 10,705 in 2001 to 11,840 in 2011. Would this rising trend continue into the future? Are rural and urban regions equally affected? We will address these questions in the next part of the study.

Figure 6.1: Occupational Distribution of Employed Workforce 15 to 64

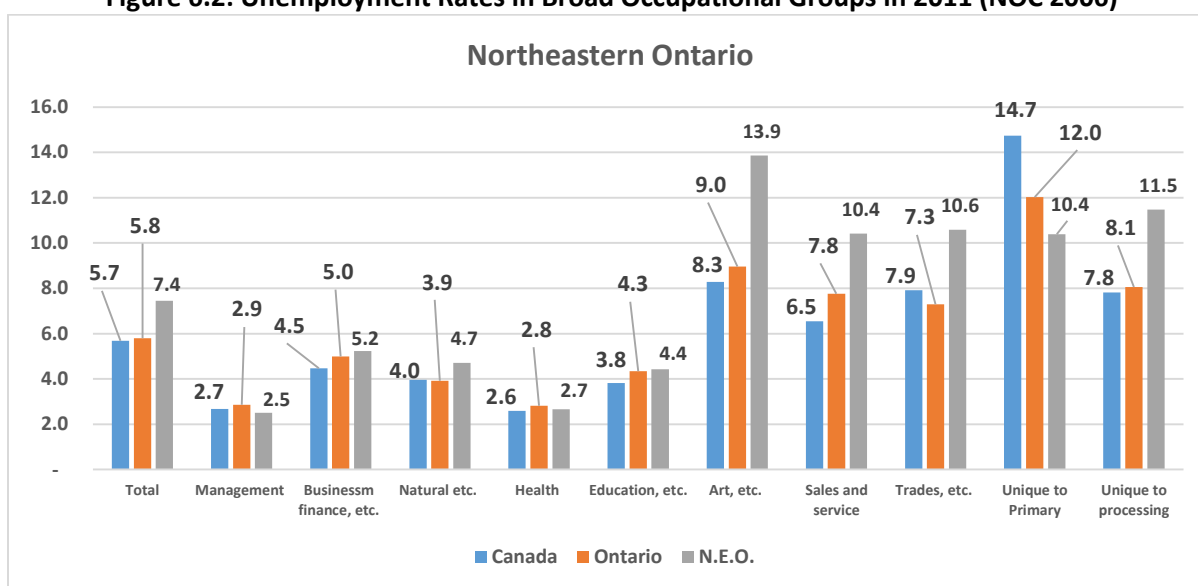


Source: Calculated based on Statistics Canada, 2001 Census and 2011 NHS, custom tabulation.

To identify occupations characterized by a tight labour market, we compare unemployment rates in various occupations in Northeastern Ontario with the provincial and national rates (Figure 6.2). The management occupations and those unique to primary are the only occupational group for which the unemployment rate in Northeastern Ontario is lower than the national and provincial levels. The unemployment rate in healthcare occupations in northeastern Ontario is higher than the national level but lower than the provincial one.

The unemployment rate for trades occupations is 10.6 percent which is significantly greater than the national and provincial ones. We will examine trends in trade occupations more closely because of the important role they potentially will play in the region's future economic growth. The unemployment rate in occupations unique to processing and manufacturing is also higher than the national and provincial ones. This reflects the weak state of the forestry and manufacturing industries in the region. Overall, the unemployment rate in Northeastern Ontario equals 7.4 percent which is about 1.8 percent higher than the national and provincial ones. It has to be noted that the effective unemployment rate in Northeastern Ontario may be greater than the 7.4 percent shown in Figure 6.2. The reason is that many unemployed individuals out-migrate or stop participating in the labour force resulting in a lower regional unemployment rate.

Figure 6.2: Unemployment Rates in Broad Occupational Groups in 2011 (NOC 2006)



Source: Calculated based on Statistics Canada, 2011 NHS, custom tabulation.

Having examined the general state of the labour market in Northeastern Ontario, we now turn to the examination of the questions raised at the beginning of this part of the study.

6.2: Population Aging and Demand for Health Care Occupations: Future Trends

Using various census information, Table 6.1 and Figure 6.3 show distribution of employment by occupation in Northeastern Ontario's healthcare sector during 1996-2011. Total employment in the healthcare sector has increased from 13,565 in 1996 to 18,875 in 2011, a growth rate of about 39.1 percent during 1996-2011 or 2.6 percent per year. Employment has increased in all major categories. Assisting occupations have experienced the highest growth (76.7%) followed by technical and related occupations in support of health services (53.3%), professional occupations in health (40.9%) and nursing occupations (9.4%). In 2011, registered nurses accounted for 29.4 percent of total employment followed by nurse aides, orderlies and patient service associates (20.7%) and licensed practical nurses (6.4%).

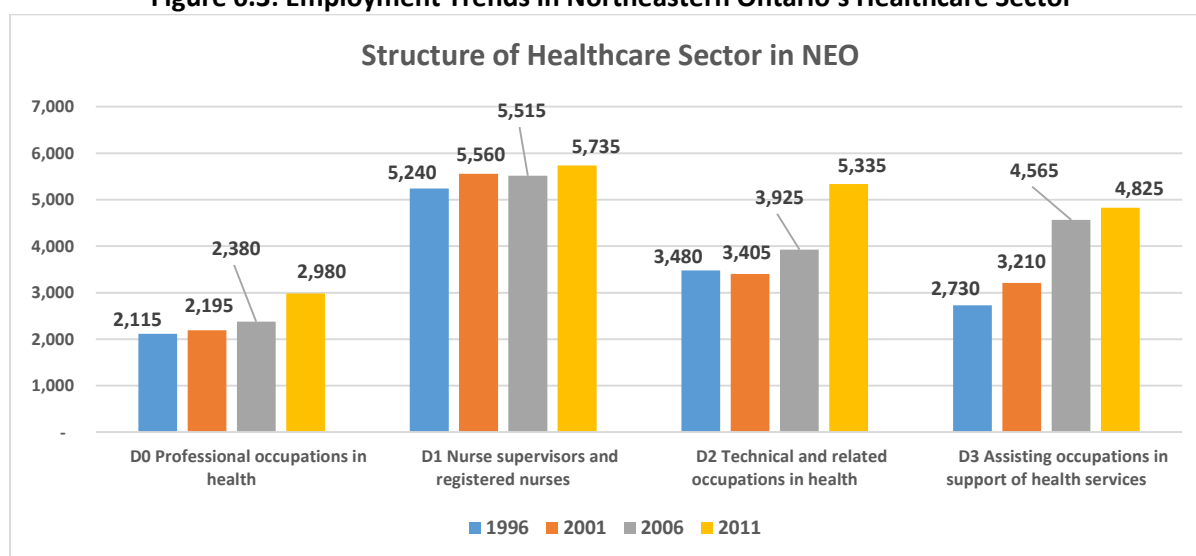
Table 6.1: Employment Trend in Northeastern Ontario's Health Care Sector

NOC 2006: Health Sector	1996	2001	2006	2011
D0 Professional occupations in health	2,115	2,195	2,380	2,980
D01 Physicians, dentists and veterinarians	1,050	1,055	1,090	1,065
D011 Specialist physicians	240	300	380	320
D012 General practitioners and family physicians	570	490	430	440
D013 Dentists	175	170	190	220
D014 Veterinarians	65	85	90	75
D02 Optometrists, chiropractors and other health diagnosing and treating professionals	195	175	275	495
D021 Optometrists	65	45	105	95
D022 Chiropractors	105	105	150	205
D023 Other professional occupations in health diagnosing and treating	25	35	20	195
D03 Pharmacists, dietitians and nutritionists	490	500	500	655
D031 Pharmacists	380	375	395	440
D032 Dietitians and nutritionists	110	120	105	210
D04 Therapy and assessment professionals	380	460	510	765
D041 Audiologists and speech-language pathologists	70	100	105	145
D042 Physiotherapists	145	160	195	225
D043 Occupational therapists	125	130	115	225
D044 Other professional occupations in therapy and assessment	40	65	90	165
D1 Nurse supervisors and registered nurses	5,240	5,560	5,515	5,735
D11 Nurse supervisors and registered nurses	5,240	5,560	5,515	5,740
D111 Head nurses and supervisors	295	130	160	185
D112 Registered nurses	4,945	5,440	5,355	5,555
D2 Technical and related occupations in health	3,480	3,405	3,925	5,335
D21 Medical technologists and technicians (except dental health)	1,295	1,390	1,310	2,315
D211 Medical laboratory technologists and pathologists' assistants	365	305	430	345
D212 Medical laboratory technicians	375	395	265	255
D213 Veterinary and animal health technologists and technicians	75	160	105	150
D214 Respiratory therapists, clinical perfusionists and cardio-pulmonary technologists	90	85	90	130
D215 Medical radiation technologists	255	295	280	285
D216 Medical sonographers	70	65	80	115
D217 Cardiology technologists	30	40	20	-
D218 Electroencephalographic and other diagnostic technologists, n.e.c.	25	20	-	-

D219 Other medical technologists and technicians (except dental health)	10	35	20	1,025
D22 Technical occupations in dental health care	345	330	425	500
D221 Denturists	20	10	30	-
D222 Dental hygienists and dental therapists	265	280	325	475
D223 Dental technologists, technicians and laboratory bench workers	60	50	65	15
D23 Other technical occupations in health care (except dental)	1,840	1,685	2,195	2,525
D231 Opticians	50	20	50	60
D232 Midwives and practitioners of natural healing	25	65	85	115
D233 Licensed practical nurses	1,055	860	1,145	1,205
D234 Ambulance attendants and other paramedical occupations	545	435	585	785
D235 Other technical occupations in therapy and assessment	165	310	330	360
D3 Assisting occupations in support of health services	2,730	3,210	4,565	4,825
D31 Assisting occupations in support of health services	2,730	3,215	4,565	4,825
D311 Dental assistants	320	330	335	395
D312 Nurse aides, orderlies and patient service associates	1,960	2,030	3,165	3,905
D313 Other assisting occupations in support of health services	450	855	1,060	525
Total Employed	13,565	14,370	16,385	18,875

Source: Calculated based on Statistics Canada, 1996, 2001, 2006 Censuses and 2011 NHS, custom tabulation.

Figure 6.3: Employment Trends in Northeastern Ontario's Healthcare Sector



Source: Calculated based on Statistics Canada, 1996, 2001, 2006 Censuses and 2011 NHS, custom tabulation.

Total demand for healthcare services is comprised of two components. First, there is a need to replace those workers who retire over the projection period. This constitutes the retirement-replacement, or retirement load component of the future demand for healthcare workers. The second component considers healthcare professionals who will have to be hired during 2011-2041 to address the growing demand for healthcare services caused by demographic changes, i.e. population change and aging of the population. This constitutes the growth component of total demand for healthcare providers. Since both determinants of demand for healthcare services are known, we can accurately estimate demand for healthcare services and therefore healthcare providers in Northeastern Ontario.

Growth Component of Demand for Healthcare Providers

It is well-known that demographic factors such as expected population growth or decline due to birth and death, age and migration, affect demand for healthcare services. To estimate the growth component of demand, we need to estimate indicators that track demand for healthcare workers in Northeastern Ontario. The growth-demand component reflects the need for more workers to accommodate the rising demand for healthcare services caused by changes in the size and age distribution of the population. We assume that the ratio of workers to patients/residents/clients remains the same over the forecast period. It is important to note that the aging profile of the population affects demand for different occupations differently. For example, the demand for workers employed in long-term care services is expected to rise rapidly as a result of relatively faster growth of the population aged 60 years and over. The aging of the population may not affect demand for healthcare workers serving a younger population cohort.

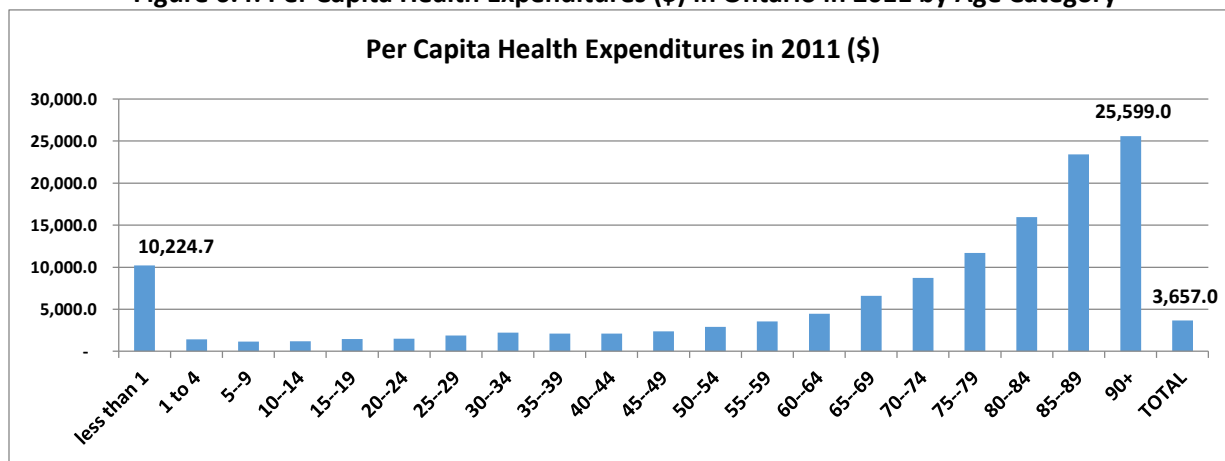
To estimate the growth component of total demand for healthcare services, we use the detailed Ministry of Finance's population projections for Northeastern Ontario during 2011-2041. The indicators developed in this part of the study aim at the need to quantitatively measure the impact of demographic changes on demand for healthcare workers in Northeastern Ontario. A recent study by the Canadian Institute for Health Information provides estimates of per capita provincial health expenditures by age in Ontario for 2011. This is shown in Figure 6.4.

Figure 6.4 shows that per capita health expenditures increase significantly as the population ages. In other words, demand for healthcare resources is positively correlated with age. Thus, per capita health expenditures by age can be used as a proxy for demand for healthcare services by different age groups. Therefore, using size and age distribution of the population in Northeastern Ontario, we can estimate an index that tracks changes in demand for healthcare services during 2013-2041. These healthcare demand indicators measure expected growth in demand for healthcare services and therefore healthcare providers in the region.

Using the information provided in Figure 6.4 and the Ministry of Finance's population projections for Northeastern Ontario, Figure 6.5 shows the estimated growth-demand indicator for

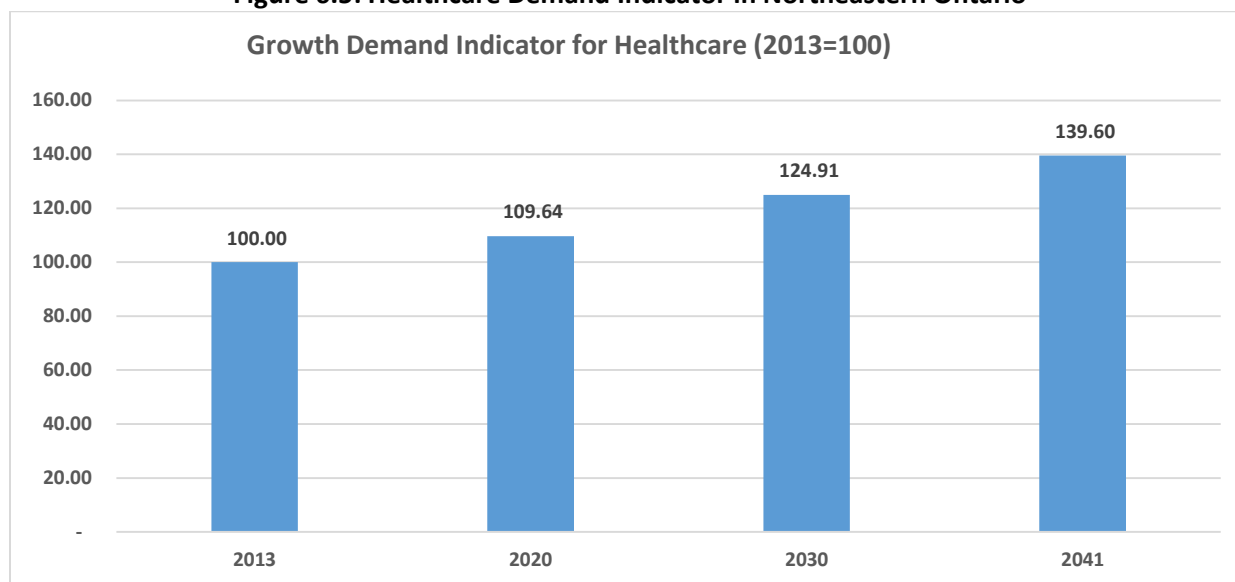
healthcare services in Northeastern Ontario during 2013-41. We have used demand for healthcare services in 2013 as the benchmark against which we measure growth.

Figure 6.4: Per Capita Health Expenditures (\$) in Ontario in 2011 by Age Category



Source: Canadian Institute for Health Information, "National Health Expenditure Trends, 1975 to 2013", 2013.

Figure 6.5: Healthcare Demand Indicator in Northeastern Ontario



Source: Estimated based on the Ministry of Finance Population projections and data from the Canadian Institute for Health Information, 2013.

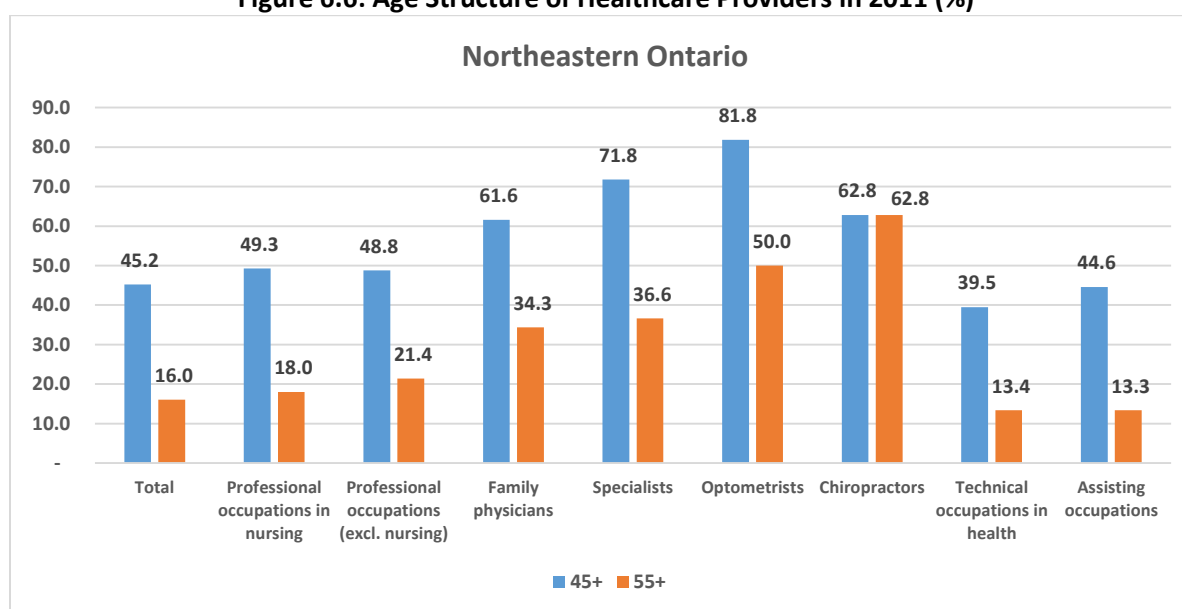
Figure 6.5 shows that demand for healthcare workers is expected to rise by 9.6 percent from 2013 to 2020. Demand is expected to rise by 24.9 percent during 2013-30 and 39.6 percent during 2013-41. According to the Ministry of Finance population projections discussed above, Northeastern Ontario's population is expected to decline from 563,548 in 2013 to 540,064 in 2041. Despite the declining population, Figure 6.5 shows that demand for healthcare services is expected to increase significantly during 2013-41. The reason is that the regional population is

aging and demand for healthcare services rises by age. In fact, the existing data reveal that demand by seniors aged 65 and over is about 3 times greater than the overall average demand.

Retirement Replacement Component of Demand for Healthcare Providers

Figure 6.6 shows the age structure of healthcare providers in Northeastern Ontario in 2011. Overall, 16.0 percent of the regional healthcare providers are older than 55. About 34.3 percent of the family physicians and 18.0 percent of those in nursing occupations are over 55 years of age. The youngest group appears to be those in the technical and assisting occupations in health. Only about 13.0 percent of them are over the age of 45 years. Overall, optometrists, specialists and family physicians appear to be older than other health providers in Northeastern Ontario.

Figure 6.6: Age Structure of Healthcare Providers in 2011 (%)



Source: Statistics Canada, 2011 NHS, custom tabulation.

Assuming an average retirement age of 65, Table 6.2 shows the retirement-replacement and expansion demand for healthcare providers in Northeastern Ontario.

Table 6.2: Total Demand for Healthcare Providers in Northeastern Ontario

Occupation	2011-2020			2011-2030		
	Expansion Demand	Replacement Demand	Total	Expansion Demand	Replacement Demand	Total Demand
Professional occupations in nursing	560	1,050	1,610	1,447	2,865	4,312
Professional occupations (except nursing)	299	665	964	773	1,515	2,288
Family physicians	48	170	218	123	305	428
Specialists	34	130	164	88	255	343

Optometrists	11	55	66	27	90	117
Chiropractors	21	135	156	54	135	189
Technical occupations	516	715	1,231	1,334	2,115	3,449
Assisting occupations	469	650	1,119	1,213	2,170	3,383
Total Numbers	1,845	3,080	4,925	4,768	8,665	13,433
Percentage Demand (%)	37.46	62.54	100.00	35.49	64.51	100.00

Source: Author's estimated based on population projections and 2011 NHS.

Table 6.2 shows that about 62.5 percent of the total demand for healthcare providers during 2011-2020 relates to replacing those who are expected to retire during the above period. The rest or 37.5 percent of the healthcare providers are needed to satisfy the growing demand for healthcare services due to the aging population in Northeastern Ontario. Total demand rises significantly when we extend the projection period to 2011-2030.

6.3. Population Aging and Demand Projections for Educators in Northeastern Ontario

Using various census information, Table 6.3 shows distribution of employment by occupation in Northeastern Ontario's education service sector during 1996-2011. Total employment in the education sector declined by 8.7 percent during 1996-2001, but rose by 12.4 percent during 2001-2011. Table 6.3 shows that secondary and elementary schools account for about 77 percent of total employment in education services sector. Employment at postsecondary institutions has increased from 1996 to 2011. The number of secondary school teachers has declined while the number of elementary school and kindergarten teachers has risen during the above period.

Table 6.3: Employment in Education Service Occupations

Occupation in Education Services	1996	2001	2006	2011
401 University professors and post-secondary assistants	810	860	1190	1135
4011 University professors and lecturers	565	605	630	745
4012 Post-secondary teaching and research assistants	245	255	560	395
402 College and other vocational instructors	1,955	1200	1430	1610
4021 College and other vocational instructors	1,955	1200	1430	1610
403 Secondary and elementary school teachers and educational counsellors	8,975	8650	8785	9290
4031 Secondary school teachers	3,385	3370	3520	3340
4032 Elementary school and kindergarten teachers	5,340	5035	5000	5545
4033 Educational counsellors	250	255	265	405
Total Professional occupations in education services	11,740	10710	11405	12035

Source: Statistics Canada, 1996, 2001, 2006 Censuses and 2011 NHS, custom tabulation.

Two factors influence demand for teachers and instructors. First, aging population and declining enrolments reduce demand for educational services. Declining demand reduces financial

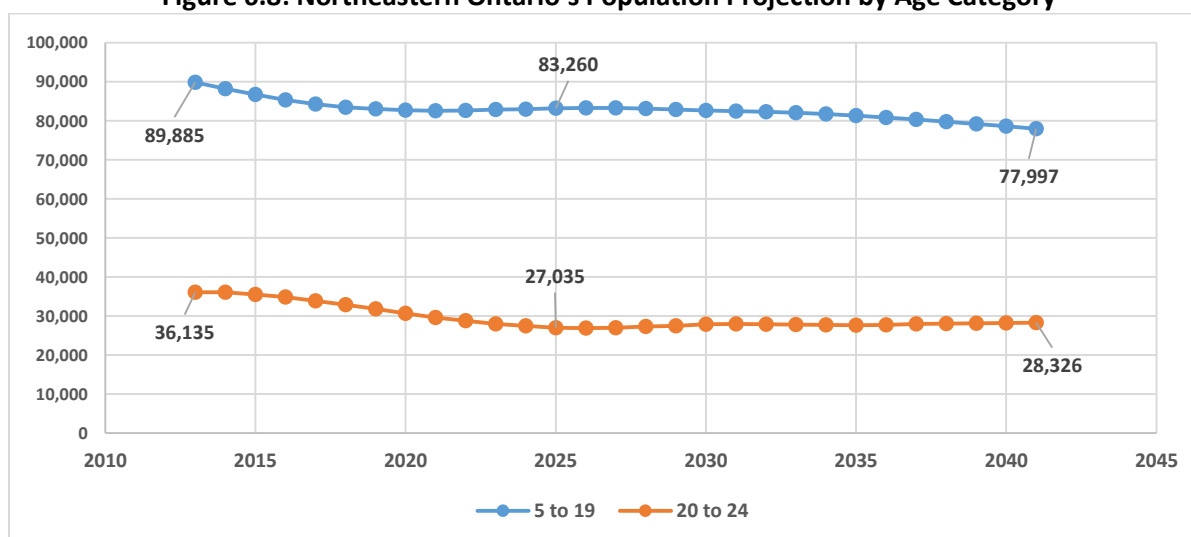
resources available to the institutions and therefore affects the number of teachers and educators needed to supply those services.

The second factor affecting demand for new teachers relates to a need to replace those who retire over the projection period. This constitutes the retirement-replacement, or retirement load component of the future demand for teachers and instructors.

Aging of the Population and Demand for Teachers and Instructors

Using Ontario's Ministry of Finance population projections, Figure 6.8 shows projections for different age groups in Northeastern Ontario. It shows that the population aged 5 to 19 years is expected to decline by 13.2 percent during 2013-2041. This trend largely affects primary and secondary schools. Similarly, total population aged 20 to 24 years is expected to decline by 21.6 percent during 2013-41. Declining youth population influences demand for postsecondary education in Northeastern Ontario.

Figure 6.8: Northeastern Ontario's Population Projection by Age Category



Source: Calculated based on the Ministry of Finance population projections

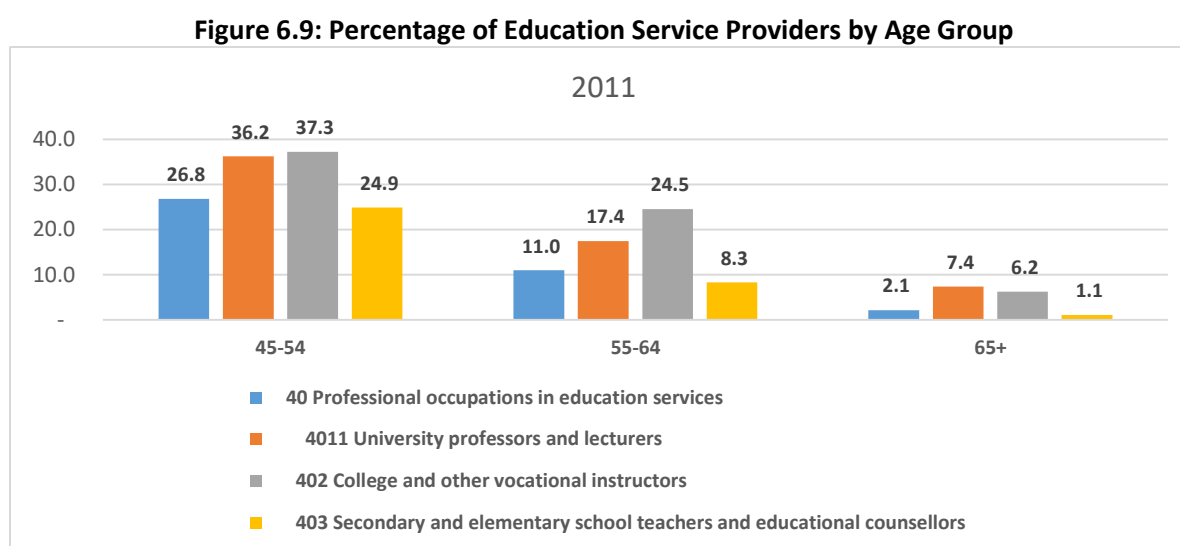
As mentioned before, Aboriginals are the only growing segment of the regional population. The number of Aboriginal children between the ages of 5 to 19 is expected to grow from 14,771 in 2013 to 15,231 in 2041. The share of Aboriginals in this age group rises for 16.4 percent of all children between 5 and 19 years of age in 2013 to 19.5 percent in 2041. Similarly, the number of Aboriginal youth aged 20 to 24 is expected to increase from 4,681 in 2013 to 5,079 in 2041. Their share of this age group is expected to rise from 12.9 percent in 2013 to 17.9 percent in 2041.

As discussed above, 45.9 percent of the Aboriginal population live in rural Northeastern Ontario with limited access to urban centres. Therefore, providing educational services to this growing segment of the regional population might necessitate reallocation of resources from urban to

rural areas. How to provide adequate educational services to the Aboriginal youth, a significant share of whom are in rural regions, is a challenge educational authorities will be facing in the coming years.

Retirement Replacement Component of Demand for Teachers and Instructors

Figure 6.9 shows the age structure of education service providers in Northeastern Ontario. Overall, 13.1 percent of individuals in professional occupations in education services are 55 years of age and older. About 25.0 percent of the university professors in Northeastern Ontario are 55 and over. About 31.0 percent of the college and other vocational instructors and 9.0 percent of secondary and elementary school teachers are over the age of 55.



Source: Calculated based on Statistics Canada, 2011 NHS, custom tabulation.

To estimate demand for teachers and instructors in Northeastern Ontario, we need to make two assumptions. First, we assume an average retirement age of 65. We note that even though the normal retirement age is 65, one cannot be forced to retire at that age. Mandatory retirement of federally regulated employees was changed in 2012. Therefore, our retirement assumption might be conservative and thus our estimated demand for educators may be expected to be lower to the extent educators would continue to work past age 65. Secondly, we assume that, in the long-term, the number of educators in the region is proportional to the number of students. Based on these two assumptions, Table 6.4 shows the retirement-replacement and expansion/contraction demand for educators in Northeastern Ontario.³²

³² We have ignored the fact that postsecondary institutions attract students from outside Northeastern Ontario.

Table 6.4: Demand for Educators in Northeastern Ontario

Occupations	2011-2020			2011-2030		
	Replacement Demand	Expansion Demand	Total Demand	Replacement Demand	Expansion Demand	Total Demand
40 Professional occupations in education services	1,575	(1,155)	420	4,800	(1,373)	3,427
401 University professors and post-secondary assistants	195	(172)	23	505	(259)	246
4011 University professors and lecturers	185	(112)	73	455	(169)	286
4012 Post-secondary teaching and research assistants	15	(59)	(44)	25	(90)	(65)
402 College and other vocational instructors	495	(242)	253	1,095	(366)	729
4021 College and other vocational instructors	500	(242)	258	1,100	(366)	734
403 Secondary and elementary school teachers and educational counsellors	870	(741)	129	3,180	(749)	2,431
4031 Secondary school teachers	270	(266)	4	1,230	(269)	961
4032 Elementary school and kindergarten teachers	505	(442)	63	1,755	(447)	1,308
4033 Educational counsellors	45	(32)	13	155	(33)	122

Source: Author's estimate based on population projections and Figure 6.9.

Table 6.4 shows that total demand for individuals in the education services sector would equal 420 during 2011-2020. This represents about 3.5 percent of total current employment in that sector. Demand for educators would rise to 3,427 during 2011-2030, primarily due to the retirement replacement demand during that period.

Aging Population and Supply of Tradesmen in Northeastern Ontario

We assume that demand for trades occupations stays at its current level. This implies that the future demand is solely related to retirement replacement needs of different employers. Table 6.5 shows employment trends in selected trades occupations in Northeastern Ontario during 1996-2011.

Table 6.5: Employment Trends in Trades Occupations in Northeastern Ontario

Selected Trades Occupations	1996	2001	2006	2011
H1 Construction trades	4,240	4,595	5,235	5,685
H11 Plumbers, pipefitters and gas fitters	895	950	1,035	1,010
H12 Carpenters and cabinetmakers	1,885	2,080	2,340	2,610
H13 Masonry and plastering trades	585	610	760	650
H14 Other construction trades	875	950	1,100	1,415
H21 Electrical trades and telecommunications occupations	3,175	3,090	2,745	3,405
H211 Electricians (except industrial and power system)	745	865	865	1,365
H212 Industrial electricians	1,405	1,105	960	940

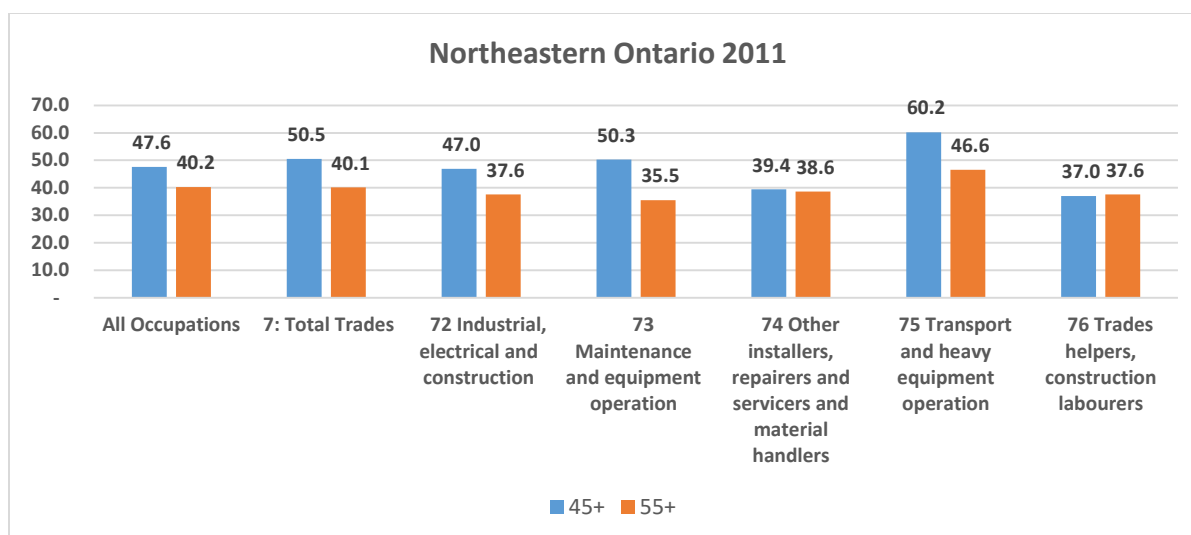
H213 Power system electricians	50	145	135	160
H214 Electrical power line and cable workers	275	320	280	265
H215 Telecommunications line and cable workers	240	195	175	355
H216 Telecommunications installation and repair workers	370	360	270	305
H3 Machinists, metal forming, shaping and erecting occupations	n.a.	3,170	3,660	3,705
H31 Machinists and related occupations	870	720	995	985
H311 Machinists and machining and tooling inspectors	820	620	885	885
H312 Tool and die makers	50	95	115	100
H32 Metal forming, shaping and erecting trades	n.a.	2,455	2,660	2,715
H41 Machinery and transportation equipment mechanics (except motor vehicle)	5,050	4,320	4,595	5,085
H411 Construction millwrights and industrial mechanics (except textile)	2,380	2,345	2,130	2,325
H412 Heavy-duty equipment mechanics	2,025	1,420	1,675	1,570
H61 Heavy equipment operators	2,100	2,495	2,690	2,545
H8 Trades helpers, construction and transportation labourers and related occupations	4,800	4,790	5,585	3,315
Total Employment in Trades	40,800	41,480	43,645	42,915

Source: Calculated based on Statistics Canada, 1996, 2001 and 2006 Census, 2011 NHS.

Total employment in trades occupations rose by about 7.0 percent during 1996-2006, but declined by 1.7 percent during 2006-2011. During 1996-2011, demand for construction trades rose by 12.8 percent. Demand for machinists also rose by about 17.0 percent. Heavy-duty equipment mechanics experienced a decline in demand by about 23.0 percent. Demand for trade helpers also declined by more than 30.0 percent.

Figure 6.10 shows the age structure of trades workers in Northeastern Ontario in 2011. On average, 40.1 percent of all workers engaged in trades occupations are aged 55 and over. This is similar to the percentage of all workers in the region who are 55 and older. About 50.5 percent of them are 45 and over. Transportation equipment operators and related workers have the highest percentage of people over the age of 55 and maintenance and equipment operators have the lowest share of people over the age of 55.

Figure 6.10: Percentage Age Structure of Workers in Trades Occupations



Source: Calculated based on Statistics Canada, 2011 NHS, custom tabulation.

Table 6.6 shows the percentage of employees in trades occupations who are over the age of 60.

Table 6.6: Percentage of Trade Workers over the Age of 60

Trade Occupations	Percentage Over 60
Total - Occupation - National Occupational Classification (NOC) 2011	8.9
7 Trades, transport and equipment operators and related occupations	9.8
72 Industrial, electrical and construction trades	8.2
7233 Sheet metal workers	10.1
724 Electrical trades and electrical power line and telecommunications workers	9.7
7302 Contractors and supervisors, heavy equipment operator crews	10.1
7312 Heavy-duty equipment mechanics	9.2
7445 Other repairers and servicers	22.6
75 Transport and heavy equipment operation and related maintenance occupations	14.6
752 Heavy equipment operators	9.8
7612 Other trades helpers and labourers	23.5

Under the assumption of no future employment growth, Table 6.7 shows the retirement replacement demand for trades occupations in Northeastern Ontario.

Table 6.7: Retirement Replacement Demand for Trades Occupations

NOC 2011 Classification	Replacement Demand	
	2011-2020	2011-2030
72 Industrial, electrical and construction trades	2,460	9,010
73 Maintenance and equipment operation trades	2,015	7,690

74 Other installers, repairers and servicers and material handlers	330	1,185
75 Transport and heavy equipment operation and related maintenance occupations	3,420	10,765
76 Trades helpers, construction labourers and related occupations	460	1,685
All Trades	8,690	30,345

Source: Calculated based on 2011 NHS, special Tabulations.

Table 6.7 shows that there is a need for 8,690 or 20.2 percent of all trades workers to replace the retiring trades people during 2011-2020. Transport and heavy equipment operators (3,420) represent the largest number of potential retirees during 2011-2020 followed by industrial, electrical and construction trades workers (2,460) and maintenance and equipment operators (2,015). About 71.0 percentage of trades workers will potentially retire during 2011-2030 and need to be replaced by new entrees to the market.

Part VII: Concluding Remarks

Northeastern Ontario's economy has undergone a significant transformation during the past three decades. Its traditional resource-based industries have declined while the economy's dependence on government funded programs, such as healthcare, education and government, has risen significantly. The resource-based sectors have always been subject to cyclical fluctuations, boom and bust cycles. Forestry cycles have been about twice longer than the mining cycles since regeneration of forests takes much longer. The mining sector appears to be benefiting from the low Canadian dollar. It is expected that the renewal of the forestry industry will happen around 2025. The potential obstacles will be the lack of necessary infrastructure and the availability and cost of energy.

The present report reveals fundamental trends that will negatively impact the region's competitive position and the standard of living of residents if not addressed immediately.

Aging and Declining Population

According to Statistics Canada's census of population, Northeastern Ontario's population grew from 566,759 in 1986 to 582,154 in 1996, but declined to 551,672 in 2001 and 551,144 in 2011. The declining population closely follows employment changes in the major goods-producing sectors of the regional economy. Many factors explain the declining regional population. First, the region has experienced significant out-migration throughout 2002-2014. The majority of those who choose to move appear to have moved out of the province. During 2002-14, 9,661 persons moved from Northeastern Ontario to other provinces compared to 6,413 who moved out of Northeastern Ontario but stayed in Ontario. The majority of movers are between the ages of 35 and 64 followed by those between the ages of 20 and 34 years.

Furthermore, Northeastern Ontario has been receiving disproportionately low rates of immigration. According to Census data, about 1.4 million immigrants came to Canada during 2001-2011. Net immigration to Ontario during 2001-2011 equaled 586,990. However, the number of immigrants in Northeastern Ontario declined by about 4,280 immigrants during the above period (due to deaths and out-migration of resident immigrants being greater than the arrival of new immigrants). In other words, the region experienced negative net immigration during 2001-2011. Another factor contributing to slow or negative population change relates to the fact that the total fertility rate in Northeastern Ontario (1.60) has been significantly below the generational replacement rate of 2.1.

Rising life expectancy and out-migration of youth have resulted in the aging of Northeastern Ontario's population. The baby boomers were followed by much smaller generations in number primarily due to a declining fertility rate. During the same period, average life expectancy at birth in Canada increased from 71.13 years in 1960 to 81.24 years in 2012. As a result the share of individuals in Northeastern Ontario below the age of 20 has declined from 29.4 percent in 1991 to 21.5 percent in 2011 while the share of seniors rose from 11.4 percent in 1991 to 18.0 percent

in 2011. During the same period, the share of individuals in their prime working age of 20 to 44 has declined from 38.2 percent in 1991 to 28.5 percent in 2011.

Declining Human Capital Content of the Labour Force

Our projections show that the labour force in Northeastern Ontario is expected to decline from 264,860 in 2013 to 210,397 in 2041, a decline of about 20.6 percent during the projection period. During the same period, the Aboriginal labour force increases from 27,372 in 2013 to 30,706 in 2041, a rise of about 12.2 percent. As a result, the share of Aboriginals in the total regional labour force is expected to increase from 10.3 percent in 2013 to 14.6 percent in 2041.

We also found that the human capital composition of the working age population in Northeastern Ontario is below that in Ontario and Canada. The report also shows that the human capital composition of the Aboriginal labour force is significantly below the regional, provincial and national averages.

The report estimates the human capital composition of the future regional workforce by combining the labour force projections with the human capital indexes for various segments of the workforce. We find that if the current level of educational achievement continues, the human capital composition of the workforce will decline in the coming years. This index is positively correlated with labour productivity, labour income and output in the region.

People without Jobs and Jobs without People

The declining supply of labour and labour productivity in Northeastern Ontario are only half of the bad news. Recent technological change and the emergence of the knowledge economy have changed the requirements of the labour market.

Various studies suggest that about 66.9 percent of the current jobs require post-secondary education and this skill requirement will rise to about 77.1 percent by 2030. However, on average, the skill level in Northeastern Ontario and its sub-regions is significantly below the current and future estimated skill requirements. The report shows that the skill level of the Aboriginal labour force lags behind the regional average.

It appears that if the skill levels of the workforce in Northeastern Ontario stays at its current level or declines in the future while skill requirements of the workforce rises, the region will end up with people without jobs and jobs without people. Even if markets adjust to bring demand and supply of labour into balance, the social impact of having many unemployable people will be enormous.

Given that the Aboriginal population will comprise a larger share of the future workforce, more investment in rural education is needed to reverse the declining human capital composition of the future labour force. Emphasis should not only be put on the increased investment but also on improving the quality of education delivered in urban as well as rural areas.

Changing Industrial Composition of the Workforce

The structure of Northeastern Ontario's workforce has been changing due to a population that is simultaneously declining and ageing. At the same time, the industrial and occupational composition of the employed workforce is shifting due to changing market conditions.

As a result, the size and industrial makeup of the employed workforce has changed during the past three decades. There has been a continuous shift away from the goods-producing sector dominated by private businesses to the service-producing sector, a large portion of which is publicly funded.

As a result, the share of full-time and full-year jobs has declined from 58.3 percent in 2006 to 51.7 percent in 2011. The average earnings of full-time and full-year jobs equaled \$55,798 in Northeastern Ontario in 2011. During the same period, the share of part-time or part-year jobs rose from 41.7 percent in 2006 to 48.3 percent in 2011. The average earnings of the part-time or part-year jobs in the region equaled \$24,957 in 2011. The same picture appears when we examine the composition of the employed workforce by sex. Rising part-time and declining full-time employment have happened across all levels of education.

Lack of Growth in Regional Income and GDP

Changing size and composition of the employed workforce impact total labour income and output in Northeastern Ontario. Total labour income and GDP declined in the goods-producing sectors but rose in the service-producing industries. The decline in the goods-producing sectors has been compensated for by a rise in the service-producing sectors. Overall, total labour income and GDP stayed relatively constant during 1986-2010.

Regional income and GDP are highly correlated with employment as well as labour productivity in various industries. The higher the labour productivity, the greater the output and income. The relative constancy of the regional income and GDP suggest that the regional economy has not experienced growth during the past 25 years.

Changing Business Landscape in Northeastern Ontario

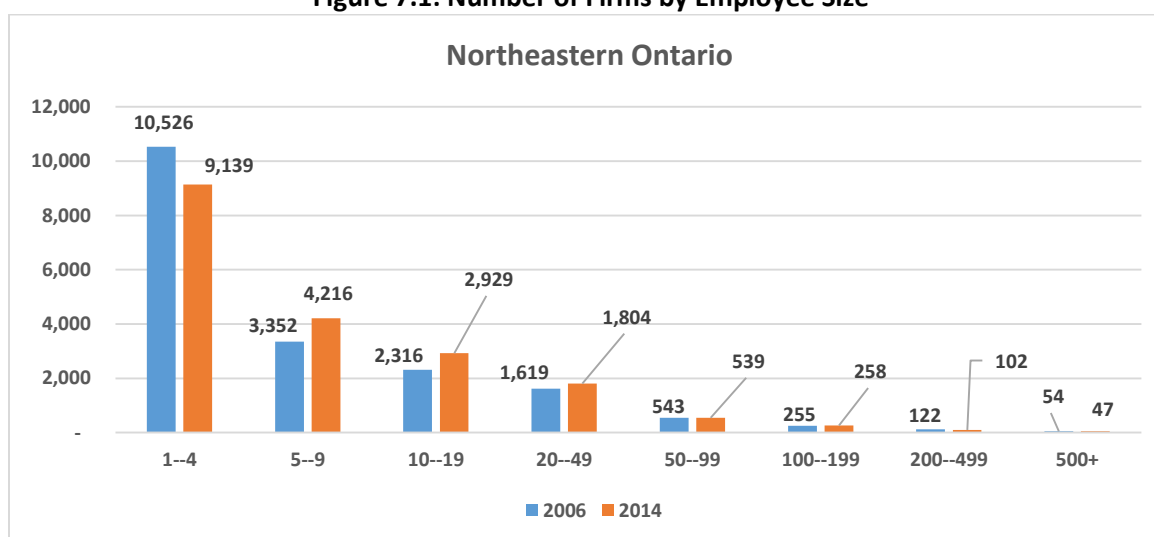
The number of employer-based establishments in Northeastern Ontario rose from 18,787 in 2006 to 19,034 in 2014.³³ Most of the business establishments in Northeastern Ontario are small (Figure 7.1).³⁴ The number of firms with 1 to 4 employees declined by 13.2 percent during 2006-2014. In 2014, this group was dominated by construction (16%), accommodation and other services (16.4%), health care and social assistance (11.3%) and retail and wholesale trade (13.3%). The number of establishments with 5 to 49 employees rose during 2006-2014. This group of firms

³³ Employer-based establishments are those businesses that maintain a payroll of at least one person. This includes all businesses that submit payroll remittances to CRA and therefore includes public sector employers.

³⁴ Note that the data in Figure 7.1 includes Muskoka district.

is dominated by those in retail and wholesale trade (26.6%), construction (12.3%), accommodation and other services (18.4%) and health care and social assistance (9.4%). The number of firms with 50 to 99 employees declined during 2006-2014. This group is dominated by retail and wholesale trade (21.6%), accommodation and food services (16.9%), manufacturing (9.5%) and health care and social assistance (9.3%). The number of firms with 100 to 199 employees rose slightly during the above period. This group is dominated by health care and social assistance (20.5%), retail and wholesale trade (20.1%), and manufacturing (8.5%). The number of establishments with 200 to 499 employees declined by 16.4 percent during the above period. In 2014, businesses in health care and social assistance accounted for 21.6% of establishments in this category followed by mining (14.7%), retail trade (9.8%), manufacturing (8.8%) and administrative and support, waste management and remedial services (8.8%). Similarly, the number of businesses with 500 and more employees declined by 13.0 percent during 2006-2014. About 36.2 percent of businesses in this group are in educational services followed by those in healthcare (14.9%), retail trade (10.6%), mining (10.6%), and manufacturing (6.4%).

Figure 7.1: Number of Firms by Employee Size



Classifying businesses into small (1 to 99 employees), medium (100 to 499 employees) and large (500+ employees), the number of small enterprises rose from 18,356 in 2006 to 18,627 in 2014. They account for 97.9 percent of total employer-based establishments in the region. On the other hand, the number of medium businesses declined from 377 to 360 during 2006-2014. The number of large firms also declined during the above period.

According to Statistics Canada's labour force survey (2012), small businesses account for more than 98 percent of all firms in Canada and accounted for 77.7 percent of all private jobs from 2002 to 2012. On average, small firms created about 100,000 jobs each year compared to 17,000 and 11,800 jobs per year by medium and large firms.

Studies have shown that business cost and business environment rank highest among all factors determining the success or failure of an enterprise. For example, the Economic Developers Council of Ontario along with Austin Consulting of Cleveland Ohio prepared a list of investment factors considered in the attraction/retention decisions of companies. They examined 23 industrial sectors. Business cost and business environment rank highest among all factors considered in determining site selection.³⁵

A recent report by Northern Ontario Business states that electricity cost account for the second highest operating cost after payroll in Ontario.³⁶ High electricity prices account for a large share of the total cost in forestry-based manufacturing and mining industries. To attract and retain businesses to northern Ontario, we need to address the cost of energy especially if our resource-based industries are to remain competitive.

Our survey of multinational (MN) and multi-locational (ML) enterprises in Northern Ontario asked businesses whether they have experienced any barriers or factors that negatively impacted their growth and/or investment in Northern Ontario.³⁷ Fifty businesses including firms in manufacturing, advanced manufacturing, professional services, mining, wholesale, transportation, forestry and construction industries responded to the survey. Results revealed that 61 percent of multi-locational and 43 percent of multinational firms have experienced barriers in the region. The survey asked the respondents to identify those barriers or factors. The following is a list of those factors from highest to lowest level of importance:

1. Difficulty finding qualified employees (ML: 29%, MN: 24%, Average = 26%)
2. Transportation costs (ML:17%, MN: 5%, Average = 11%)
3. Government regulations (ML: 15%, MN: 3%, Average = 9%)
4. Infrastructure for expansion is poor (ML: 4%, MN: 11%, Average = 7%))
5. Energy costs (ML: 0%, MN: 15%, Average = 7%)
6. Shipping costs (ML: 9%, MN: 0%, Average = 5%)
7. Fuel costs (ML: 0%, MN: 9%, Average = 5%)
8. Taxes (ML: 0%, MN: 9%, Average = 5%)

Another report by the Canadian Council of Chief Executives surveyed more than 100 of Canada's largest employers in all industrial sectors and regions of the country in March of 2014. More than

³⁵ See B. Moazzami, "Northern Ontario's Economy: Challenges and Opportunities", prepared for Ministry of Northern Development and Mines as a part of Growth Plan for Northern Ontario, May 2009. Also see B. Moazzami, HDR Decision Economics and Oraclepoll Research Limited, "Multinational and Multi-locational Enterprise Initiative: Survey of Northern Ontario Companies", prepared for FedNor, 2012.

³⁶ Northern Ontario Business, July 15, 2015.

³⁷ Moazzami, B., HDR Decision Economics and Oraclepoll Research, "Multinational and Multi-Locational Enterprise Initiative: Survey of Northern Ontario Companies", May 2012.

70.0 percent of the companies identified scarcity of skilled workers as the primary barrier to filling the available positions.³⁸

The present study suggests that if current trends continue, the human capital composition of the workforce in Northeastern Ontario will deteriorate in the coming years. Given that the current skill levels are below the national and provincial levels, any further decline will result in higher unemployment and lower income and GDP. There is a need to invest in education and upgrading of the workforce especially in the rural Northeastern Ontario.

³⁸ The Canadian Council of Chief Executives, "Taking Action for Canada: Jobs and Skills for the 21st Century", March 2014.