NORTHERN POLICY INSTITUTE

INSTITUT DES POLITIQUES DU NORD

NORTHERN ONTARIO
WORKFORCE PLANNING

Northern Projections

Human Capital Series - THUNDER BAY DISTRICT

By James Cuddy & Dr. Bakhtiar Moazzami

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Who We Are - Northern Ontario Workforce Planning

Workforce Planning Ontario is a network of 26 Workforce Planning Boards covering four regions across the province. Workforce Planning Boards gather intelligence about the supply and demand side of the local labour market and work in partnership with employers, employment services, educators, researchers, economic development, government and other stakeholders to identify, understand and address labour market issues. This includes supporting and coordinating local responses to meet current and emerging workforce needs.

Given the unique geography and labour market issues that impact Northern Ontario, all 6 planning boards in the north have collaborated to form Northern Ontario Workforce Planning. They include: Algoma Workforce Investment Corporation (AWIC); Far Northeast Training Board (FNETB); The Labour Market Group (LMG); Northwest Training and Adjustment Board (NTAB); North Superior Workforce Planning Board (NSWPB); and Workforce Planning for Sudbury & Manitoulin (WPSM). FNETB and NSWPB are currently pilot sites for Local Employment Planning Councils (LEPC).

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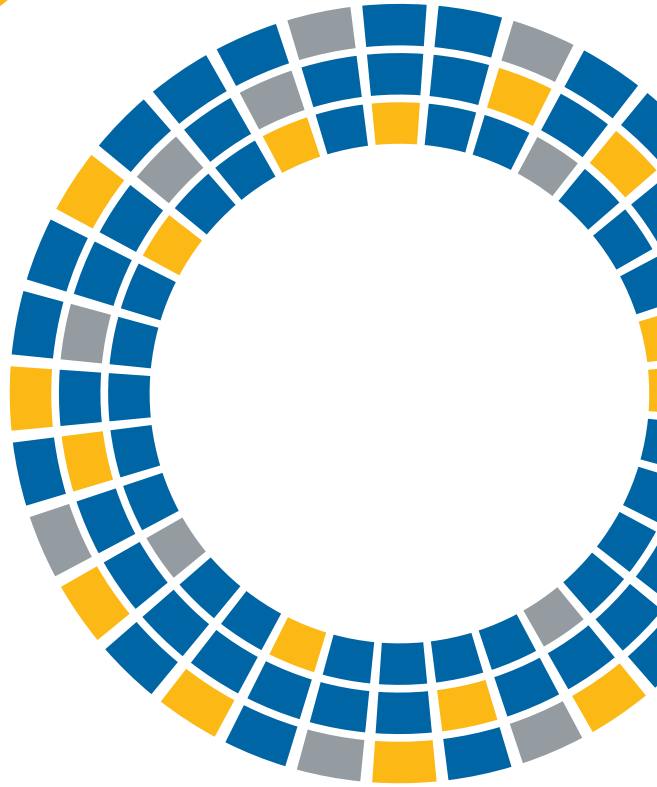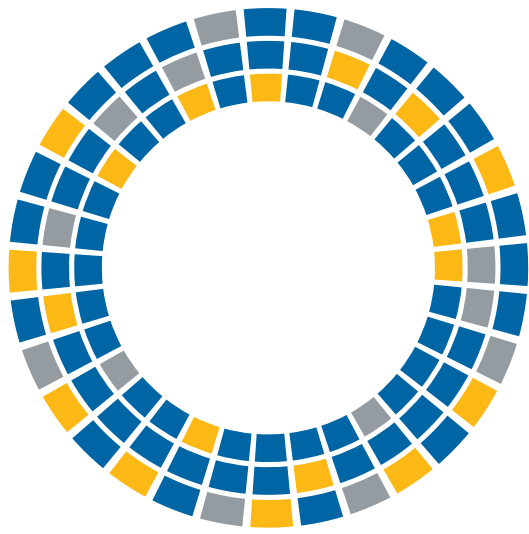
Who We Are

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James Cuddy

James Cuddy is Northern Policy Institute's in-house Economist. He has over 5 years of experience conducting research on various economic issues, with a particular focus on labour market and socioeconomic analysis and regional and urban economics. As a skilled leader with a strong communications background, he helps to expand and implement the Institute's research priorities and assist in quality control.

James is a graduate of Carleton University with a B.A. in Economics (2013) and the University of Ottawa with a M.A. in Economics (2015).

Dr. Bakhtiar Moazzami

Dr. Moazzami has taught Economics and Econometrics at Lakehead University since 1988. He is well known for his research activities particularly related to Northern Ontario. He has written many reports on Northern Ontario's economic development challenges and opportunities. He was commissioned by the Ministry of Northern Development and Mines to undertake a comprehensive study of Northern Ontario's economy as a part of the research conducted for the Growth Plan for Northern Ontario. Included in the study were the identification of growing, declining and emerging industrial clusters in the region. Professor Moazzami has also written extensively on Northern Ontario's Aboriginal people and Northern Aboriginal economy. Dr. Moazzami's expertise and influence reaches beyond Lakehead University and Northern Ontario. He has been a regular guest speaker at the University of Waterloo's Economic Development Program.

Summary of Findings

The objective of this report is to analyze, explain and forecast economic behavior and trends in Thunder Bay district. The author's find that there are several trends unfolding that will impact Thunder Bay's competitive position and the standard of living of residents if not addressed immediately. At the same time, there are some signs of growth in the region that should continue to be supported. These include:

1. The urban population is increasing

From 2001 to 2011, Thunder Bay district population declined by roughly 3 percent. However, during the same period the urban population increased, while the rural population declined, reflecting moves of people from rural to urban areas within Northwestern Ontario and to other Canadian destinations. Of the district's Aboriginal population, 68.2 percent live in urban areas, mostly off-reserve, while 31.8 percent live in rural areas. Of the latter, 58.2 percent live in relatively remote areas with a weak link to an urban centre, and 26.8 percent live in very remote regions with no link to an urban centre. These are mostly Aboriginals living on-reserve. Of the francophone population in the district, 53.9 percent live in urban centres, and of those who live in rural areas, 83.9 percent live in relatively remote areas with only a weak link to an urban centre. Some 89.0 percent of the district's immigrant population live in urban centres.

2. Migration levels are driving population growth

Thunder Bay district has experienced modest intraprovincial in-migration throughout since 2007-08, while interprovincial migration has been negative since 2001-02. This latter trend has more than offset the level of intraprovincial in-migration, therefore driving net domestic out-migration in the region. Also contributing to the district's declining population is low levels of immigration (Figure 2). As of 2014-15, the district attracted 131 immigrants, which is equivalent to roughly 7 times less immigrants per capita compared to Ontario as a whole. Notably, however, out of all northern districts, Thunder Bay attracts the second largest number of immigrants per capita.

3. Aboriginal population and labour force is growing

Thunder Bay's population is not expected to experience much population growth in the decades to follow, however the Aboriginal population is expected to grow by nearly 42 percent from 2013 to 2041. The working age Aboriginal population will grow by 38 percent, increasing their share of this cohort from 11 to 19 percent. As a result, Thunder Bay district's labour force is expected to decline by about 20 percent over the period, while the Aboriginal labour force is expected to increase by about 36 percent. At the same time, the share of Aboriginals in the total regional labour force is expected to increase from 11 percent in 2013 to 18 percent in 2041.

4. Education and human capital is key to a productive economy

The human capital composition of the working-age population in Thunder Bay is above that in Northwestern Ontario, but below that of provincial and national levels. The human capital indexes for immigrants and francophones in Thunder Bay are both lower than the total working-age population at the national, provincial. Notably, human capital indexes for the Aboriginal labour force in Thunder Bay are higher than regional levels and roughly equivalent to national levels. Given that the Aboriginal share of the population is increasing, and given that their human capital composition is lower than total working-age population in the Thunder Bay district, future labour productivity will decrease if education levels do not rise among this segment of the population. There is strong evidence showing that higher skill levels increase the likelihood of participation in the workforce and reduce unemployment rates in Thunder Bay district.

5. Participation in the labour force among women is rising

Both the total population and the labour force in the district declined slightly between 2001 and 2011. Labour force participation and employment rates declined among men, but rose among women over the same period. On the other hand, the unemployment rate declined slightly for men, but increased marginally for women. Labour force participation and employment rates among francophone men in the Thunder Bay district declined between 2001 and 2011, but rose among francophone women. A similar trend is observed for the immigrant population. There was also a significant difference between the Aboriginal labour force on-reserve and off-reserve, with the unemployment rate among the former at 29.5 percent in 2011 and reaching as high as 66.7 percent on some reserves (such as Osnaburgh 63A).

In contrast, the unemployment rate among the off-reserve Aboriginal workforce was much lower, at 19.7 percent, but still significantly higher than the regional average of 9.0 percent.

6. The labour force has shifted away from good-producing industries towards services-producing industries

Total employment has declined by about 6.2 percent from 1986 to 2011. Employment in the goods-producing sector has declined by about 50 percent, while the service-producing sector has grown by about 14 percent. The share of the goods-producing sector in total regional employment has also declined from 31.8 percent in 1986 to about 17.3 percent in 2011. Notably, however, construction and mining have experienced increased employment from 2006 to 2011.

A shift in the industrial structure of the workforce in the Thunder Bay district was accompanied by a change in the occupational distribution of the labour force. Employment in most occupational groups declined, except for business, finance, and administration; natural and applied sciences; health; and social science, education, government services, and religion.

As a result, total employment income and GDP declined in the Thunder Bay district by about 9.8 percent over the period from 1986 to 2011, due partly to declining employment and partly to the changing occupational structure of the employed workforce. The goods-producing sectors of the district's economy include high-wage and high-value-added industries, and their decline has not only affected the level of output, but also resulted in lower average earnings in the district.
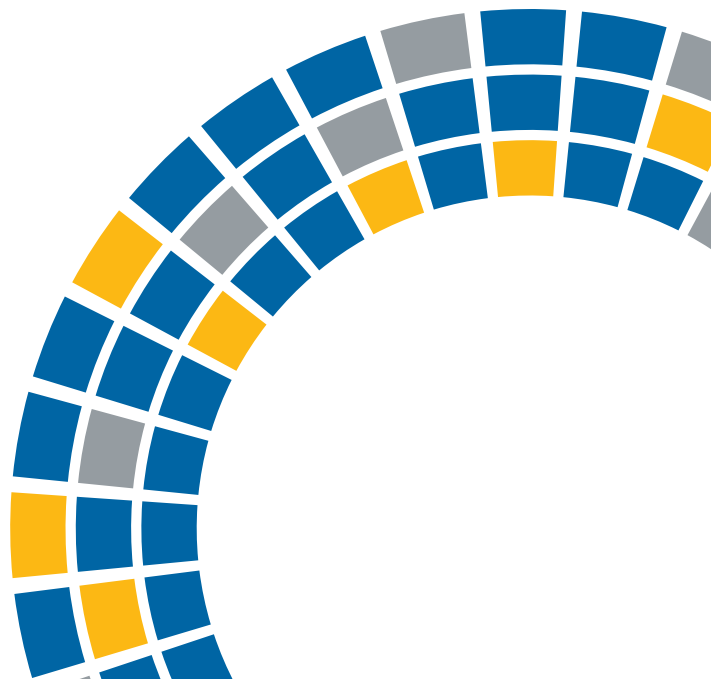
Introduction

The objective of this report is to examine past and present trends and characteristics in Thunder Bay district's (hereafter also referred to as Thunder Bay) economy and to forecast its future challenges and opportunities. The report focuses primarily on the supply side of the economy. The authors examine the region's labour market including its human capital composition; employment trends; the shifting occupational composition of the employed workforce; the shifting of the region's industrial composition from goods-producing to services-producing sectors; the declining share of the private sector; the region's rising dependency on the public sector; and declining labour income and gross domestic product (GDP) in Thunder Bay district.

The report begins by examining demographic change in Thunder Bay over the past three decades and by defining and estimating various dependency indicators.

The study looks into the future and provides projections for total and Aboriginal populations of Thunder Bay district over the next three decades. From these population projections, the study estimates past, present and future trends in the size and composition of the regional labour force.

In the following section, the study defines and quantitatively measures the human capital composition of Thunder Bay district's workforce in the coming years. This section also discusses the implications of the growing application of technology in the production process and, accordingly, the future skill requirements of the workforce.

The report then moves on to discuss the consequences of shifting the composition of the employed labour force in the district from goods-producing, dominated by private businesses, to services-producing, predominantly financed by the public sector. The study also examines the shifting occupational composition of the employed workforce, and the implication thereof for total regional income and GDP in the Thunder Bay district.

The study concludes with a summary and discussion of some policy implications.

Data Sources

Most of the data used in this report is based on detailed information regarding individual census subdivisions (CSDs) in Thunder Bay district and Northwestern Ontario obtained through special tabulations from Statistics Canada.

Except for the population data, the 2011 data are based on the 2011 National Household Survey (NHS). Total population forecasts is based on data made available by the Ontario Ministry of Finance.

Population Groups Studied

The report provides information on the following four population groups:

• The total population;

• The francophone population, defined as individuals who report their mother tongue to be French;

• The 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 , and/or those who reported they were members of an Indian band or First Nation; and

• Immigrant population defined as persons who are, or have ever been, landed immigrants in Canada.

period from 1987 to 2007. However, the level of natural increase has been declining in Northwestern Ontario, with the Thunder Bay district experiencing more deaths than births after 2005, further adding to the population decline in the region. This decline is due to three factors. First, the population is aging, resulting in a greater share in the higher age categories and fewer women of childbearing age. Second, the region's fertility rate, although higher than average, remains below the generational replacement rate of 2.1. Third, there is outmigration of women of childbearing age from the region.

of Northeastern Ontario

Northern Ontario is subdivided into the Northwest and the Northeast. 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 includes 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. However, 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[1].

Demographic Change in Northwestern Ontario: The Past Three Decades

Thunder Bay district covers 103,720 square kilometers and recorded a population of 146,057 in 2011. It has a population density of 1.4 persons per square kilometer which is well below that of Ontario (14.1). According to Statistics Canada's census of population, Thunder Bay's population declined from 158,810 in 1991 to 146,057 in 2011, which translated into an 8 percent decline over this period (Figure 1).

In terms of net migration flows, Thunder Bay district has experienced modest intraprovincial in-migration throughout since 2007-08. Intraprovincial migration refers to the movement of individuals to another region within the province. Interprovincial migration, known as the movement of individuals from one province to another, has been negative since 2001-02. This trend has more than offset the level of intraprovincial in-migration, therefore driving net domestic out-migration during this period (Figure 2). The largest portion of individuals who out-migrate are between the ages of 20–24 years old. Also contributing to the district's declining population is low levels of immigration (Figure 2). As of 2014-15, the district attracted 131 immigrants, which is equivalent to roughly 7 times less immigrants per capita compared to Ontario as a whole. Notably, however, out of all northern districts, Thunder Bay attracts the second largest number of immigrants per capita.

In addition to out-migration of youth and low levels of immigration in the region, rising life expectancy have resulted in the aging of Thunder Bay's population. At the same time, the large baby-boom generation, born in the two decades following the Second World War, is now beginning to retire. The generations that followed were much smaller, primarily due to a declining fertility rate. As a result, the share of individuals in the district below the age of 20 has declined from 28 percent in 1991 to 22 percent in 2011, while the share of seniors rose from 12 percent in 1991 to 16 percent in 2011 (Figure 3). During the same period, the share of individuals between the ages of 20 to 44 declined from 41 to 30 percent, while individuals aged 45 to 64 increased from 19 to 32 percent.

These demographic changes have had a significant impact on social and economic conditions in the district. The population will continue to age in the foreseeable future, with implications for the supply of labour, production capacity, and the ability of Thunder Bay to stay economically viable. One important aspect of the aging population relates to the relationship between economically active and economically dependent age groups – that is, between the working population on the one hand and the young and elderly on the other.

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1   The analysis in this study is based on these jurisdictional and geographic parameters.

Figure 1: Population, Thunder Bay District, 1986–2011
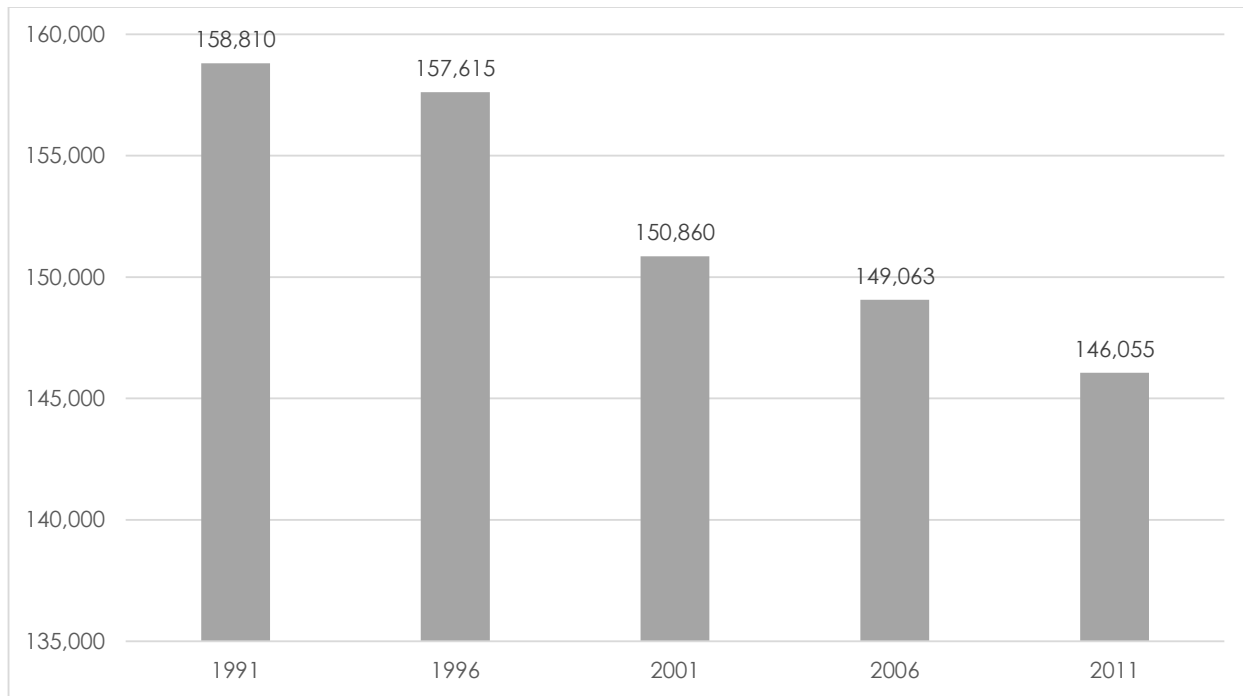
Sources: Statistics Canada, Census of Canada; and idem, National Household Survey.

Figure 2. Net Domestic Migration and Immigration, Thunder Bay District, 2001/2002–2014/2015

Source: Author's calculations based on Statistics Canada, CANSIM database, table 051-0063.

Figure 3: Age Distribution of Population, Thunder Bay District, 1991–2011

Source: Author's calculations based on Statistics Canada, Census of Canada, and National Household Survey, custom tabulation.

Population Trends in Urban and Rural Areas
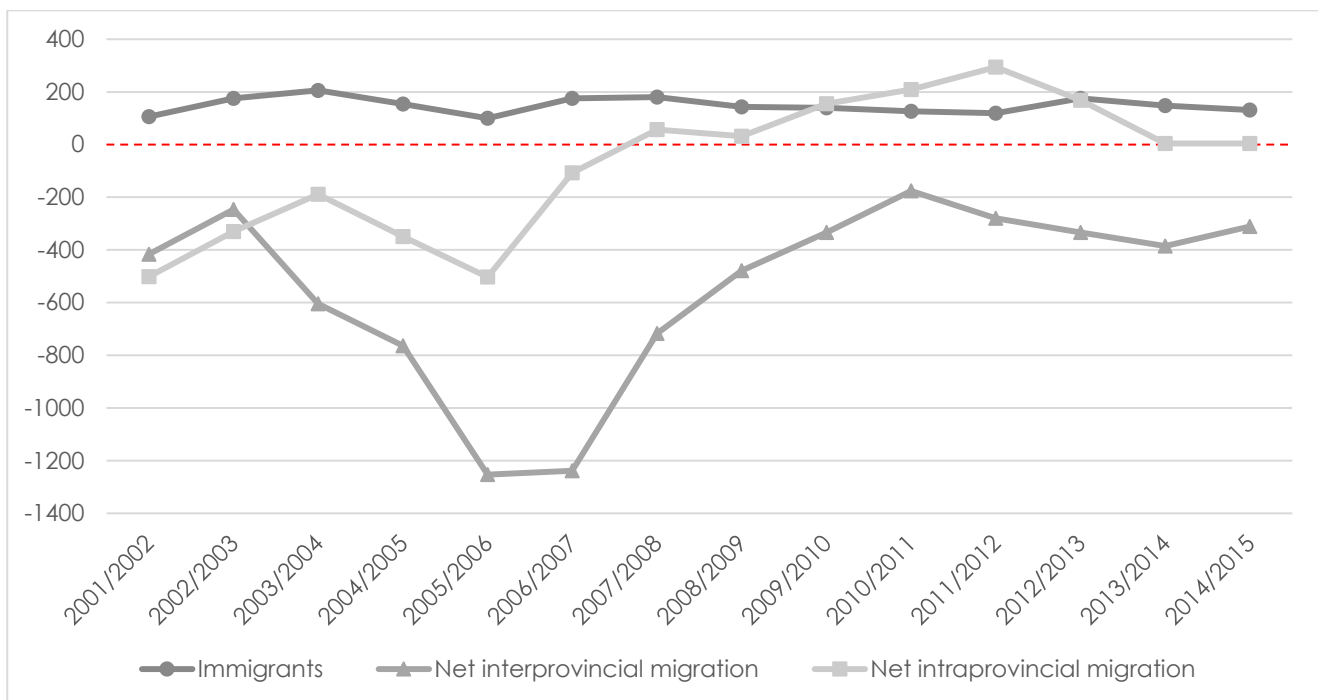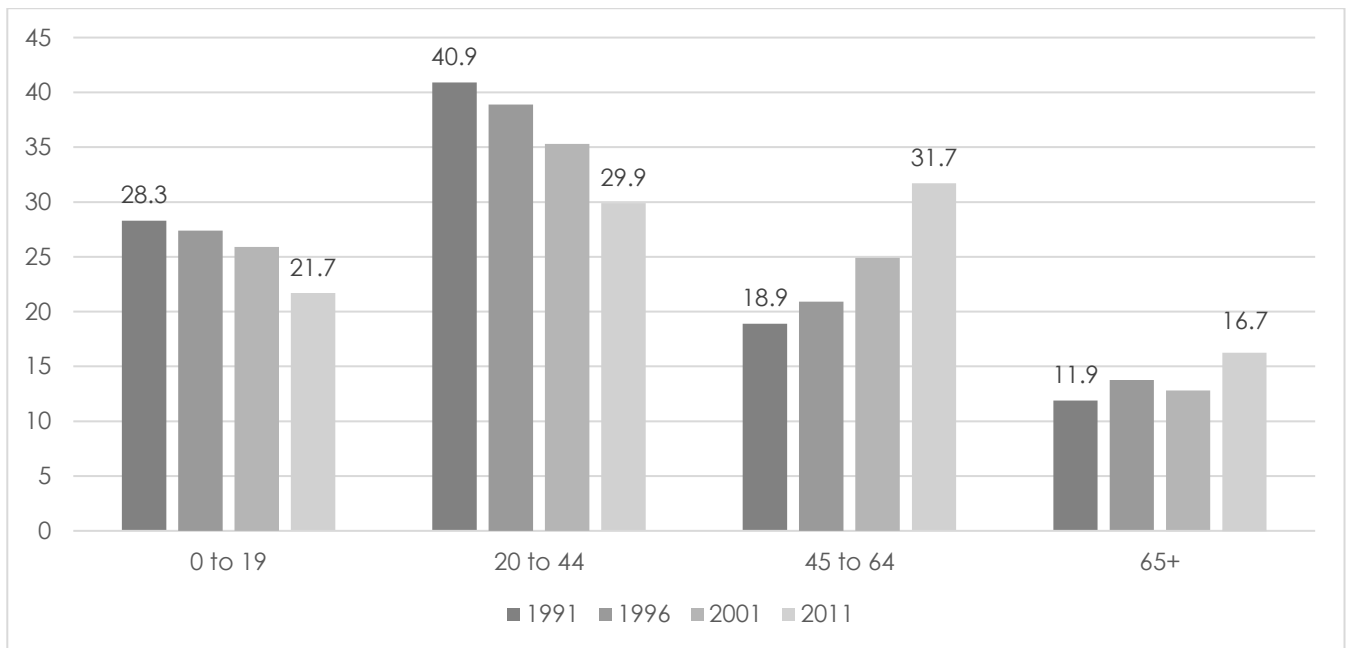
There are many ways to define rural and urban areas. The term "rural" is intuitively understood as an area with low population concentration dispersed at a low density, while "urban" is understood as a place with high population concentration at a high density. This intuitive understanding is the basis 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 kilometre[2]. An alternative and perhaps more appropriate definition, proposed by Statistics Canada and based on the commuting flows between different areas, is "rural and small towns" (RSTs) as opposed to "large urban centres." It defines urban regions as including all Census Metropolitan Areas and Census Agglomerations (CAs), and both CMAs and CAs include the total population of neighbouring census subdivisions (CSDs). According to this definition, therefore, rural and small town areas are defined as areas that are not part of any CMA or CA. RSTs are further divided into five types of zones based on the degree of influence that large urban centres have on them[3], as measured by the percentage of people living in an RST who commute to work in an urban centre.

Using the above definition, Figure 4 shows that some 83.3 percent of the Thunder Bay district's population live in urban areas. Moreover, the urban population increased between 2001 and 2011, while the rural population declined, reflecting moves of people from rural to urban areas within Northwestern Ontario and to other Canadian destinations. Of the Thunder Bay district's rural population, in 2011, 24.2 percent live in areas with a close link to an urban centre, 12.9 percent live in areas with a moderate link to an urban centre, 56.8 percent live in areas with a weak link to an urban centre, and 6.1 percent live in remote regions. Of the Aboriginal population in the district, 68.2 percent live in urban areas, mostly off-reserve, while 31.8 percent live in rural areas. Of the latter, 58.2 percent live in relatively remote areas with a weak link to an urban centre, and 26.8 percent live in very remote regions with no link to an urban centre. These are mostly Aboriginals living on-reserve. Of the francophone population in the district, 53.9 percent live in urban centres, and of those who live in rural areas, 83.9 percent live in relatively remote areas with only a weak link to an urban centre. Some 89.0 percent of the district's immigrant population live in urban centres.

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2   One problem with this definition is that it can lead to the misleading identification of rural and urban areas. Based on this definition, for example, the Attawapiskat First Nation on James Bay is classified as an urban area.

3   For a definition of the various zones, see Roland Beshiri and Jiaosheng He, "Immigrants in Rural Canada," Rural and Small Town Canada Analysis Bulletin 8, no. 2 (2009): 3.

Figure 4. Distribution of Total, Francophone, Immigrant, and Aboriginal Populations by Urban and Rural Zones, Thunder Bay District, 2001 and 2011
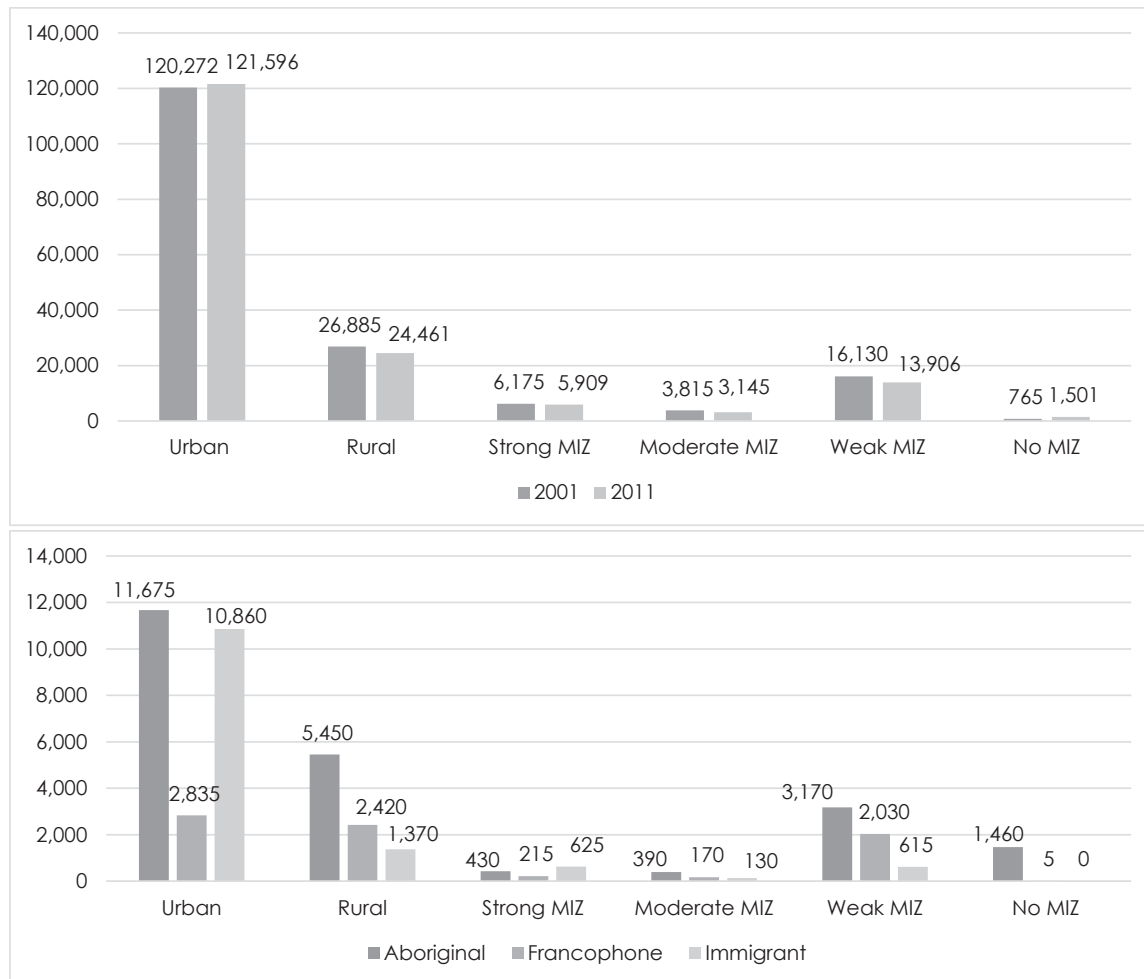
Source: Author's calculations based on Statistics Canada, Census of Canada, and National Household Survey, custom tabulation.

Demographic Change in Northwestern Ontario: The Next Three Decades

This part of the study provides population projections for Thunder Bay district, both for the total population and for the Aboriginal population. Estimates for the former are based on projections by the Ontario Ministry of Finance; estimates for the latter are based on Northern Ontario's Demographic Model, developed by Moazzami.

A few words regarding the Ministry of Finance projections are in order. First, the Ministry's 2011 population estimates are about 3,943 greater than those reported by the 2011 census, having been adjusted for net undercoverage by the census, especially of the region's Aboriginal population in Thunder Bay district.

Second, the Ministry's estimated parameters for fertility at the census division level were modelled to maintain regional differences. The census division-to-province ratio for mean age at fertility in the most recent period was assumed to remain constant.

Third, the Ministry's mortality estimates at the census division level were developed using a ratio methodology. The ministry applied the Ontario-level mortality structure to each census division's age structure over the most recent three years of comparable data and calculated the expected number of deaths. It then compared these estimates to the actual annual number of deaths in each census division over this period to create ratios of actual-to-expected numbers 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[4].

Population Projections

Thunder Bay district's total population is expected to decline from 149,604 in 2013 to 145,822 in 2041 (Table 1). The continuing aging of Thunder Bay's population is also evident from the Ministry of Finance's projections (Figure 5 and Table 2), with the share of individuals under age 20 expected to decline from 21 percent in 2013 to 18 percent in 2041. The share of working-age people (ages 20 to 64) is projected to decline from 62 percent in 2013 to 50 percent in 2041[5], and the share of seniors is expected to rise from 17 percent in 2013 to 31 percent in 2041. As the next part of the study will show, the dramatic decline in the working-age population has important implications for the future availability of a qualified labour force in the district.

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4   See Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

5   Focus is placed 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.

Table 1: Population Projections by Age Group, Thunder Bay District, 2013–2041

Year	0--19	20--44	45--64	65+	Total
2013	31,044	46,193	46,374	25,993	149,604
2014	30,586	46,010	46,078	26,823	149,497
2015	30,144	45,787	45,728	27,748	149,407
2016	29,803	45,367	45,471	28,699	149,340
2017	29,566	45,106	44,971	29,684	149,327
2018	29,506	44,811	44,258	30,797	149,372
2019	29,336	44,687	43,475	31,917	149,415
2020	29,271	44,400	42,719	33,064	149,454
2021	29,262	44,101	42,023	34,102	149,488
2022	29,261	43,915	41,028	35,311	149,515
2023	29,307	43,668	40,043	36,517	149,535
2024	29,311	43,436	39,109	37,687	149,543
2025	29,328	43,046	38,280	38,881	149,535
2026	29,299	42,755	37,426	40,026	149,506
2027	29,254	42,472	36,715	41,013	149,454
2028	29,213	42,185	35,938	42,041	149,377
2029	29,095	41,912	35,369	42,896	149,272
2030	28,921	41,635	34,947	43,635	149,138
2031	28,758	41,355	34,648	44,212	148,973
2032	28,611	41,022	34,493	44,652	148,778
2033	28,434	40,746	34,452	44,922	148,554
2034	28,252	40,386	34,478	45,186	148,302
2035	28,056	39,974	34,526	45,462	148,018
2036	27,847	39,640	34,406	45,813	147,706
2037	27,635	39,272	34,501	45,960	147,368
2038	27,416	38,968	34,624	46,000	147,008
2039	27,196	38,678	34,778	45,976	146,628
2040	26,981	38,392	34,879	45,981	146,233
2041	26,772	38,157	34,969	45,924	145,822

Source: Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Figure 5: Population Projections by Age Group, Thunder Bay District, 2013–41
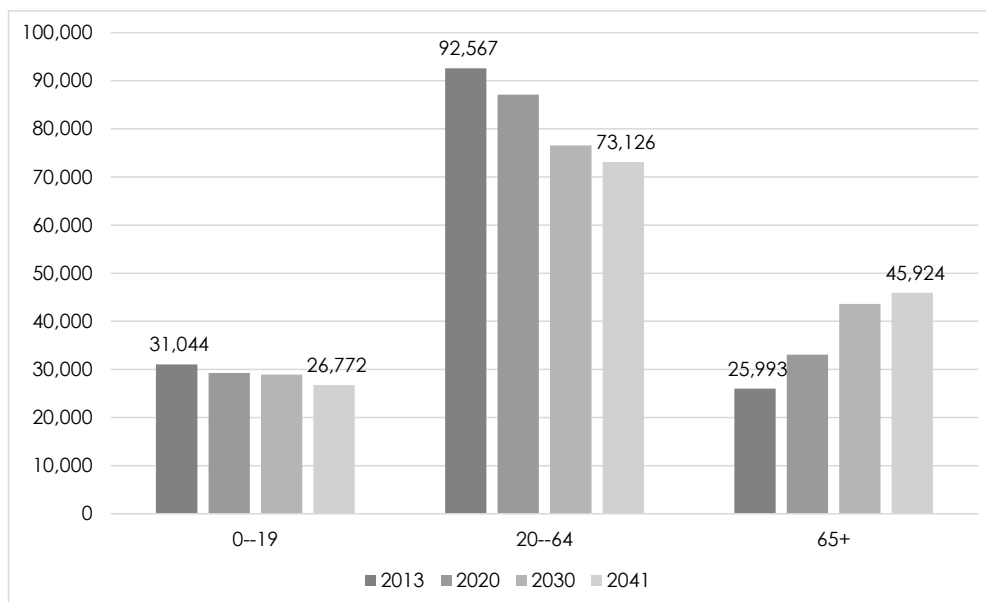
Source: Author's calculations based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Table 2: Population Projections by Age Distribution, Thunder Bay District, 2013–2041

| Year	0 to 19	20 to 64	65+
2013	20.75	61.87	17.37
2020	19.59	58.29	22.12
2030	19.39	51.35	29.26
2041	18.36	50.15	31.49

Source: Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Aboriginal Population Projections

In making projections for the Aboriginal population in Thunder Bay out to 2041, this study employs Northern Ontario's Demographic Forecasting Model, which is based on the Cohort Component method[6]. The base year data for the projection are from Statistics Canada's National Household Survey for 2011. In projecting the future Aboriginal population, this study does not adjust for the undercoverage of Aboriginal people in the region — as mentioned above, there were 3,943 omitted persons in Thunder Bay district alone — so the projections should be considered conservative. This study also assumes zero net migration of Aboriginal people over the forecast period, since the existing evidence suggests there is relatively low mobility among the Aboriginal population in the region. The fertility rate for the Aboriginal population is assumed equal to that in rural Northeastern Ontario, and the mortality rate to equal the rate for the general population of Canada based on the 2011 census.

Based on these assumptions, Table 3 and Figure 6 show that the Aboriginal population in Thunder Bay is expected to increase from 18,425 in 2013 to 26,101 in 2041, a growth rate of about 41.7 percent. The number of individuals under age 20 are expected to increase slightly during this period, while working-age Aboriginals are expected to rise from 10,196 in 2013 to 14,101 in 2041, an increase of about 38.3 percent. The number of individuals aged 65 and over are expected to rise from 1,165 in 2013 to 4,093 in 2041.

The Aboriginal population's share of total district's population is expected to increase from 12.3 percent in 2013 to 17.9 percent in 2041. The share of working-age Aboriginals (those ages 20 to 64) is expected to increase from 11 percent in 2013 to 19 percent in 2041 (Figure 7). The share of Aboriginal seniors is expected to rise from 4.5 percent in 2013 to 8.9 percent in 2041.

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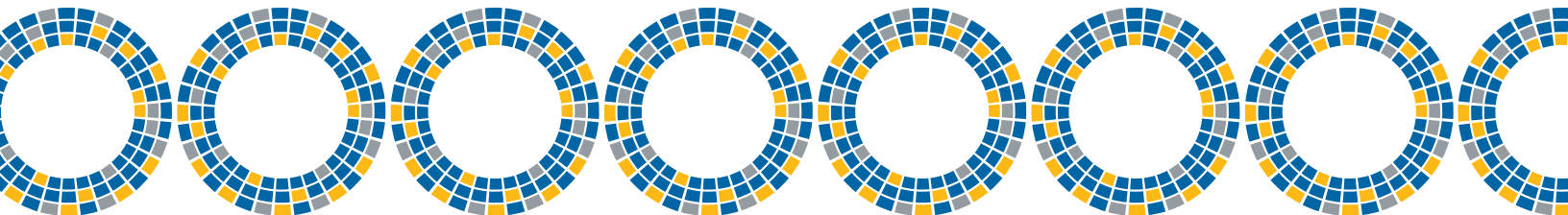
6   For a complete discussion of this model, see B. Moazzami, "It's What You Know (and Where You Can Go): Human Capital and Agglomeration Effects on Demographic Trends in Northern Ontario" (Thunder Bay, ON: Northern Policy Institute, 2015).

Table 3. Projected Aboriginal Population, Thunder Bay District, 2013–2041

| Year	0--19	20--44	45--64	65+	Total
2013	7,064	6,246	3,950	1,165	18,425
2014	7,013	6,395	4,049	1,254	18,709
2015	6,975	6,547	4,107	1,372	19,001
2016	6,933	6,690	4,202	1,471	19,296
2017	6,925	6,842	4,250	1,576	19,594
2018	6,938	6,984	4,323	1,652	19,897
2019	6,958	7,107	4,383	1,750	20,199
2020	6,950	7,261	4,427	1,863	20,502
2021	7,000	7,349	4,457	1,998	20,803
2022	6,976	7,528	4,426	2,175	21,106
2023	7,034	7,626	4,415	2,334	21,409
2024	7,107	7,711	4,400	2,493	21,710
2025	7,175	7,783	4,397	2,653	22,008
2026	7,259	7,851	4,400	2,789	22,299
2027	7,257	7,953	4,470	2,906	22,586
2028	7,302	8,079	4,444	3,045	22,870
2029	7,333	8,205	4,472	3,138	23,148
2030	7,339	8,375	4,447	3,261	23,422
2031	7,390	8,488	4,410	3,402	23,690
2032	7,469	8,589	4,409	3,487	23,954
2033	7,543	8,685	4,401	3,584	24,213
2034	7,611	8,683	4,497	3,673	24,465
2035	7,670	8,700	4,594	3,749	24,713
2036	7,722	8,734	4,660	3,839	24,955
2037	7,769	8,741	4,793	3,890	25,193
2038	7,808	8,717	4,967	3,935	25,427
2039	7,845	8,703	5,120	3,988	25,656
2040	7,877	8,698	5,268	4,038	25,881
2041	7,907	8,684	5,417	4,093	26,101

Source: Author's calculations based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Figure 6: Aboriginal Population Projections by Age Group, Thunder Bay District, 2013–2041
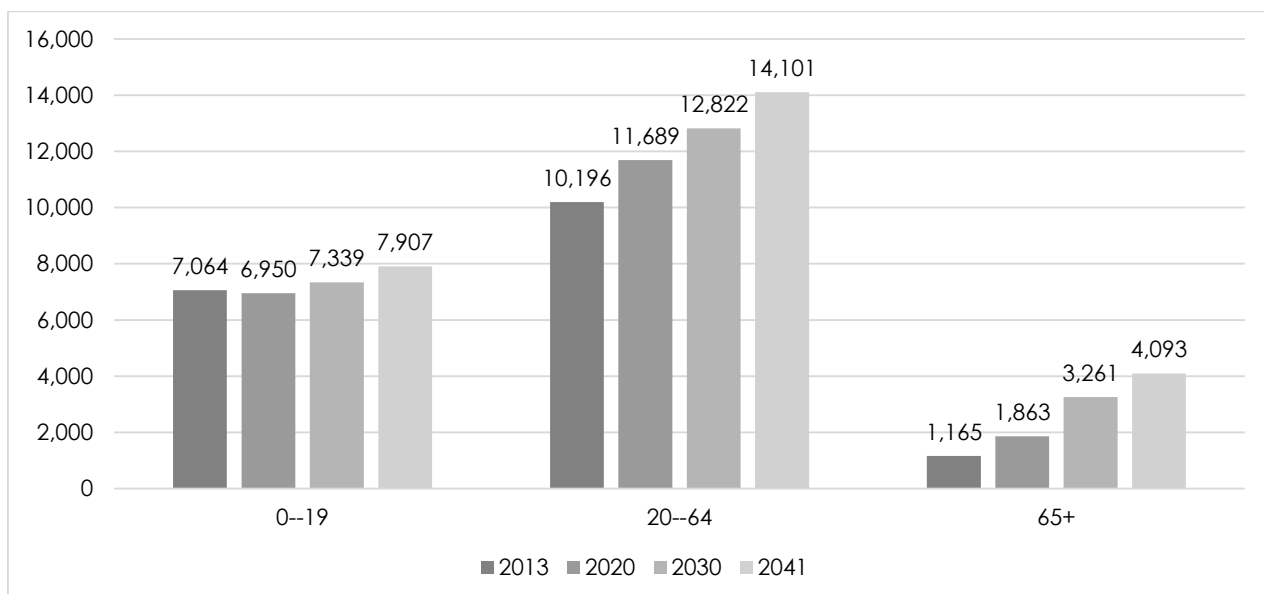
Source: Author's calculations based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Figure 7: Projections of the Share of the Aboriginal Population (%), Thunder Bay District, 2013–2041
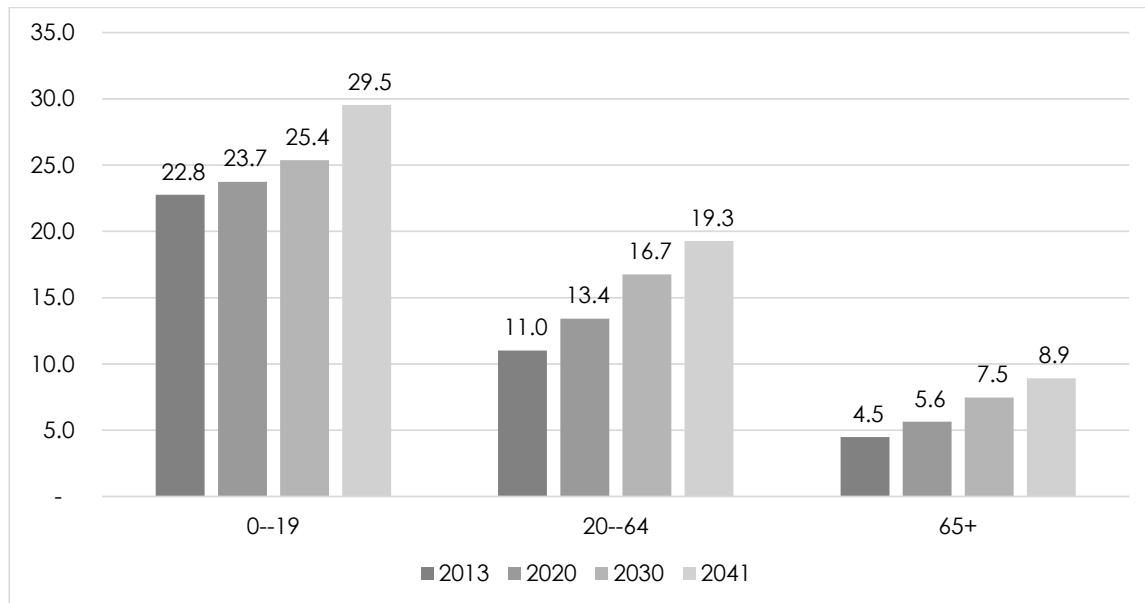
Source: Author's calculations based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Thunder Bay District'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.

This study has shown that the Aboriginal population represents a growing segment of Thunder Bay district's total population and its working-age population. A significant gap exists, however, between the level of educational achievement of Aboriginal individuals and that of the general population, resulting in a severe labour market outcome disparity that affects the current and future productive capacity of Thunder Bay's labour force.

Labour Market Trends in Thunder Bay District

Table 4 and Figure 8 show labour market trends among the population ages 15 to 64 in the Thunder Bay district. As the table shows, both the total population and the labour force in the district declined slightly between 2001 and 2011. Labour force participation and employment rates declined among men, but rose among women over the same period. On the other hand, the unemployment rate declined slightly for men, but increased marginally for women.

Labour force participation and employment rates among francophone men in the Thunder Bay district declined between 2001 and 2011, but rose among francophone women. A similar trend is observed for the immigrant population. The rates among immigrants were lower than the regional averages, and among Aboriginals significantly lower than the regional averages. There was also a significant difference between the Aboriginal labour force on-reserve and off-reserve, with the unemployment rate among the former at 29.5 percent in 2011 and reaching as high as 66.7 percent on some reserves (such as Osnaburgh 63A). In contrast, the unemployment rate among the off-reserve Aboriginal workforce was much lower, at 19.7 percent, but still significantly higher than the regional average of 9.0 percent.

Table 4: Labour Market Trends, Population 15 to 64 Years of Age, Thunder Bay District, 2001 and 2011

Labour Market Outcome	2001	2011	2001	2011
	Men		Women	
Total District Population				
Total population 15 to 64 years of age	50,445	49,205	50,160	49,255
In the labour force	40,755	36,800	35,730	35,560
Employed	36,290	33,025	33,130	32,820
Unemployed	4,460	3,775	2,600	2,745
Not in the labour Force	9,695	12,405	14,430	13,695
Participation Rate	80.80	74.80	71.20	72.20
Employment Rate	71.90	67.10	66.00	66.60
Unemployment Rate	10.90	10.30	7.30	7.70
Francophone Population				
Total population 15 to 64 years of age	2,525	1,665	2,395	1,810
In the labour force	2,095	1,240	1,740	1,345
Employed	1,870	1,100	1,615	1,255
Unemployed	225	135	125	90
Not in the labour Force	430	430	650	465
Participation Rate	83.00	74.50	72.70	74.30
Employment Rate	73.90	66.10	67.40	69.30
Unemployment Rate	11.00	11.30	7.20	6.70
Immigrant Population				
Total population 15 to 64 years of age	4,750	3,205	4,585	3,265
In the labour force	3,755	2,340	2,940	2,200
Employed	3,480	2,205	2,795	2,065
Unemployed	275	135	140	135
Not in the labour Force	995	875	1,645	1,070
Participation Rate	79.00	73.00	64.10	67.30
Employment Rate	73.30	68.80	61.00	63.10
Unemployment Rate	7.30	5.60	4.80	6.10
Aboriginal Population				
Total population 15 to 64 years of age	3,840	5,350	4,520	6,025
In the labour force	2,795	3,285	2,555	3,595
Employed	2,070	2,575	2,120	2,890
Unemployed	720	710	430	700
Not in the labour Force	1,050	2,060	1,965	2,435
Participation Rate	72.80	61.40	56.50	59.70
Employment Rate	54.00	48.10	46.90	48.00

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

Figure 8: Labour Force Participation and Unemployment Rates, Population 15 to 64 Years of Age, Thunder Bay District, 2011
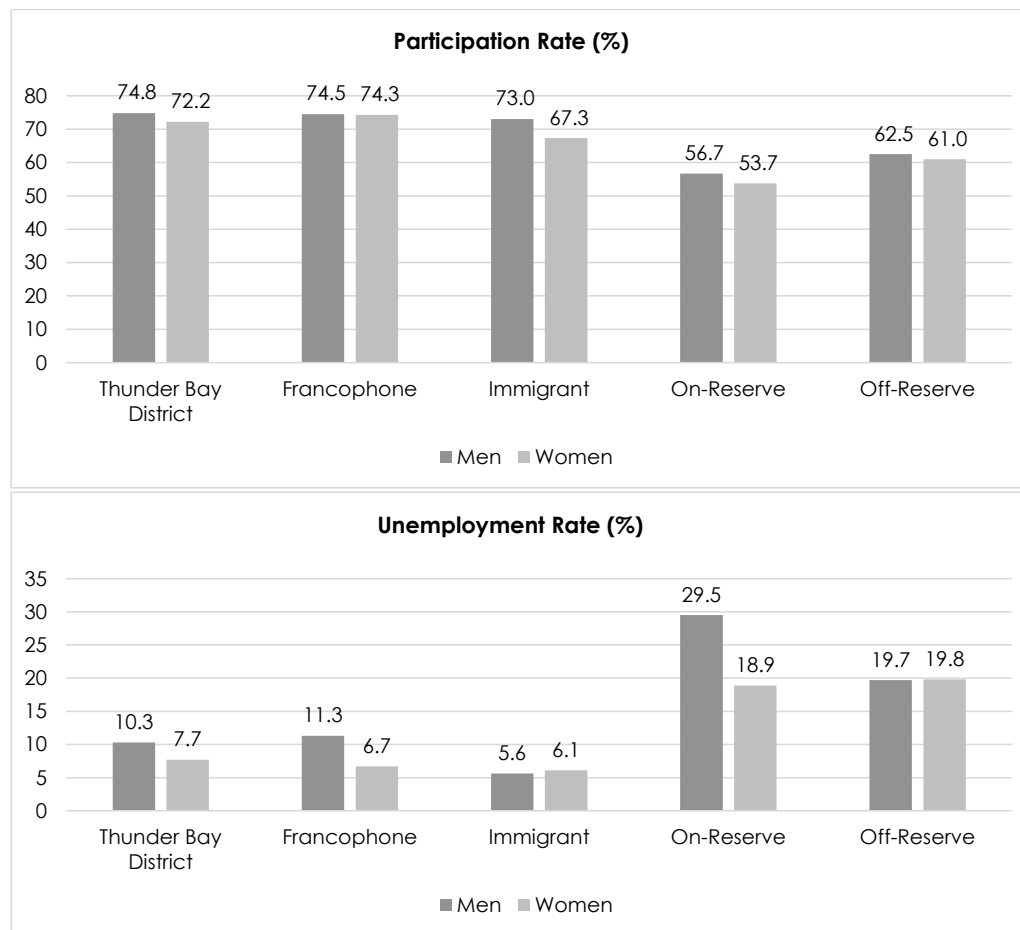
Participation Rate (%)

	Thunder Bay District	Francophone	Immigrant	On-Reserve	Off-Reserve
Men	74.8	74.5	73.0	56.7	62.5
Women	72.2	74.3	67.3	53.7	61.0

■ Men ■ Women

Unemployment Rate (%)

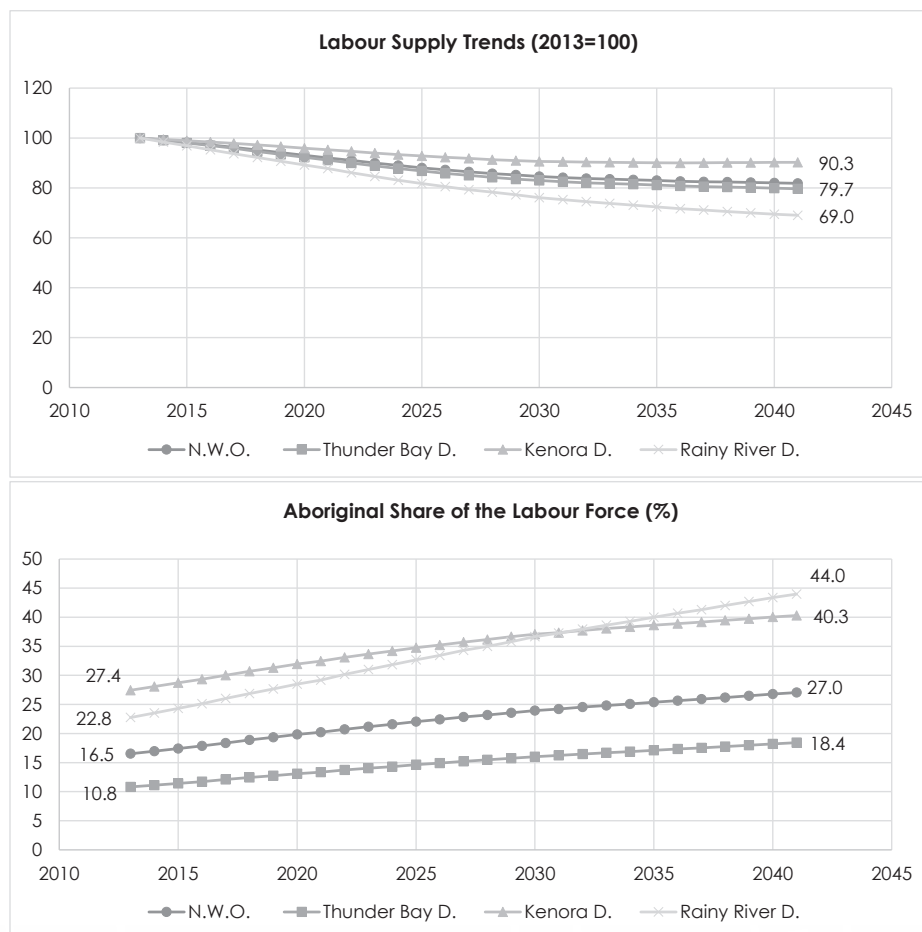|	Thunder Bay District	Francophone	Immigrant	On-Reserve	Off-Reserve
Men	10.3	11.3	5.6	29.5	19.7
Women	7.7	6.7	6.1	18.9	19.8

■ Men ■ Women

Source: Author's calculations based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Size and Composition of the Future Labour Force

To forecast the future labour force in Thunder Bay District and Northwestern Ontario, this study uses detailed population projections along with information regarding labour force participation rates for men and women in different age groups. It is assumed that participation rates during the projection period (out to 2041) stay constant at their 2011 level. Different assumptions regarding 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.

Figure 9 and Table 5 provide labour supply projections for Northwestern Ontario and its three districts for the period from 2013 to 2041. Thunder Bay district's labour force is expected to decline by about 20 percent over the period, while the Aboriginal labour force is expected to increase by about 36 percent. As a result, the share of Aboriginals in the total regional labour force is expected to increase from 11 percent in 2013 to 18 percent in 2041.

Figure 9: Future Supply of Labour, Total and Aboriginal Share, Thunder Bay District and Northwest Ontario, 2013–2041

Labour Supply Trends (2013=100)

90.3
79.7
69.0

N.W.O.   Thunder Bay D.   Kenora D.   Rainy River D.

Aboriginal Share of the Labour Force (%)

44.0
40.3
27.4
27.0
22.8
18.4
16.5
10.8

N.W.O.   Thunder Bay D.   Kenora D.   Rainy River D.

Source: Author's estimates based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Table 5: Projected Labour Supply, Total and Aboriginal, Thunder Bay District and Northwestern Ontario, 2013–2041

Year	Thunder Bay District			Northwest Ontario		
	Total Labour Force	Aboriginal Labour Force	Aboriginal Share (%)	Total Labour Force	Aboriginal Labour Force	Aboriginal Share (%)
2013	74,887	8,108	10.83	118,066	19,513	16.53
2014	74,207	8,253	11.12	117,057	19,863	16.97
2015	73,434	8,393	11.43	115,941	20,200	17.42
2016	72,629	8,521	11.73	114,821	20,511	17.86
2017	71,795	8,680	12.09	113,659	20,896	18.38
2018	70,854	8,813	12.44	112,368	21,218	18.88
2019	69,991	8,933	12.76	111,155	21,513	19.35
2020	69,077	9,047	13.1	109,865	21,790	19.83
2021	68,235	9,122	13.37	108,663	21,972	20.22
2022	67,375	9,243	13.72	107,446	22,267	20.72
2023	66,499	9,326	14.02	106,188	22,468	21.16
2024	65,724	9,410	14.32	105,063	22,674	21.58
2025	64,967	9,506	14.63	103,985	22,909	22.03
2026	64,247	9,578	14.91	102,983	23,079	22.41
2027	63,641	9,680	15.21	102,098	23,309	22.83
2028	63,064	9,759	15.47	101,264	23,485	23.19
2029	62,579	9,857	15.75	100,545	23,708	23.58
2030	62,134	9,952	16.02	99,887	23,923	23.95
2031	61,729	10,021	16.23	99,352	24,070	24.23
2032	61,427	10,120	16.48	98,929	24,284	24.55
2033	61,215	10,211	16.68	98,613	24,480	24.82
2034	61,010	10,298	16.88	98,313	24,664	25.09
2035	60,757	10,393	17.11	97,962	24,865	25.38
2036	60,481	10,481	17.33	97,608	25,048	25.66
2037	60,302	10,574	17.53	97,398	25,241	25.92
2038	60,164	10,683	17.76	97,219	25,474	26.2
2039	60,023	10,785	17.97	97,046	25,690	26.47
2040	59,822	10,894	18.21	96,808	25,920	26.77
2041	59,651	10,996	18.43	96,618	26,132	27.05

Source: Author's estimates based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).

Productivity and the Human Capital Composition of the Workforce in Thunder Bay District and Northwestern Ontario

Productivity growth is directly linked to the human capital composition of the workforce. Human capital is defined as the stock of knowledge, skills and abilities embodied in individuals that directly affects their level of productivity. Since knowledge and skills are acquired through education and experience, investing in human capital represents an avenue through which Thunder Bay district can enhance productivity and minimize the impact of its declining labour force.

To estimate the human capital composition of the regional workforce, one needs to specify and measure a proxy for human capital that also reflects and incorporates a measure of productivity of the workforce in Thunder Bay and Northwestern Ontario. To obtain such an index, this study first estimated a standard earnings model using the 2006 census micro-data file[7]. This study 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 $1,000 and less than $1 million. The benchmark or reference group are those with less than a high school diploma.

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

The estimated return-to-schooling coefficients (Figure 10) show the increased earnings, compared to the reference group, of obtaining different levels of education. 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 72.6 percent. The return to schooling estimates reflect higher productivity resulting from an increased level of education. In short, the return to education increases as the level of schooling rises, reflecting higher earnings commensurate with higher productivity as the level of education increases.

Figure 10. The Return to Education (%), by Level of Educational Attainment, Canada, 2006
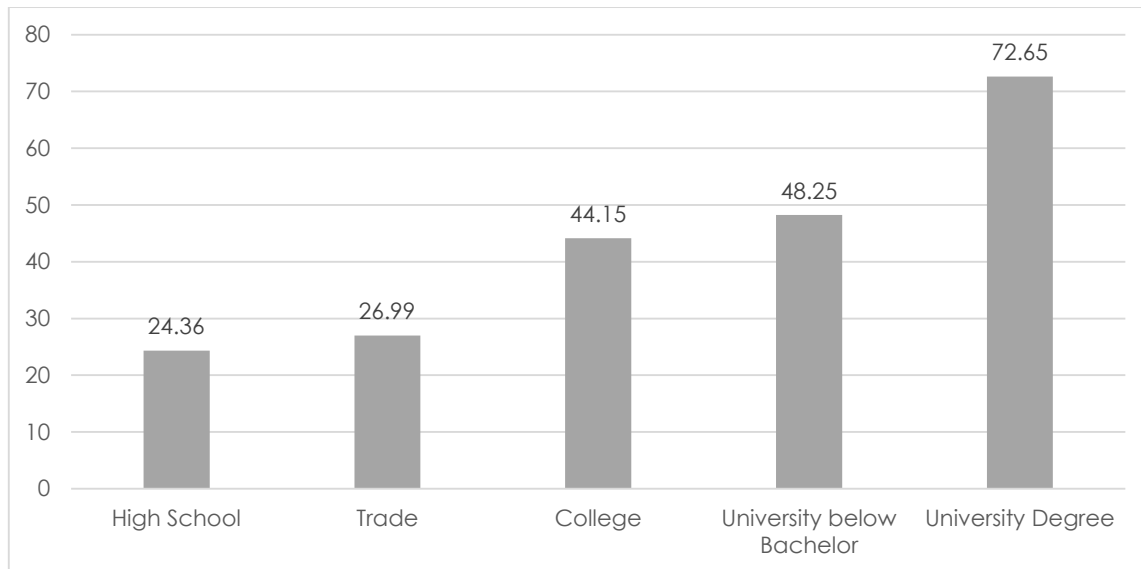
Note: Persons with an education who do not have a job are not included.
Source: Author's estimates based on Statistics Canada's 2006 Census Microdata file.

This study then used 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 Thunder Bay district and Northwestern Ontario[8]. Figure 11 shows estimated human capital indexes for working-age Aboriginals, immigrants, francophones and the total population in Canada, Ontario, Northwestern Ontario and Thunder Bay[9]. The estimated indexes range from 100 if none of the area's residents have completed high school to about 200 if all residents have obtained a university degree.

As Figure 11 shows, the human capital composition of the working-age population in Thunder Bay is above that in Northwestern Ontario, but below that of provincial and national levels. The human capital indexes for immigrants and francophones in Thunder Bay are both lower than the total working-age population at the national, provincial. Lastly, while human capital indexes for the Aboriginal labour force are lower than that of the total population in Thunder Bay, they are notably higher among the Aboriginal population at the regional level and roughly equivalent to national levels.

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8   HCI = exp{Σβi . Si shares}, where HCI stands for Human Capital Index, exp stands for exponential, and Si shares are the share of the population ages 15 to 64 with Si level of education in a given census subdivision. The formulation of the human capital measure is based on R.E. Hall and C.I. Jones (1999), "Why Do Some Countries Produce So Much More Output per Worker than Others?" Quarterly Journal of Economics 114 (1, 1999): 83–116. See also Francesco Caselli, "Accounting for Cross-Country Income Differences", First Draft, November 2003.

9   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.

Figure 11. Human Capital Index for the Working-Age Population, Canada, Ontario, Northwestern Ontario and Thunder Bay District, 2011
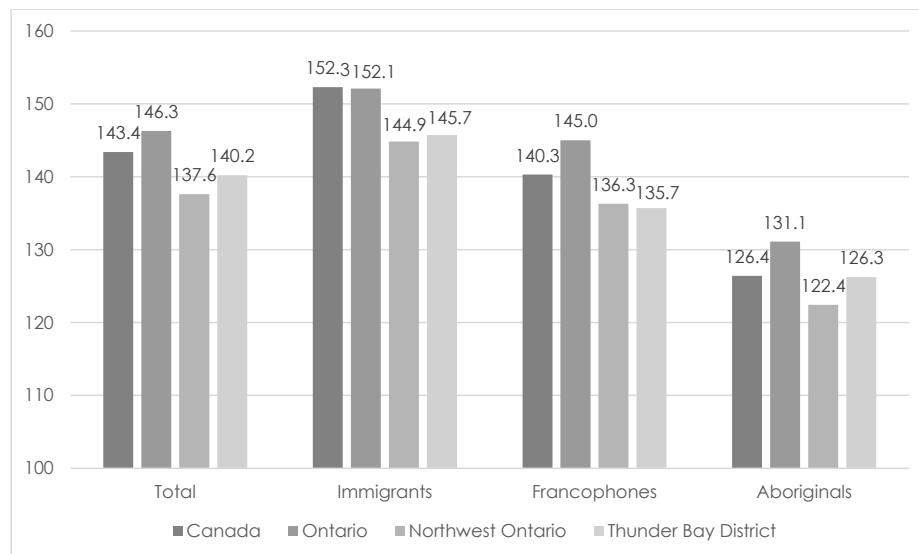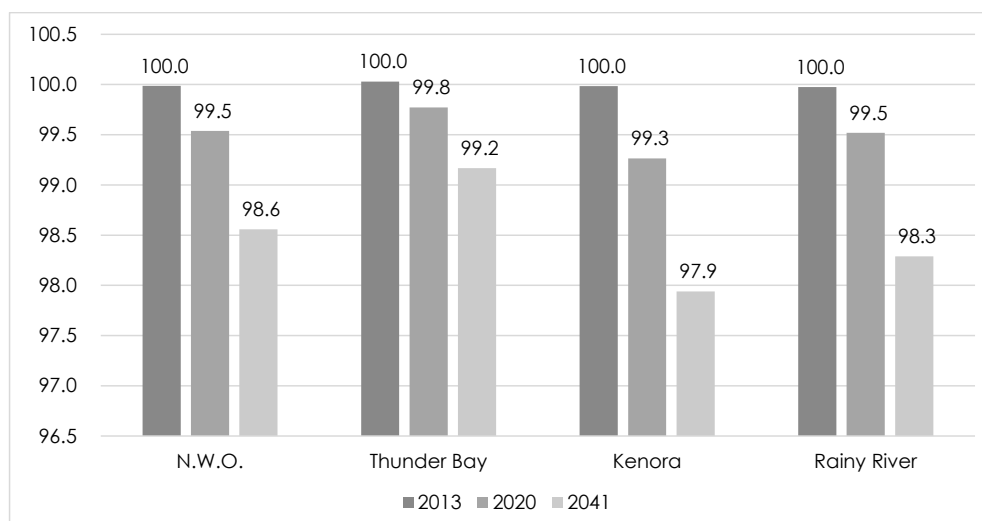

Source: Author's estimates based on Statistics Canada's 2006 Census Microdata file.

A Perfect Storm: Declining Labour Supply and Labour Productivity in Thunder Bay District

Earlier, this study identified two important demographic trends in Thunder Bay. First, the working-age population is declining; as a result, the supply of labour is expected to decline over the coming years. Second, a growing Aboriginal labour force potentially could offset that trend, but the human capital composition of the Aboriginal workforce is lower than total working-age population in the Thunder Bay district, so if the current situation continues, future labour productivity will decline.

To estimate the human capital composition of the future regional workforce, this study combined the labour force projections with the human capital indices for various segments of the workforce. As Figure 12 shows, that if the current level of educational achievement continues, the human capital composition of the workforce will decline in the coming years in both Thunder Bay district and Northwestern Ontario, however Thunder Bay is expected to decline at a slower rate. This index is positively correlated with labour productivity, labour income and output in the region.

Figure 12. Projected Productivity Index of the Workforce in Northwestern Ontario, 2013–2041

Source: Author's estimates based on Ontario, Ministry of Finance, "Ontario Population Projections, 2013-2041" (Toronto, 2014).
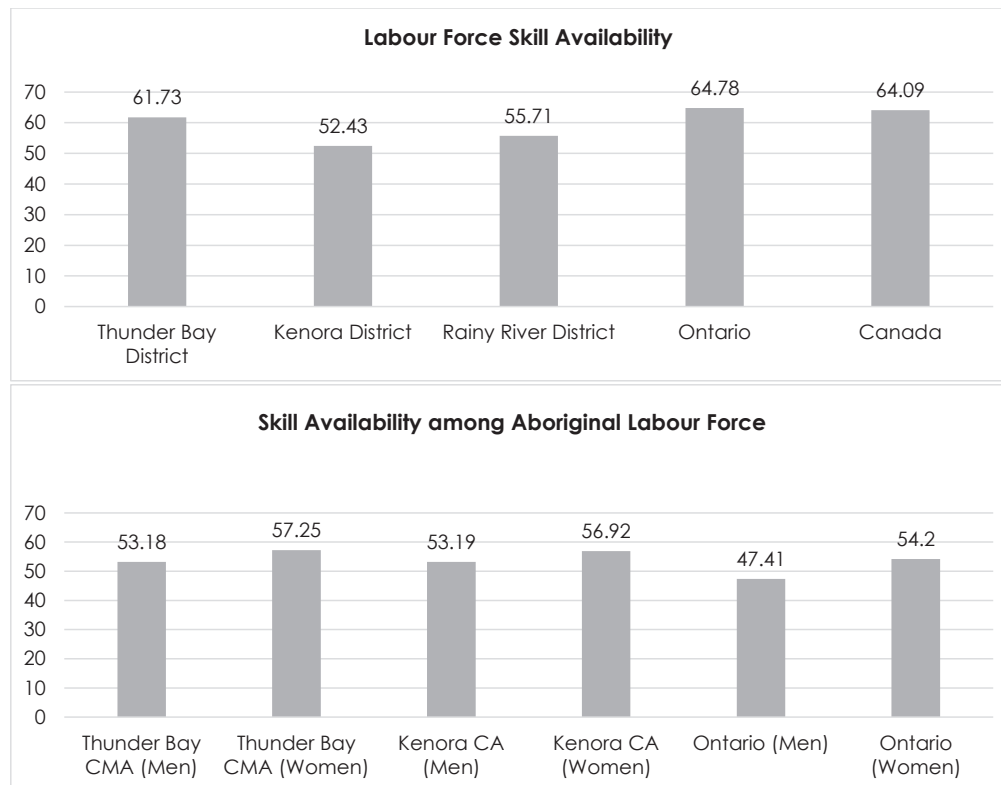
The declining supply of labour and declining labour productivity in Thunder Bay District is only half of the story. Technological changes and the emergence of the knowledge economy have altered the requirements of the labour market. Various studies suggest that, by 2031, about 80 percent of the workforce 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 63.4 percent of all jobs require some post-secondary credential[10]. Based on various studies by the Ontario Ministry of Education, Human Resources and Skills Development Canada, the British Columbia Ministry of Skills, Training and Education, the British Columbia Ministry of Advanced Education and Labour Market Development and other government agencies, Miner Management Consultants provides estimates of the percentage of new jobs that will require post-secondary education in the coming years (Figure 13). Interestingly, however, as Figure 14 shows, while the skill levels of the prime-working-age population in Thunder Bay district is lower than the skill levels in Ontario and Canada for the total population, the skill level among the Aboriginal population in the Thunder Bay Census Metropolitan Area is above provincial levels for both men and women. However, education levels in general, are still lagging the current estimated skill requirements of about 63.4. Closing this gap will be imperative.

Figure 13. Percentage of Jobs Requiring Post-Secondary Education, Canada, 2006–2031
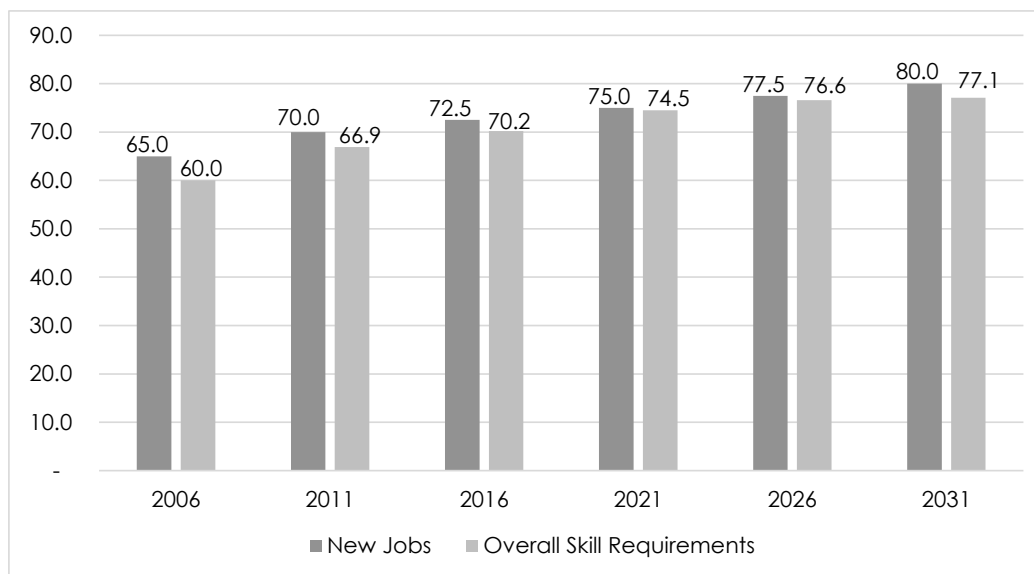
Source: Rick Miner, "People without Jobs, Jobs without People: Canada's Future Labour Market" (Toronto: Miner Management Consultants, 2010).

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

Figure 14: Percentage of the Labour Force Ages 25–64 with Postsecondary Credentials, Northwestern Ontario, Ontario and Canada, 2011

Labour Force Skill Availability

District	Value
Thunder Bay District	61.73
Kenora District	52.43
Rainy River District	55.71
Ontario	64.78
Canada	64.09

Skill Availability among Aboriginal Labour Force

| Category	Value
Thunder Bay CMA (Men)	53.18
Thunder Bay CMA (Women)	57.25
Kenora CA (Men)	53.19
Kenora CA (Women)	56.92
Ontario (Men)	47.41
Ontario (Women)	54.2

Source: Author's calculations based on Statistics Canada, National Household Survey 2011, custom tabulation.

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

Does the level of skills affect labour market performance – that is, labour force participation and unemployment rates? Figure 15 shows that a higher skill level increases the likelihood of participation in the workforce. In Thunder Bay district in 2011, the participation rate of the prime-working-age population (25-64) without a high school diploma was 56.6 percent compared to 73.2 percent for those with a high school diploma and 81.1 percent for those with a postsecondary credentials. Figure 15 also shows that total labour force participation rates in Thunder Bay district lag behind the provincial and national averages.

Similarly, as shown in Figure 16, the average unemployment rate among those without a high school diploma in Thunder Bay was 15.9 percent compared to 6.8 percent for those with a high school diploma and 5.4 percent for those with postsecondary credentials. Overall, the total unemployment rate in Thunder Bay district of 6.8 percent was higher than Ontario and Canada.

Figure 15: Labour Force Participation Rate by Level of Educational Attainment (%), Canada, Ontario and Northwestern Districts, 2011
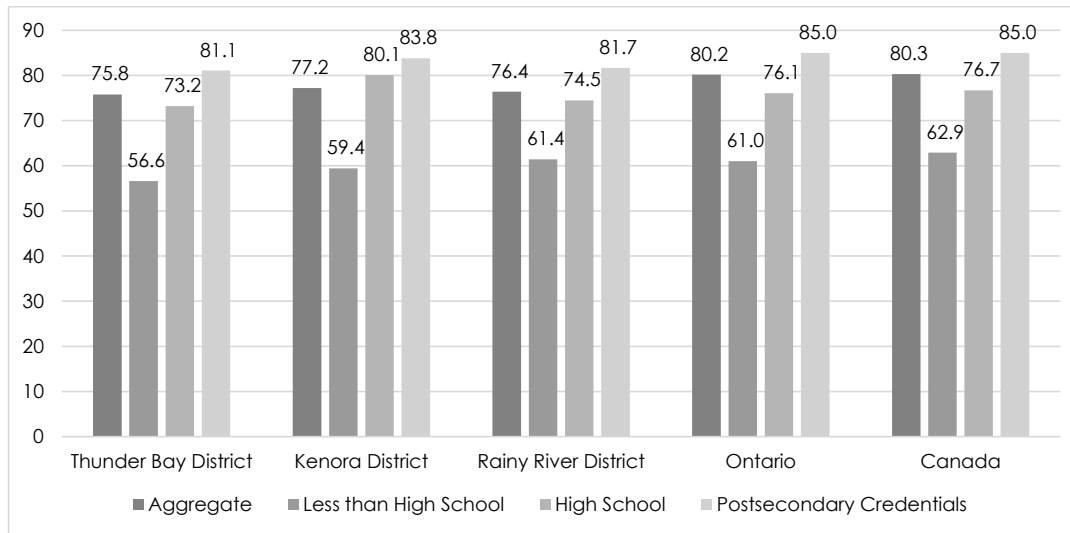
Source: Author's calculations based on Statistics Canada, Census of Canada 2011, and National Household Survey 2011, custom tabulation.

Figure 16: Likelihood of Unemployment by Highest Level of Schooling (%), Canada, Ontario and Northwestern Districts, 2011
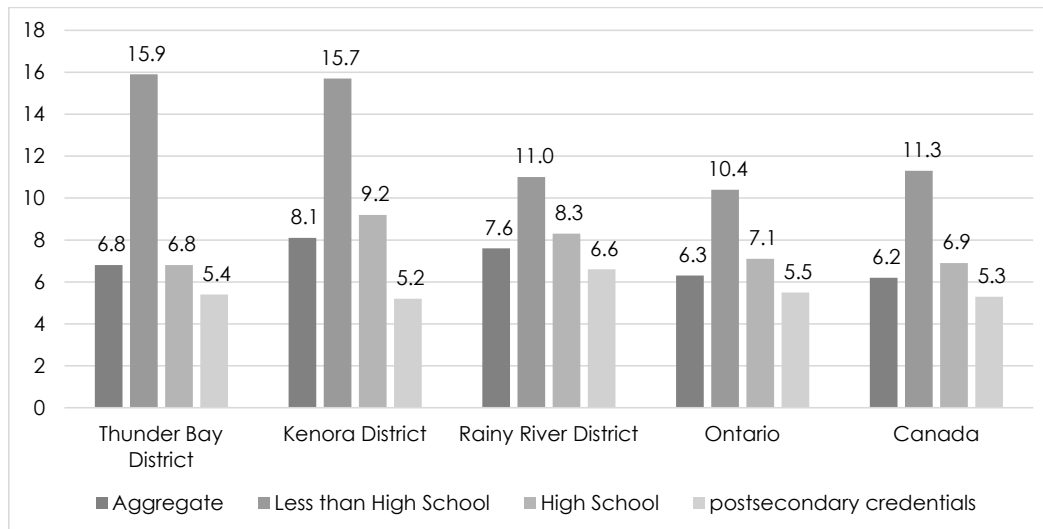

Source: Author's calculations based on Statistics Canada, Census of Canada 2011, and National Household Survey 2011, custom tabulation.

Recently, 50 companies in advanced manufacturing, manufacturing, mining and professional and scientific services were surveyed in Northern Ontario[11]. Of these, 22 had operations in Northern Ontario and other jurisdictions (multilocational) and 28 were multinationals operating in Northern Ontario. Fifteen had their headquarters in Northern Ontario, 11 were located in Northwestern Ontario and 39 were located in Northeastern Ontario.

In short, individuals who do not have post-secondary credentials have a higher likelihood of non-participation in the labour force and face a greater probability of unemployment, and these probabilities will only increase in the coming years. To the extent that the skill level of the workforce in Thunder Bay district is below the estimated requirement needed for emerging occupations, the region will face a situation of workers with qualifications that do not match the existing jobs and of jobs that cannot find qualified workers — essentially Miner's, "People without Jobs, Jobs without People." Even if markets adjust to bring labour demand and supply into balance, the social impact of having many unemployable people in the region will be enormous.

The above evidence suggests that one potential solution to Thunder Bay's declining workforce size and productivity is to promote higher education through increased access to services, especially for the Aboriginal population who experience lower levels of educational achievement. One of the benefits of investing in education is a lower likelihood of unemployment and dependency on government transfer payments. Additionally, agreements such as the Trans-Pacific Partnership will continue to make labour more mobile among various countries, increasing the importance of achieving higher levels of educations. In this case, 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 Thunder Bay district 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.
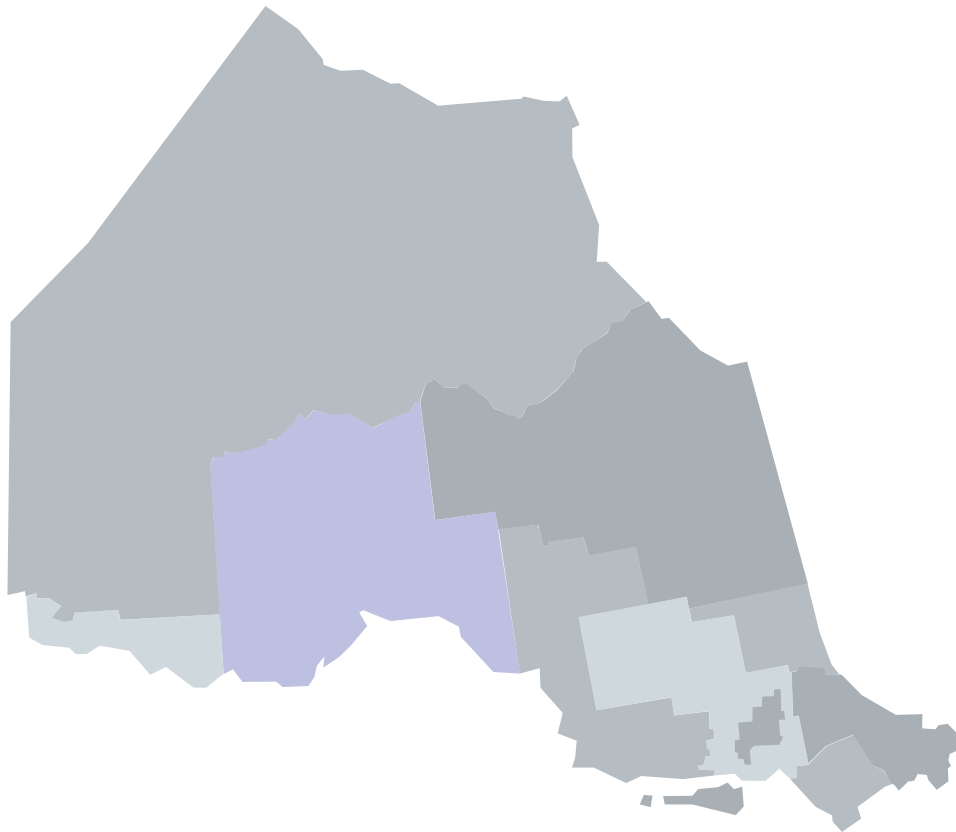
11   B. Moazzami, HDR Decision Economics Inc. and Oraclepoll Research Limited, "Multinational and Multi-locational Enterprise Initiative, Survey of Northern Ontario Companies", 2012.

The Consequences of Shifting the Composition of the Employed Labour Force in Thunder Bay District

The structure of Thunder Bay district's workforce has been changing due to a population that is simultaneously declining and aging. 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 over 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, Table 6 shows the changing industrial composition of the employed workforce in Thunder Bay.

Table 6 shows employment trends in the goods- and service-producing sectors of Thunder Bay district's economy. Total regional employment has declined from 72,490 in 1986 to 67,975 in 2011, a decline of about 6.2 percent. As is the case with the overall regional economy, employment in the goods-producing sector has declined from 23,055 in 1986 to 11,775 in 2011, a decline of about 50.0 percent. During the same time, the service-producing sector has grown by about 14.0 percent. The share of the goods-producing sector in total regional employment has also declined from 31.8 percent in 1986 to about 17.3 percent in 2011. Notably, however, construction and mining have experienced increased employment from 2006 to 2011.

Table 6: Industrial Composition of the Employed Workforce Ages 15 and Older, Thunder Bay District, 2001–2011

	1986	**1991**	**1996**	**2001**	**2006**	**2011**
Goods-Producing Sector	**23,055**	**21,255**	**19,735**	**17,020**	**14,260**	**11,775**
Agriculture, fishing & hunting	855	875	835	955	990	755
Logging & forestry	3,110	1,725	1,660	1,265	1,160	600
Mining & quarrying	1,475	2,360	2,040	1,715	1,400	1,860
Utilities	2,200	2,395	2,225	775	840	800
Construction	3,525	4,220	3,900	3,365	3,445	4,180
Manufacturing	11,890	9,680	9,075	8,945	6,425	3,580
Wood industries	1,575	950	1,555	2,185	1,815	300
Paper & Allied industries	6,655	5,590	4,385	3,955	2,500	1,210
Service-Producing Sector	**49,435**	**54,720**	**52,415**	**53,555**	**57,195**	**56,200**
Trade	11,870	12,065	12,120	10,155	10,605	9,860
Transportation & warehousing	5,940	5,000	4,780	4,645	4,405	3,715
Finance , insurance, real estate and leasing	2,415	2,860	2,450	2,830	2,760	2,845
Professional, scientific and technical services	2,015	2,475	2,570	2,485	2,850	3,240
Educational services	5,530	6,030	5,755	5,510	6,460	6,170
Health care and social services	6,990	8,455	9,580	9,240	10,385	10,795
Accommodation and food services	5,240	5,545	5,515	5,450	5,690	4,875
Other services	3,840	3,960	4,635	8,205	8,840	7,720
Public administration	5,595	8,330	5,010	5,035	5,200	6,980
Total Employed Workforce	**72,490**	**75,980**	**72,145**	**70,570**	**71,445**	**67,975**

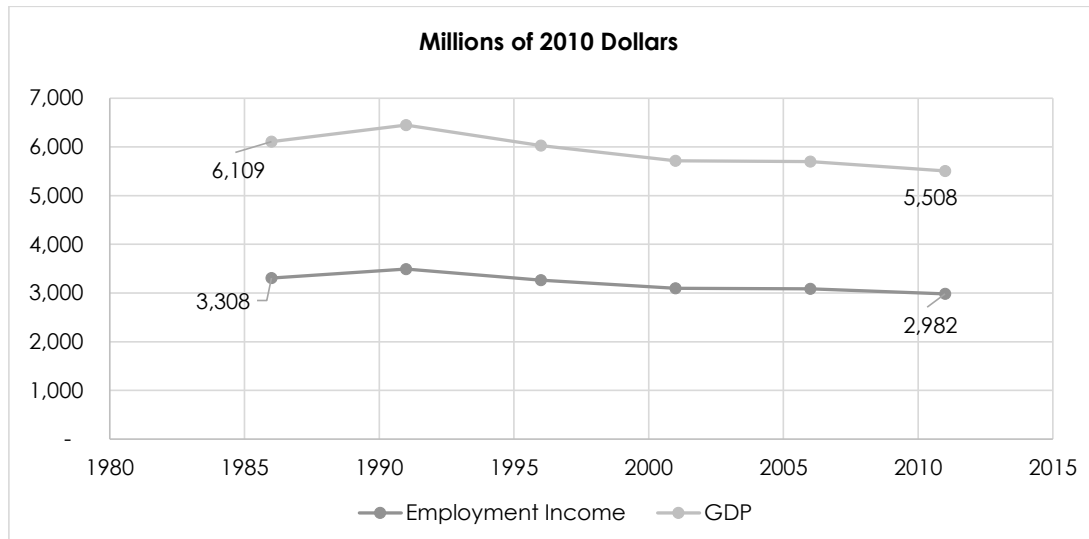*Source: Author's calculations based on Statistics Canada, National Household Survey 2011, custom tabulation.*

A shift in the industrial structure of the workforce in the Thunder Bay district was accompanied by a change in the occupational distribution of the labour force (Table 7). Employment in most occupational groups declined, except for business, finance, and administration; natural and applied sciences; health; and social science, education, government services, and religion. Figure 17 shows that total employment income and GDP declined in the Thunder Bay district by about 9.8 percent over the period from 1986 to 2011, due partly to declining employment and partly to the changing occupational structure of the employed workforce. The goods-producing sectors of the district's economy include high-wage and high-value-added industries, and their decline has not only affected the level of output, but also resulted in lower average earnings in the district.

Table 7: Employed Workforce by Occupation, Thunder Bay District, 1996–2011

National Occupational Classification 2006	2001	2011	Percentage Change (2001-2011)
A Management occupations	5,975	5,210	-12.80
B Business, finance and administrative occupations	10,315	10,485	1.65
C Natural and applied sciences and related occupations	3,260	3,965	21.63
D Health occupations	4,540	5,480	20.70
E Occupations in social science, education, government service and religion	6,215	7,645	23.01
F Occupations in art, culture, recreation and sport	1,325	1,235	-6.79
G Sales and service occupations	18,585	16,860	-9.28
H Trades, transport and equipment operators and related occupations	12,720	11,420	-10.22
I Occupations unique to primary industry	2,525	2,010	-20.40
J Occupations unique to processing, manufacturing and utilities	3,970	1,540	-61.21
Total	**69,430**	**65,850**	**-5.16**

Source: Statistics Canada, Census of Canada (various years), and National Household Survey 2011, custom tabulation.

Figure 17: Total Labour Income and GDP (millions of 2010 dollars), Thunder Bay District, 2001–2011

Source: Author's calculations based on Statistics Canada, Census of Canada (various years), and National Household Survey 2011, custom tabulation.

Recommendations

1. Market the city of Thunder Bay as the economic engine of the Northwest

While the population in Thunder Bay district has declined, the urban population has increased, reflecting the movements of people from rural to urban areas. Additionally, within the Thunder Bay Census Metropolitan Area, the skill level among the Aboriginal population is above provincial levels for both men and women. The urban core of Thunder Bay district has shown some promising signs of growth that should be marketed outside of the region.

2. Continue to foster female participation in the labour force

Labour force participation and employment rates declined among men, but rose among women from 2001 to 2011. The female population, whom have historically participated less in the labour force than males, are a key source of increasing workforce participation in the Thunder Bay district. This is true for Aboriginal, francophone and immigrant women as well.

3. Make Aboriginal education the number one priority in the region

Thunder Bay's population is not expected to experience much population growth in the decades to follow, however, the Aboriginal population is expected to grow by nearly 42 percent from 2013 to 2041. The population of working age Aboriginals will grow by 38 percent, increasing their share of the labour force from 11 percent in 2013 to 18 percent in 2041. Notably, human capital indexes for the Aboriginal labour force in Thunder Bay are higher than regional levels and roughly equivalent to national levels. However, given that the Aboriginal share of the population is increasing, and given that their human capital composition is lower than total working-age population in the Thunder Bay district, future labour productivity will decrease if education levels do not rise among this segment of the population. There is a strong evidence showing that higher skill levels increase the likelihood of participation in the workforce and reduce unemployment rates in Thunder Bay district.

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Northern Policy Institute is Northern Ontario's independent think tank. We perform research, collect and disseminate evidence, and identify policy opportunities to support the growth of sustainable Northern Communities. Our operations are located in Thunder Bay, Sudbury, Sault Ste. Marie, and Kenora. We seek to enhance Northern Ontario's capacity to take the lead position on socio-economic policy that impacts Northern Ontario, Ontario, and Canada as a whole.

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