

Immigrant Labour Market Requirements for Nova Scotia

Evidence for Increased Immigration

CONTEXT

The purpose of this paper is to demonstrate why more immigrants are needed in our province, to provide information about immigrant outcomes, and to outline the approaches that Nova Scotia has taken to increase immigration and assist with their integration.

DEMOGRAPHIC SITUATION IN NOVA SCOTIA

Population Decline

Nova Scotia has one of the oldest populations in the country and our region's labour force is shrinking. This provides strong support for the need to increase immigrant levels to Nova Scotia to address existing and expected labour shortages. The shortage of skilled labour in this region is a significant threat to our economic prosperity.

In summary, negative population growth in Nova Scotia would slow the growth rate of human capital formation, as well as of physical capital formation, both of which would impact adversely on the economic well-being of the resident population. Shortages in the availability of skilled workers, a decline in innovators, and shrinking markets for goods and services are all serious consequences of negative population growth.

Out Migration

In the years preceding the global recession, Nova Scotia was losing several thousand individuals per year to interprovincial migration. This is yet, another reason for Nova Scotia's shrinking population.

APPROACH TO IMMIGRATION

Provincial Immigration Strategy

The Province's new immigration strategy, Welcome Home to Nova Scotia, will provide the workers we need to grow the Nova Scotia economy and communities. Nova Scotia will continue to attract professional and innovative immigrants and ensure that they get the support they need to make Nova Scotia their home. Together, Nova Scotia is investing in the province's future. By 2020, the new immigration strategy is aiming to increase the total number of immigrants annually by 7,200, including 3,600 new nominees and their family members, and another 3,600 individuals through the federal immigration streams.

Nova Scotia Nominee Program (NSNP)

Competing internationally for talent and skilled workers and encouraging them to settle in Nova Scotia is the primary focus of the immigration program in our province. The Nova Scotia Nominee Program (NSNP) serves as one way of attracting skilled labour but we recognize that it is only one tool available to Nova Scotia within a comprehensive suite of Canadian immigration programs. The NSNP accounts for approximately 1/3 of all immigrant landings to the province. Attracting more professionally trained and internationally connected workers is crucial if we are to innovate,

compete, and grow. Since 2010, Nova Scotia's ability to nominate more people for immigration to meet our province's labour market needs has been capped at 500 nominations per year. The caps placed on all PN programs have been made based on historical levels of nominations that each province was able to make up until 2010. Nova Scotia disagrees that this is the correct distribution model.

Due to this cap, we are looking to increase the number of immigrants to the province by encouraging people to apply for immigration under Federal streams such as the Canadian Experience Class and through the Federal Skilled Worker stream if they have arranged employment. We are also participating in the Federal Skilled Worker Backlog reduction project as a way to increase immigration to our province.

LABOUR MARKET OUTLOOK IN NOVA SCOTIA

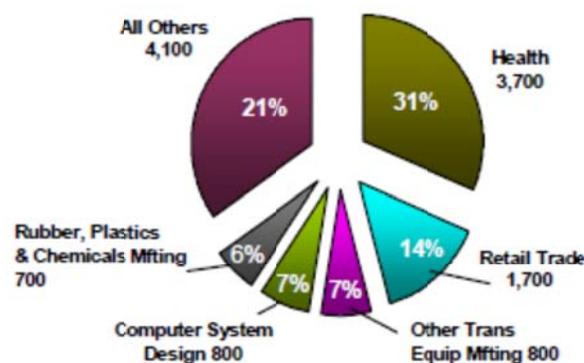
According to the Province of Nova Scotia's Spring 2011 Budget Forecast, growth in the economy will be positive in the years ahead, with real GDP forecast to grow to average 1.8 per cent over 2010 to 2015. While the impacts of the recent global recession are still lingering and unemployment remains elevated, its effects are fading. Major project investments include the large \$25 billion National Defence shipbuilding contract which will provide a much needed boost to the economy. It has been forecasted that approximately 8,400 jobs in Nova Scotia (11,500 at peak production) will be created.

More Jobs, Less Population

In the face of population decline, the Nova Scotia labour market is expected to generate additional jobs over the next five years.

Even today, business leaders say they simply cannot find people with the skills they need to take full advantage of exciting opportunities in changing markets.

Industrial Employment Growth Nova Scotia 2010-2015



EVIDENCE-BASED SUPPORT FOR INCREASED IMMIGRATION TO NOVA SCOTIA

A close examination of the future supply-demand conditions in Nova Scotia's labour market over the coming decade, highlights the important role immigration must play in responding to anticipated labour shortages. As the labour needs of employers in the province continue to grow within the context of an aging and shrinking workforce, it becomes more critical for immigration policy to align

with provincial labour market needs. Without changes to the current cap placed on Nova Scotia's Provincial Nominee Program, it is anticipated that the province's economy will fall short of its growth potential and expected labour shortages will be a significant challenge.

A methodology was developed to estimate the number of immigrant labour market requirements in Nova Scotia's labour market for the period of 2011-2020. Various data sources, assumptions and forecasting techniques were used within a two-stage estimation process. The analysis was undertaken by the Nova Scotia Department of Labour and Advanced Education, with the support of the Nova Scotia Department of Finance and the Office of Immigration. For a complete description of the methodology, please see Appendix 1.

Key Findings ¹

Based on results, the outlook for Nova Scotia's labour market suggests that demand for labour will exceed supply in the range of 10,000 to 15,300 by 2020, with the assumption annual immigration remains constant. With the unemployment rate projected to reach a notional 2.8%, there will be significant tension in the labour market, which could lead to consequences such as inflation, delayed major projects, eliminated positions and unsafe working conditions.

Adjustment in the labour market to the supply-demand imbalance can be expected. However, market responses through added inter-provincial migration and increased labour force participation may only address 50-70% of the projected shortfall in labour. As such, Nova Scotia's labour market requires an additional 2,800 to 8,000 workers through immigration by 2020 to ensure the needs of employers are fully met. Given many immigrants to Nova Scotia are too young (dependents) or choose not to work (such as stay-at-home mothers), or need time to navigate the credential recognition process, this implies overall immigration levels to the province would have to be 20-50% greater on average per year over the next decade to satisfy the labour market. This identified need highlights the inadequacy of the current target range of immigration to Canada of 240,000-265,000 immigrants per year as well as the processing limits placed on the Provincial Nominee Programs.

Detailed Results

Figure 1 shows that Nova Scotia's labour force is predicted to decline 2.9% over the period of 2011 to 2020. This would result in an estimated 14,600 fewer persons in the labour force compared to the base period. Furthermore, the declines might be expected to continue beyond the projection horizon given the working-age population in Nova Scotia (aged 18-64) is projected to decline an additional 10% over the following ten years (2020-2030).

Figure 1: Ex Ante Labour Force Projection ('000), Nova Scotia

Year	Overall	Age Group				Gender	
		15-24	25-39	40-54	55+	Male	Female
2011	496.4	78.0	142.1	180.6	95.6	251.2	245.2
2015	493.4	72.0	143.6	169.6	108.2	246.5	247.0
2020	481.8	62.1	142.9	152.0	124.9	238.7	243.2
# Chg 11-20	-14.6	-15.9	0.7	-28.6	29.2	-12.5	-2.1
% Chg 11-20	-2.9%	-20.4%	0.5%	-15.8%	30.6%	-5.0%	-0.8%

Note: 2011 are estimated values based on (Jan-Nov) year-to-date analysis

¹ See Appendix for a detailed explanation of the methodology used.

The youth labour force (ages 15-24) is projected to decline 20%, while the labour force aged 55 and over is estimated to grow 30%. These combined trends will lead to an older workforce; currently in Nova Scotia, 1 in 5 workers are aged 55 and over, while an estimated 1 in 4 will meet the criteria by 2020.

A change in labour force can be decomposed into three effects (population growth, population shift, and participation rate). Figure 2 shows the contributions of each individual effect underlying the projected change in Nova Scotia's labour force over the period 2011 to 2020. The results imply that without the expected gains in labour force participation, the combined population effects would lead to a decline in Nova Scotia's labour force of 35,500 over 2011-2020. The overwhelming population shift effect is a result of a growing proportion of individuals moving into age groups with relatively lower participation rates.

Figure 2: Sources of Labour Force Change ('000), Nova Scotia, 2011-2020

Effects	Overall	Age Group				Gender	
		15-24	25-39	40-54	55+	Male	Female
Population Growth	-3.6	-17.8	1.2	-34.3	21.4	-3.9	0.1
Population Shift	-31.9	-0.2	0.0	-0.1	-5.6	-15.3	-16.5
Participation Rate	21.0	2.2	-0.4	5.8	13.4	6.7	14.3
Total Change in LF	-14.6	-15.9	0.7	-28.6	29.2	-12.5	-2.1

Supply-Demand

Combining the outlook for labour supply with projected labour demand allows for the analysis of aggregate imbalances in the labour market (prior to adjustment). Presumably, there is no exact point when a labour market enters/exits a state of shortage/surplus, but rather operates within a continuum of each state. Following this logic, it's permissible to observe shortages during a recession, although they are more likely isolated in particular regions or industries. When labour supply falls within and below the range of demand, the labour market is assumed to respond to the shortage through various channels of adjustment (e.g., migration, increased participation).

Figure 3: Ex Ante Labour Supply/Demand ('000), Nova Scotia, 2011-2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Supply	496.4	496.3	495.5	494.6	493.4	491.8	489.5	486.9	484.4	481.8
Demand(5.5)	478.7	482.8	484.2	486.7	488.8	488.8	489.8	491.6	492.7	491.8
Demand(6.5)	483.8	487.9	489.3	492.0	494.1	494.0	495.1	496.9	498.0	497.1
Supply - Demand(5.5)	17.7	13.5	11.4	7.9	4.6	3.0	-0.3	-4.7	-8.4	-10.0
Supply - Demand(6.5)	12.6	8.4	6.2	2.7	-0.7	-2.2	-5.6	-9.9	-13.6	-15.3

Note: Demand(5.5) and Demand(6.5) refer to excess worker requirements of 5.5% & 6.5%, respectively, above projected employment

Figure 3 shows the projected labour supply/demand results over 2011-2020. Over the coming decade, the combination of declining labour supply and growing labour demand will lead to significant labour shortages of between 10,000 and 15,300 workers by 2020. This decline will begin as early as 2015.

Figure 4: Ex Ante Labour Supply/Demand, Nova Scotia, 2011-2020

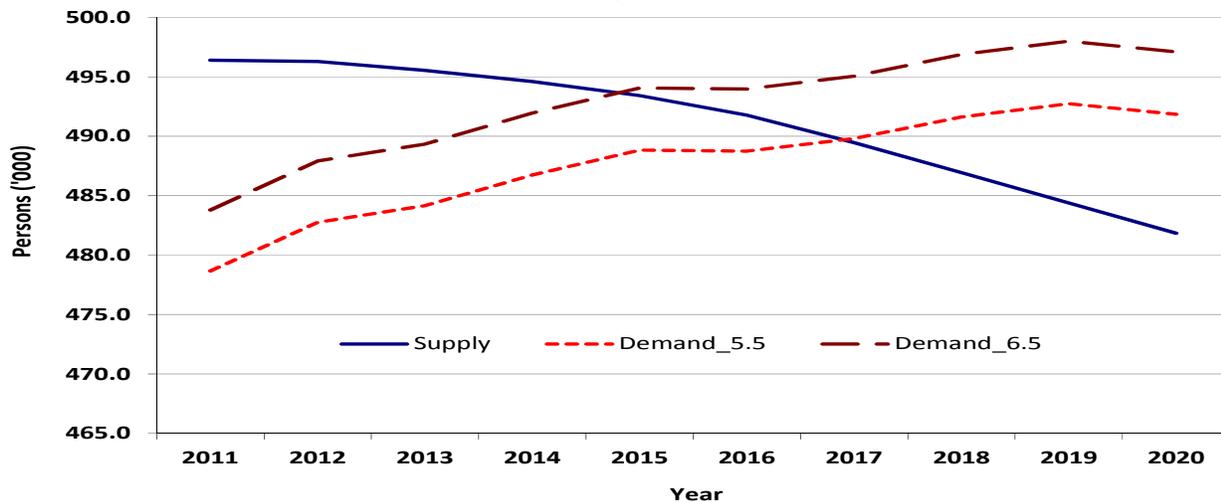


Figure 4 shows the results graphically. Over the period of 2011 to 2015, the excess supply of labour in Nova Scotia diminishes to zero. Over the following two years, labour supply may be insufficient to meet the needs of the labour market, as labour supply falls within the two demand estimates. By 2020, there is a projected shortage of 10,000-15,300 workers, and the unemployment rate reaches 2.8%. These extreme conditions could lead to consequences such as cost increases, delayed major projects, lost jobs and unsafe or unsatisfactory working conditions.

Interprovincial Migration and Labour Force Participation

A second analysis models the expected adjustment due to potential inter-provincial migration and labour force participation in response to the labour market imbalance to identify whether their combined effects might fill the gap in labour. If not, additional immigration becomes a viable and effective solution to the outstanding shortages, and thus preventing reductions in demand.

While Nova Scotia’s labour market is expected to tighten over the coming decade, most other labour markets across Canada are expecting similar pressures.² This explains the limited net inter-provincial migration response to the projected labour market conditions. Over the period 2015-2020, net inter-provincial migration is estimated to provide an additional 2,000 persons to Nova Scotia (1,300 labour force participants) compared to the base scenario.³

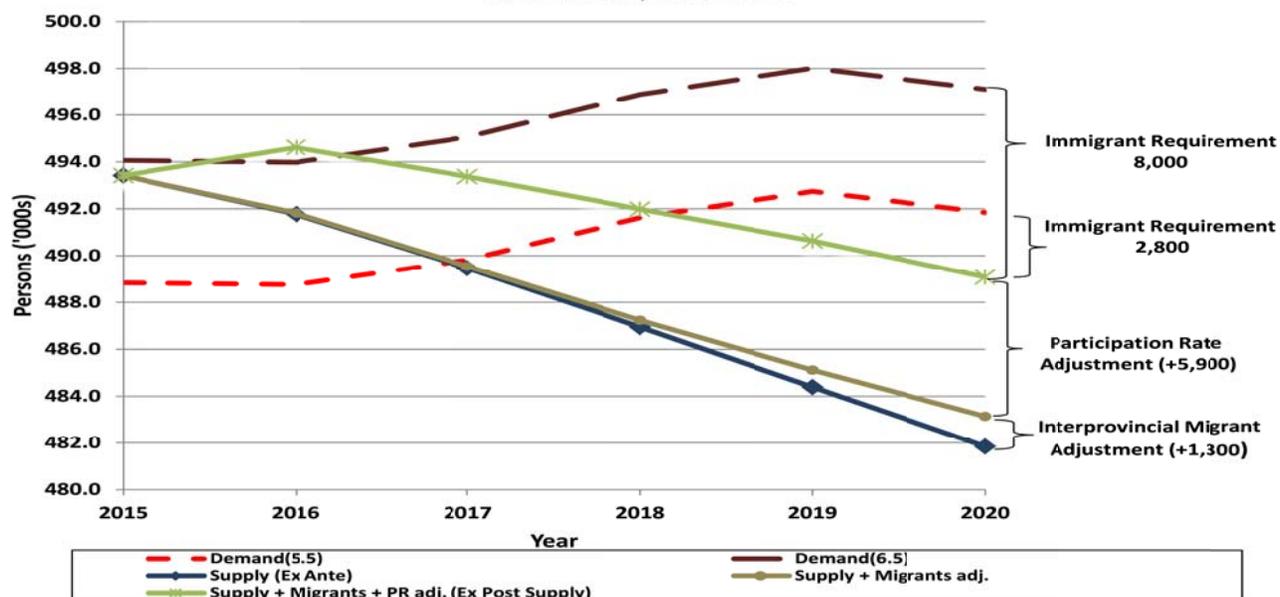
IMMIGRANT REQUIREMENTS

The result of the analysis suggests the magnitude of the predicted shortage is not likely to be addressed through supply-side market adjustment alone. To avoid the negative consequences of a prolonged labour shortage, and inevitable demand-side “dampening”, Nova Scotia’s labour market requires additional labour supply through immigration of 2,800 to 8,000 by 2020 as shown in Figure 5.

² The Nova Scotia-Canada unemployment rate ratio is projected (by the Conference Board of Canada) to decline from 1.18 to 1.10 over 2015 to 2020.

³ This is an average net gain of 400 per year over the base case estimate, which averages -1,240 per year.

Figure 5: Forecast of Demand and Supply of Workers, Nova Scotia, 2015-2020



Not all immigrants to Nova Scotia, however, can be expected participate in the labour force, which is true for the general population as well. Many new immigrants are either too young to work (children), have retired, choose to stay home to raise children or face barriers to finding employment. Based on historical patterns, it is estimated that 6 in 10 immigrants to Nova Scotia will be in the labour market. As such, Nova Scotia would require 20-50% more immigrants each year over the next decade to satisfy the immigrant labour market requirements. This amounts to immigration of at least 3,000-3,800 per year over 2011-2020.

The link between immigrant labour market requirements and overall immigration levels relates to the behaviour and age-structure of immigrants, in addition to the barriers they face in finding employment. On average, 30% of immigrants to Nova Scotia are outside the core working-age (25-64 years), and many of those of working-age choose not to work. Assuming the age-structure of immigrants and relative rates of labour force participation continue into the future, overall immigration levels to Nova Scotia would have to be 1.66 times the estimated immigrant labour market requirements to satisfy the labour market.⁴

The current excess supply of labour in Nova Scotia is projected to disappear as early as 2015, at which point more skilled, employable workers will be needed in the province for many years to come. This provides a limited amount of necessary lead time for appropriate planning and capacity building to ensure effective integration of new arrivals. Taking immediate steps to align immigration policy with provincial labour market needs appears necessary to avoid the undesirable consequences of a labour shortage.

⁴ Relative participation rates between immigrants and the overall population of Nova Scotia (using 2006 Census data) were measured and applied to the projected *ex post* participation rates to obtain age-group scalars. Cohorts of immigrants 6-10 years since migration were used in the calculation to better reflect potential labour supply, since new immigrant participation rates are constrained by barriers facing them, such as foreign credential recognition and employers requiring Canadian work experience.

IMMIGRANT OUTCOMES – IMMIGRANTS ARE DOING WELL IN NOVA SCOTIA

Given the need for more immigrants in Nova Scotia, we must also state how immigrants who are coming to Nova Scotia are doing. Compared to other parts of the country, immigrants in Nova Scotia are very successful. The following data is derived from research conducted by Dr. Ather Akbari.⁵ Dr. Akbari (Professor and Economics Researcher at Saint Mary's University in Halifax, NS) is currently updating this data based on the CIC Permanent Resident Data Set (PRDS), Immigration Database (IMDB), and the Labour Force Survey.

Overall, existing data has determined that:

- Immigrants in Nova Scotia are responsible for a large part of the labour force growth that has occurred in recent years. Nova Scotia will be dependent on migrants (internationally or inter-provincially) for future labour force growth.
- Recent immigrants (arrived in previous 5 years) to Nova Scotia are on average younger and better educated than the non-immigrant population. (Data from 2006 Census)
- Immigrants to Nova Scotia, when compared with the non-immigrant population, have equivalent or superior labour market outcomes such as; higher labour force participation rates, lower unemployment rates and higher earnings.
- Retention rates increased during period 2000-2006 compared to the 1990s; immigrants who stayed in Nova Scotia earned more money and were less likely to be receiving social assistance compared to those who left the province.

Immigrant Earnings:

- An average immigrant resident in Canada earned about \$780 in weekly earnings in 2009. In Nova Scotia, the average immigrant earned \$807 in weekly earnings.
- An average recent immigrant (arriving in the previous 5 years) also earned more on weekly basis in Nova Scotia than in Canada overall (\$665 versus \$640).
- Immigrants aged between 25-44 years start to earn more than the equivalent non-immigrant, and continue to earn more up to the age of 65+.

Education Levels:

- About 42 percent of immigrants who reside in Nova Scotia have a university degree, while only 17 percent of all Nova Scotians have a university degree.

Unemployment Rate:

- In 2009, the unemployment rate among all immigrants in Canada was 10 percent. In Nova Scotia, however, the immigrant unemployment rate was lower – 7.4 percent only. Therefore, the human capital of immigrants has made a positive economic contribution to Nova Scotia.

⁵ Akbari, Ather. "Labour Market Performance of Immigrants in Smaller Regions of Western Countries: Some Evidence from Atlantic Canada", [International Migration & Integration](#), Published online: 18 March 2011

Akbari, Ather. "Socioeconomic and Demographic Profiles of Immigrants in Atlantic Canada: 1981-2008". Report prepared for the Atlantic Canada Opportunities Agency. www.atlantic-metropolis.net

- Among recent immigrants (those who had arrived over the past five year period), the unemployment rate in Canada was 15 percent. In Nova Scotia, the rate among such immigrants was lower, 10.7 percent.

Job Types:

- About 21,300 Immigrants worked in the province in 2009. Most popular sectors among them are in management; sales and services; social science, education, government and religion; and business finance and administrative jobs.
- About 88 percent of immigrants work in the service-producing industries. Most popular services industries include health care and social assistance; education; trade; and professional, scientific and technical services.

Urban and Rural Jobs:

- Many immigrants are now finding jobs in rural Nova Scotia. Between 2006 and 2009, immigrants in the rural labour force rose by about 47 percent. Out of 5,600 immigrants who had come to the province during 2004-09, about 1,200 found jobs in rural Nova Scotia. Most of them work in service producing sector.

Immigrant Retention in NS:

- In 2001, only about 48 percent of immigrants who had arrived in Nova Scotia during the past five years were still residing in the province. In 2006, about 64 percent of immigrants who arrived in the province during the previous five years were still residing there. Immigrant inflows in the province have also increased by about 52 percent since 2001.
- The retention rate of immigrants in Nova Scotia has steadily increased from 48 per cent during the census period of 1996-2001 to over 70 percent during the period of 2001-2006.
- More immigrants to the province are coming as provincial nominees (PNs).

	2003	2004	2005	2006	2007	2008	2009	2010
Nova Scotia Nominees	0	64	326	863	900	866	833	638
All Economic Immigrants (NS)	734	1,000	1,223	1,774	1,790	1,828	1,690	1,685

- Between 2003 and 2010, almost 40% of all economic category immigrants to the province were nominees.

Why are Immigrants doing so well in Nova Scotia?

Several hypotheses are suggested for why immigrants in Nova Scotia are succeeding compared to non-immigrants including: less competition with non-immigrant university holders, lack of ethnic enclaves promoting better interaction with non-immigrant community, selection of new arrivals in the NSNP, and different countries of origin. Another reason are the settlement supports we provide them.

IMMIGRANT SUPPORTS IN NOVA SCOTIA

The Province of Nova Scotia recognizes that with our changing labour market and mismatch between our population's existing skills and the new skills needed that retraining opportunities will be required. Programs have been put in place through the Workforce Strategy to help business improve their productivity and their workforce including the Workplace Innovation and Productivity Skills incentive, Workplace Education, a Welcoming Workplaces initiative to promote diversity, and careers initiatives to develop better ways to link workers with employers.

Immigration and improving retention rates are priorities for Nova Scotia, as evidenced by the significant amounts of funding allocated to successful settlement and integration. The Nova Scotia Office of Immigration invests just over 50 per cent of its budget funding settlement programs for immigrants. Settlement funding has increased since the Office was established in 2005 and provincial Labour Market Agreement (LMA) funds have also provided another funding avenue since 2008. In 2011-12, almost \$5.0 million was invested in integration and labour market support programs by funding programming to immigrant service providing organizations. An additional \$7.0 million was also allocated to settlement and integration via CIC.

Over the last decade, Nova Scotia has continually led the way in innovative settlement programs, especially in pre-arrival supports. Immigrant Settlement and Integration Services (ISIS) is the leading deliverer of settlement services in Nova Scotia and provides the full range of programs and services along the settlement and integration continuum to 3,500+ clients annually in 34 communities across Nova Scotia. ISIS is also the primary contact in Nova Scotia on refugee, settlement and immigration issues for 2,000+ organizations, employers, government departments and individuals annually.

Currently, ISIS has online programming in pre-employment, language and business. This has allowed ISIS to deliver pre-arrival services. ISIS, NSARDA, and FANE, in partnership with the Nova Scotia Office of Immigration, has developed a new way of offering pre-arrival and post-arrival services and will be called Nova Scotia Start. It is already up and running, with an official launch happening in March 2012. With Nova Scotia Start, the emphasis will be on better preparing for a newcomer's coming by providing information and services and a settlement plan pre-arrival.

Nova Scotia Start will be available to all immigrants coming to or landed in Nova Scotia. Nova Scotia Start will provide quality and consistent settlement services, information, needs assessment and referral services wherever a person settles in Nova Scotia and it will be flexible and responsive to the individualized needs of clients. Additionally, clients will leave with a standardized settlement plan.

The pre-employment, language and business online programs offered by ISIS will play a pivotal role in pre-arrival services to newcomers in their home countries, ensuring that newcomers will receive quality employment and settlement planning information before they move, which will better prepare them, both professionally and personally, to successfully settle in the province.

Other funded supports include work placements, wage subsidies, career access fund for FQR-related expenses and an immigrant small business loan program. Settlement services are offered in both English and French, and immigrant navigators throughout the province provide supports or immigrants in rural communities.

Foreign Credential Recognition & the Multi-Stakeholder Working Groups

ISIS has established multi-stakeholder working groups in the regulated fields that have high number of immigrant applications. Each of the working groups involves essentially the same group of key stakeholders in that profession, so the professional association or occupational regulatory body, educational institution (university, college, and continuing education), government (Nova Scotia Office of Immigration and other departments), employer representatives, association of internationally educated professionals, settlement employment and language providers and other.

The goals of the working group are to ensure fair, transparent, and equitable processes for the assessment of international qualifications in a particular profession; provide training and supportive programs to assist newcomers with the assessment process and preparation for practice; development of employment and bridging programs to facilitate the workforce integration of skilled newcomers; and creation and development of innovative and workable solutions. This model has met with overwhelming success and support within the community, and in a number of cases it has resulted in systemic change in licensing procedures. This approach has also been the catalyst for engaging professions to develop their own bridging programs for internationally educated professionals.

Nova Scotia also began implementing the Fair Regulation Practices Act in 2010 and works closely with regulators on this front.

PUBLIC PERCEPTION ON IMMIGRATION

Prior to the eighth annual Pierre Elliot Trudeau Foundation Conference on Immigration in November 2011, a national survey was conducted of Canadians about their views on immigration in Canada. Based on respondents, the Canadian public (59%) believes overall that immigrants are doing well with respect to finding gainful employment. 47% stated that immigration is making Canada a better place and 74% say it would be better if immigrants were more evenly distributed across the country.

According to an Angus-Reid poll released on January 31, 2012 the proportion of Canadians who believe immigration is having a negative effect in the country is the lowest in the past four years and the main concern appears to be illegal immigration not with immigrants legally entering the country.

It is important to note that although public opinion is a key consideration when making policy decisions on immigration it should not be the only consideration as most Canadians do not fully understand the complexities of immigration and the labour market.

CONCLUSION

Given the evidence-based facts presented in this paper, public perception, immigrant outcomes and the high level of supports the Province provides to newcomers, it is evident that more immigrants are needed in our province to support the upcoming labour needs. The ability for Nova Scotia to determine where these needs exist and therefore attract qualified individuals who will meet those needs is critical.

As the data presented itself, Canada needs to seriously consider increasing the total number of immigrants coming to Canada to 285,000 or 300,000. As well, the processing limits placed on

nominee programs will not allow our province to meet the upcoming shortfalls in our labour market and will require working with CIC to increase nominations for Nova Scotia.

Remaining at 500 nominations is not a sustainable model for Nova Scotia, as the economy and the population will be detrimentally affected if action is not taken to reverse the trends that we are seeing now. We need to increase the number of immigrants coming to Nova Scotia through all immigration classes, including the Canadian Experience Class, Federal Skilled Workers (arranged employment) and even private refugee sponsorship, etc. We are taking measures to increase immigration from all categories in order to mitigate these impacts but we need to continue a productive dialogue on what is the optimum level of immigration that needs to come to Canada to keep our country vibrant and our businesses strong.

APPENDIX

Methodology

Stage 1 – Ex Ante

The first stage involved the development of *ex ante* projections of labour supply and demand; that is, the outlook for the labour market without incorporating adjustment to projected supply-demand imbalances. This first step is common to most labour market forecasting models, including the Canadian Occupational Projection System (COPS), as it provides a useful basis for examining conditions and planning appropriate responses.

The demand projection is an estimate of labour requirements, which reflects both expected employment and a requirement for excess workers. The employment growth forecast used in this analysis was produced by the Conference Board of Canada in November, 2011, and reflects the expected impact of the recently awarded \$25 billion shipbuilding contract. The latter component (excess worker requirements) recognizes that a “healthy” functioning labour market occurs not in a zero unemployment environment, but rather with some minimum excess labour to accommodate structural, frictional and seasonal realities.⁶ The range of 5.5-6.5% is used to measure the excess worker requirements above employment for Nova Scotia.⁷ As a comparison, British Columbia’s labour supply-demand forecasting model uses a measure of 6%. The range lies well below the 30-year average unemployment rate for Nova Scotia (10.8%) and its historical low in 2008 (7.7%), implying that results lying within or below the range should be cause for great concern.

The *ex ante* labour supply outlook is an estimate of the labour force under particular base scenarios for population and labour force participation.

- A custom population scenario was produced by the Nova Scotia Department of Finance largely resembling the official base case population scenario for the province, with the exception of immigration being held at current levels. Constraining immigration is a necessary condition to ensure proper interpretation and application of the supply-demand results. Births, deaths and inter-provincial migration are assumed to follow historical patterns.
- An age-gender cohort entry/exit rate approach is used to project participation rates, which follows the approach applied by British Columbia Stats⁸ and developed by the Organization for Economic Co-operation and Development (OECD).⁹ A Hodrick-Prescott (HP) filter is applied to the results to smooth the data and capture the long-term trend. For ages 15-19 and 70 and over, the entry-exit cohort approach cannot be applied. Instead, their recent 10-year trends were extrapolated forward.
- The labour force (supply) projection is the multiple of population and labour force participation rate, computed at the age-gender level.

Stage 2 – Ex Post

More advanced labour market models attempt to capture the expected adjustment following a predicted supply-demand imbalance. Depending on the intended use of the information, this step may be desirable since long-term *ex ante* labour market projections may produce unrealistic results, such as negative unemployment.

⁶ In Nova Scotia, for instance, peak-season employment varies 4-5% above the annual average.

⁷ The intuition of an excess worker requirement rate is similar to the lowest sustainable rate of unemployment (LSRU) and non-accelerating inflation rate of unemployment (NAIRU), which economists generally believe to be in the range 6%. Fortin, P. (2000), *Macroeconomic Unemployment and Structural Unemployment*, Canadian Public Policy, vol. xxvi.

⁸ Schrier, D. (2010). *British Columbia Labour Force Participation Rate Projections: A Cohort Analysis Model*. BC Stats, Ministry of Advanced Education and Labour Market Development.

⁹ Burniaux, J.M., R. Duval and F. Jaumotte (2003). *Coping with Ageing: A Dynamic Approach to Quantify the Impact of Alternative Policy Options on Future Labour Supply in OECD Countries*. OECD Economic Department WP. N. 371.

A labour market can adjust through various supply-side and demand-side mechanisms. On the demand-side, for example, a shortage may lead to increased labour costs and a substitution toward other factors of production (resulting in job losses). On the supply-side, a shortage in labour may lead to increased labour force participation, inter-provincial migration and international migration.

Empirical research has shown that differing labour market conditions across regions contributes to inter-provincial migration patterns, among other factors. A fixed-effects model, following the specification of Coulombe (2006), is used to estimate the impact of provincial structural differences in unemployment rates on net inter-provincial migration rates.¹⁰ While Nova Scotia's labour market is expected to tighten over the coming decade, most other labour markets across Canada are expecting similar pressures, suggesting a limited response through the inter-provincial migration channel.

A labour shortage could also lead to additional labour force participation among the current population, beyond the trends estimated in the *ex ante* stage. The relationship between participation rates and labour market "tension" is estimated using OLS regression with fixed provincial effects and a lagged dependent variable; the estimator was run separately for eight age-gender groups. A variable for labour market "tension" is derived using unemployment rate data, where a current period's estimate is the difference in the current unemployment rate from a six-period moving-average unemployment rate.¹¹ Positive values indicate a labour market is "loosening", since unemployment is elevated above recent historical levels, while negative values indicate a labour market is "tightening" and job opportunities are growing.

The labour supply adjustments to the inter-provincial migration and participation rate responses, due to a tightening labour market, are calculated as corrections to the *ex ante* population and participation rate values using the coefficients from the regression analysis and the forecasted unemployment rate.

The *ex post* projection of labour supply is therefore the sum of three components:

$$\begin{aligned} \text{Ex Post Labour Supply} &= \text{Ex Ante Labour Supply} \\ &+ \text{Net Inter-provincial Migration Adjustment} \\ &+ \text{Participation Rate Adjustment} \end{aligned}$$

Immigrant Requirements

The need for additional immigrant workers is calculated as:

$$\text{Immigrant Labour market Requirements} = \text{Labour Demand} - \text{Ex Post Labour Supply}$$

¹⁰ Coulombe, S. (2006). *Internal Migration, Asymmetric Shocks, and Interprovincial Economic Adjustments in Canada*, International Regional Science Review, vol. 2, 199-223.

¹¹ Varying lag lengths (from 1 to 10) were tested for the moving average component. The chosen lag length optimized the provincial average correlation between the new series and Statistics Canada's help-wanted index (Table 277-0001). An optimal correlation of -0.75 was found.